AN HISTORICAL INVESTIGATION AND BIBLIOGRAPHY OF NINETEENTH CENTURY MUSIC PSYCHOLOGY LITERATURE

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

David Medford Butler, B.Sc., M.A.

* * * * *

The Ohio State University

1973

Reading Committee:

Professor Keith Mixter

Professor Norman Phelps

Professor William Poland

Approved by

William Poland

Adviser
School of Music

ACKNOWLEDGMENTS

I wish to thank Professors Keith Mixter and Norman Phelps for serving on the reading committee. Professor Phelps' historical insights and Professor Mixter's bibliographic expertise were of great value to this study.

My sincerest appreciation is extended to my adviser, Professor William Poland. His high standard of scholarship, genuine interest, and creative talent are reflected in every portion of this study. I will, of course, assume responsibility for any substantive error or lack of clarity in expression which may be found.

Special thanks are due Mr. Thomas Whitney of The Ohio State University Instruction and Research Computer Center. Without his sincere interest and remarkable acumen, the computer storage, retrieval, and printing of the entire dissertation could not have been accomplished.

My warmest thanks are given to my wife, Ruth, both for her constant encouragement and her great help as proofreader and typist.

VITA

June 19, 1943 . . . . Born - Dayton, Ohio

1965 . . . . B.Sc. in Music Education, The Ohio State University

1966 . . . . M.A. in Music Theory, The Ohio State University

1967-1969 . . . . Teacher, East Cleveland City Schools

1969-1970 . . . . Teacher, Columbus Public Schools

1971-1973 . . . . Teaching Associate, The Ohio State University School of Music

FIELDS OF STUDY

Major Field: Music Theory

Studies in Behavioral Theories of Music and Contemporary Theories of Music. Professor William Poland.

Studies in the History of Music Theory. Professor Norman Phelps.

Studies in Music Theory. Professors Charles Vedder and Harold Luce.

Studies in Music History. Professor Herbert Livingston.

TABLE OF CONTENTS

VOLUME II: A BIBLIOGRAPHY OF NINETEENTH CENTURY MUSIC PSYCHOLOGY LITERATURE

LIST OF TABLES AND FIGURES

Figure | Page

INTRODUCTION

Purpose

It is the purpose in this study to describe the development of the field of music psychology in the nineteenth century by:

1. presenting a comprehensive bibliography of music psychology literature published during the period 1800-1900;
2. extracting from this bibliography evidence of both individual studies and trends of investigation relevant to current investigation in music psychology;
3. showing relationships of the literature of music psychology during the nineteenth century to current research, tracing developments in areas most extensively investigated during the past and present century;
4. showing what effects psychological studies had upon musical scholarship during the nineteenth century;
5. investigating the ideological bases of inquiry of several important theories of music written during the nineteenth century, showing the degree to which several leading nineteenth century music theorists were

influenced by psychophysical data or by evidence derived from psychological investigation.

Outline of Volumes and Chapters

Volume I

Chapter 1 is a survey of the field of music psychology through a quantitative study of the literature. In order to study the broadest outlines of the field, only texts containing a general presentation of music psychology were selected for investigation and comparison. Inclusions and emphases of subjects in the two most recent texts, by Lundin (1967) and Farnsworth (1969) are described and compared at length. These texts are then compared for subject content and subject emphases with three important earlier general music psychology texts by Mursell (1937), Seashore (1938), and Schoen (1940).

Four scholarly journals exist which together afford the reader a body of periodical literature related to music psychology. The editors of *Psychological Abstracts* index what psychologists observe to be music psychology literature. The *Journal of Music Theory* and, to a greater extent, the *Journal of Research in Music Education* contain what musicians observe to be music psychology literature.

The Journal of the Acoustical Society of America contains psychoacoustical literature; psychoacoustics has been presented as an integral part of the study of music psychology from the time the first general music psychology text, Stumpf's Tonpsychologie (1883-90) was published.

Expositions and emphases of subjects presented in these four journals were investigated in an identical manner to the subject analyses of the five twentieth century music psychology texts.

Chapter 2 is a study of several areas of music psychology investigation which, on the basis of the amount of literature related to each, were judged to be of primary importance in the field. These judgments were made as a result of insights provided by the bibliography of nineteenth century literature in Volume II and the body of twentieth century literature investigated in Chapter 1. These areas of investigation are: (1) the study of the perception of pitch, timbre, and consonance, (2) the investigation of the affective properties of music, and (3) the study of musical ability.

Chapter 3 is an historical investigation of music psychology during the nineteenth century, together with a study of its relationship with musical activity during that period. Helmholtz emerges as the most important historical figure in this investigation. The chapter includes studies of (1) literature which influenced Helmholtz, (2) Helmholtz's influence upon activity in music and in music psychology, and (3) developments in music psychology after the publication of Helmholtz's Tonempfindungen (1863).

Chapter 4 is a survey of several influential nineteenth century music theory texts. The purpose of this survey is to examine the evidential bases given, by leading theorists of the period, in support of their fundamental theoretical premises; i.e., their bases for the definitions of the most basic elements of music. The primary goal in this study was the assessment of the influence of music psychology literature on activity in the field of music theory during the nineteenth century.

Chapter 5 is a summary of data presented in Volume I.

Volume II

Volume II of this dissertation is a partially annotated bibliography of music psychology literature from the period 1800-1900. For the benefit of those who may want to use this bibliography for their research purposes, an author alphabetized listing and a subject indexed and language indexed listing are provided. The bibliography has been indexed into a computer information storage and retrieval system to allow selective orderings of entries and to reduce the likelihood of compilation error. This storage procedure allows retrieval of entries by author, date or date range, language, general or specific topics, publisher, journal, city of publication, or any combination of these categories. Since the bibliography contains 895 entries, the flexibility afforded by this storage system should be of considerable time saving value to those who approach it with specialized scholarly needs. This computer project was made possible by technical assistance and funding provided by the Instruction and Research Computer Center of The Ohio State University. The bibliography is stored on tape; information concerning acquisition of a copy of this tape may be obtained through The Ohio State University Instruction and Research Computer Center Library. A copy of the program used to generate the subject indexed and language indexed listing of the bibliography is given in Volume II (see infra, p. 460).

Entries in this bibliography are presented in American Psychological Association bibliographic entry form, modified only in that the publication date immediately follows the author. It will be noted that at times authors' first initials are given, and at other times full names are given. Although entry uniformity was judged to be important, available information was judged to be more important: many entries in the bibliography are from sources not generally encountered in normal music psychology reading activities.

The bibliography is based primarily on the holdings of the Information Retrieval System supported by The Ohio State University School of Music; without this source, the task of compiling the bibliography would have been immensely more difficult. The Information Retrieval System indexes information about documents related to music theory. The use of the term 'music theory' in this context corresponds to Haydon's (1941, p. 10) definition: "Music theory is, in a sense, the principal section of systematic musicology." Literature currently being indexed into the System includes documents relating to the organized study of music theory, music education, music sociology, music psychology, musical acoustics, and the musical use of computers.

Compilation procedures included the survey of references cited in available music psychology texts, experimental music psychology periodical literature, and histories of psychology. Major bibliographic sources were Chandler and Barnhart's (1938) _A bibliography of experimental aesthetics, 1864-1937_, Rand's (1905) _Bibliography of philosophy, psychology, and cognate subjects_, Mecklenburg's (1962) _Bibliographie einiger Grenzgebiete der Musikwissenschaft_, and the music indices of the catalogues of the New York Public Library and the Library of Congress. Additional bibliographic data were solicited from leading investigators of music perception phenomena, most notably: Dr. Reinier Plomp of the Institute for Perception TNO, Soesterberg, The Netherlands; Dr. Juan Roederer of the University of Denver, and Dr. W. Dixon Ward of the Hearing Research Laboratory, The University of Minnesota.

Volumes I and II of this dissertation are directly related in that entries from the bibliography are used as evidential bases for statements found within the first volume. Reference data in Tables 12 (infra, p. 67), 13 (infra, p. 70), 14 (infra, p. 71), 15 (infra, p. 72), 16 (infra, p. 75), 17 (infra, p. 78), and 18 (infra, p. 80) in Chapter 2 are extracted from this bibliography; nineteenth century music psychology literature which is cited in the body of the text in Volume I may also be found in the References section for this volume.

The bibliography is intended to be a source of literature in a field which has a highly diffused and largely unknown body of literature. Not all of the documents entered in the bibliography were seen; it is probable that a primary investigation of these documents would result in the discovery of a number of other documents which should be included in the bibliography.

The subject indexed listing of the bibliography is the product of a subject coding system which was generated by insights provided in the topographical outline of music psychology presented and discussed in Chapter 1. A copy of the coding log used to subject index the bibliography is given in Appendix A (infra, p. 457). A copy of the program used to generate the subject and language index of the bibliography is given in Appendix B (infra, p. 460). The average number of subject coding designations per entry was two; the largest number of subject codings for any document was seven. In a simple extension of the program, much more detailed indexing of documents is possible. The Introduction to the second volume (infra, p. 176) contains a description of the subject and language distributions in the subject indexed and language indexed listing of the bibliography.

CHAPTER ONE

A DESCRIPTION OF CURRENT AND NINETEENTH CENTURY CENTERS OF INQUIRY IN MUSIC PSYCHOLOGY

Introduction

Possibly the deepest underlying problem facing the field of music psychology is its very identity. The field is an aggregation comprised both of musicians and of psychologists, each group serving in the dual capacity of contributor to the literature and as reader of it. This identity problem is most readily evidenced throughout the literatures related to the studies of psychophysics, musical properties, and musical perception. All too frequently, these discrete areas of investigation are confused; invariably, the result of such confusion is misinformation. It would serve no constructive purpose to indict one party or the other. It is more advantageous to view the field as a data spectrum which transcends the disciplines of music and psychology. At various places on this spectrum exist uncomfortable topical interfaces. The discomfort is attributable to language systems which differ most drastically when the same term is taken to mean two very different things. In order to better understand this situation, one needs only to compare some definitions for terms in the English and English (1958) A comprehensive dictionary of psychological and psychoanalytical terms with the musical definitions for those terms. The English and English dictionary is the principal authoritative dictionary of psychological, physiological, and psychiatrical terms available in the English language. The work is a commendable effort to be both descriptive and prescriptive. The authors took special care to clarify nomenclature and attempted to remedy some common terminological faults which exist in the field of psychology; examples of this effort may be seen in the entries for neologism, adiadochokinesis, phobia, and bogus erudition. The authors also attempted to account for musical interpretations of many problematic terms such as pitch, dominant, chromatic, scale, and interval. Their efforts in this pursuit are doubtless more diligent than are those of experimentalists in either the field of psychology or of music. It is revealing, then, to note terms in this dictionary which are defined and/or interpreted differently by musicians. These terms are so basic to musicians that the Harvard dictionary of music, the standard one volume reference work for musicians, does not enter them. I synthesized suitable musical definitions to provide the comparison given in Table 1:

Table 1. A Comparison of Psychological and Musical Definitions for Four Identical Terms.

English and English	Musical definition
Performance: what a person does when faced with a task . . . more abstractly, a class or set of responses that alter the environment in a way that is defined by the class, the class itself being discovered and specified only by observing responses in two or more situations.	Performance: the public exhibition or execution of a musical work, or a series of several musical works.
Modality: a sense department, more inclusive than sense quality, of data that quantitatively resemble each other more than they resemble other sense data.	Modality: a descriptor of compositional adherence to any of the Greek, east European, or medieval Church modes.
Harmonic analysis: resolution of a complex curve into the sine and cosine components of which, according to Fourier's law, it is composed.	Harmonic analysis: the description of the structures and functions of chords.
Dynamics: the study of forces, originally of physical forces, acting on a body.	Dynamics: the growth and recession of volume in music, based upon changes of loudness, texture, and performance medium.

The best example of confusion arising between musicians and psychologists may be found in the history of the investigation of the phenomenon of pitch perception. An abundance of experimental and review literature (Helmholtz, 1863; Stumpf, 1883-90; Meyer, 1900; Shower and Biddulph, 1931; Stevens, 1934, 1935, 1937; Cohen, 1961) exists on this subject. One conclusion reached by all of the above investigators deals with the interdependence of pitch and loudness perception: alteration of the intensity of a given stimulus tone will result in a perceived change of pitch of that tone, although there is no measurable change in its frequency. Farnsworth (1969, p. 54) and Lundin (1967, p. 20) reported this perceptual phenomenon and based musical assertions on it; neither author noted that all experimental evidence which they cited related only to the perceptual properties of sine waves. Fletcher (1934) found that the apparent pitch change of tones of unchanged frequency and altered intensity is one fifth as great when complex tones, instead of simple tones, are used as the stimulus. An evident oversight on the part of every writer who has concluded that the pitch-loudness interaction is an example of altered musical perception is the fact that a sine wave, except for only a very few notes produced by the flute and organ, and for sine tones in electronic music compositions, is not a musical tone. Moreover, no flute or organ tones could be described as steady-state signals. Confusion has resulted because psychoacoustical observations of nonmusical perception were interpreted as musical data.

This example of misinterpretation of data has for its ultimate historical source the Fourier (1822) thesis, developed by Ohm (1843) and Helmholtz (1863), which holds that all complex periodic tones are reducible to their sine wave components, and that the auditory perception mechanism known as the cochlea performs a harmonic analysis, in the nonmusical sense, of all auditory stimuli, breaking down all complex signals to their simplest sine wave components. This is a simplified presentation of the frequency-pitch theory of hearing. The frequency-pitch theory has, since 1863, been the most popular theory of hearing; it has by no means been the only one espoused. For a comparative presentation of the several theories of hearing proposed in addition to that of Helmholtz (infra, p. 109), see <u>Chapter 3</u>, pages 109-111.

Experimentalists within the field of psychophysics have embraced steady-state sound sources because of their controllability. At the time that Helmholtz published his <u>Tonempfindungen</u> (1863), which contained his frequency-pitch theory of tone perception, Koenig's tuning forks were the most reliable tone generators available. Although these forks did not produce steady-state tones, they did produce tones with sine wave characteristics which were closer to steady-state in their physical characteristics than were other contemporary experimental stimulus tones: Preyer (1876) had only a whistle which he blew as his auditory stimulus; Savart (1840) had a wooden, manually operated ratchet. With the increasing emphasis upon experimental rigor which took place during the post-Fechnerian era, such uncontrolled sound generators as these served to detract greatly from the credibility of experimental results. To be substantiated, an experiment now had to be replicable. It is little wonder, then, that experimentalists looked to steady-state generators instead of less controllable musical instruments. Organ pipes, Chladni's (1802) brass plates, and Marloye's improved tuning forks and resonator boxes which were available in 1839, existed and were used well before the concept of experimental rigor became paramount: the post-Fechner period, which comprises the last four decades of the nineteenth century.

The device which replaced tuning forks as the primary psychoacoustical research tool, the electric sound generator-loudspeaker combination, became available only after the first World War. Developed principally by engineers at the Bell Telephone Laboratories, and popularized principally by Stevens (1934), the wave generator-loudspeaker combination has remained basically unchanged since the 1920s. The tuning fork and the sound generator-loudspeaker combination represent the best research tools available to psychoacousticians during their respective eras. Psychoacousticians used both types of sound source to produce tonal stimuli with sine wave characteristics, and adopted the new electric generator-loudspeaker type because better steady-state stimulus tone characteristics meant greater experimental rigor.

Music is never steady-state sound. Even electronic music composers, when confined to such steady-state sound sources as tone generators, introduce variability as a part of the composition process. The epitome of a steady-state composition would be an unfiltered, unmodulated, totally-unaltered steady-state tone, of unchanged frequency, and of infinite duration.

Psychophysicists can easily be misunderstood by musicians. Musical generalizations deduced from nonmusical information can be misinforming. Analogy can serve rewardingly as a thought mode in the processes of problem defining and in pre-experimental speculation, but never as evidence. The likelihood of misunderstanding is only increased when psychophysicists mislabel nonmusical premises as musical ones.

Information Sources, I: Texts

A Comparative Content Analysis of Farnsworth's (1958, 1969) *The Social Psychology of Music* and Lundin's (1953, 1967) *An Objective Psychology of Music*

In order to assess the present state of affairs within the field of music psychology, two bodies of literature were carefully examined. The first, general textbooks, furnishes a quickly accessible introduction to basic areas of inquiry. In addition to this foundational information, an examination of the current periodical literature was undertaken. It was assumed that the areas of investigation in both of these literatures would bear some resemblance to one another.

There are two contemporary music psychology texts which are general in content and which together will furnish the reader an adequately comprehensive survey of the field. The first of these is by Lundin (1953, second edition 1967). The table of contents of the second edition of Lundin's text gives an accounting of subject areas included. A second and slower operation that provides more detailed topic coverage is analysis of the subject index. An imperative concern when analyzing the content of a text is that no subject be overlooked. By juxtaposing the table of contents with the subject index, it was anticipated that a realistic representation of the various topical areas and their relative weightings would result.

The survey, consequently, entailed the counting of subject index entries and numbers of pages of text devoted to several general subject headings. These general subject headings were synthesized by grouping all subject index entries into related bodies. Lundin's relative weightings of the various subject areas are shown in Table 2; interpretations of this table are given below.

Table 2. Subject Content and Distribution in Lundin's (1967) *An Objective Psychology of Music.*

SUBJECTS in decreasing order of number of subject index entries	Number of pages allotted	Percent of total text length	Number of subject index entries
1. Psychophysics	81	30%	79
2. Listening behavior	44	17%	68
3. Ability	17	6%	64
4. Musical properties	44	17%	62
5. Testing, measurement	36	13%	51
6. Applied music psychology	28	11%	31
7. Development, music learning	16	6%	27

The general subject area most cited was the area of psychophysics. There are 79 references to the various discussions of timbre, harmonics, consonance, tonal fusion, volume, pitch discrimination, loudness perception, and temperament. This primary importance is also reflected in the table of contents: 81 (30%) of the 266 pages of text are devoted to psychoacoustic considerations. Within the table of contents, the nominal subject designations are the various 'dimensions of tone' and 'combinations of tone.'

The subject index contains 68 entries concerned with listening behavior. Salient topics within this second most cited subject area include esthetics, affective response to music, musical taste, and musical mood. The two definitive chapter headings related to this subject are 'The affective response to music' and 'The aesthetic response to music.' These two chapters comprise 44 pages (17%) of text. This figure may seem low when compared to the figures dealing with psychophysics; that is, the numbers of pages of coverage contrast more sharply than do the numbers of citations for these two topical areas. This disparity stems from the fact that a number of subject citations within the area of listening behavior refer to information found in chapters dealing with testing and measurement.

Third in rank of coverage was the concept of ability, taken to include discussions of absolute and relative pitch, musicality, the idiot-savant, and other discussions of musicality in relation to abnormality, heredity, and creativity. A total of 17 pages (6%) of text are devoted to the various considerations of ability. Although sixth-ranked in actual amount of text devoted to its presentation, the topic of ability ranked third-highest in its subject index rank, with 64 entries.

The fourth subject area represented in Table 2 has to do with properties of music, their description and their perception. There are 62 citations in the subject index which deal with melody, harmony, rhythm, mode, modulation, key centers, and vibrato. It is within this subject area that the table of contents taken alone would be most misleading: these musical properties are represented only by the chapter headings 'The combination tones: melody and harmony' and 'Rhythm as stimulus and response.' Other properties which were cited above are not included in the table of contents; they are investigated as appendages of the three so-called "basic" properties of music: melody, harmony and rhythm. There is, however, close agreement in numbers of pages devoted to these properties. The 44 pages (17%) of text devoted to this subject tallies closely with relative figures cited in reference to listening behavior. Many citations in this group were found to relate to testing and measurement.

The fifth major subject area discussed by Lundin deals with testing and measurement. There are 51 subject index citations concerning ability testing, subjective response studies concerned with musical taste, galvanic-skin-response (GSR) and other physiological measurements of music-related behavior, and elementistic psychophysical tests devoted to defining types and limits of auditory perception. The table of contents indicates that 36 pages (14%) of text were devoted to the presentation of this material.

The sixth subject area includes what may be called applied music psychology. This general topic includes the subgroups of music therapy and music in industry, along with pedagogical concepts. Thirty one citations within this area are indexed. The length of text devoted to this consideration amounts to 28 pages (11%) of the entire text.

The seventh and final subject area in this list concerns development and learning in music. This topic has 27 subject-index citations; the chapter comprises 16 pages (6%) of the total text length. Again, the table of contents, when read alone, proves to be misleading: only half of the chapter called 'Learning and remembering music' relates to this subject area. A strong argument could be made that musical memory belongs as much in the realm of musical ability as within the domain of development and learning.

The second contemporary music psychology text is by Farnsworth (1958, second edition 1969). When an identical accounting of subject matter was performed upon the second edition of Farnsworth's text, a remarkable degree of difference in treatment of subject matter, and indeed in inclusion and exclusion of various topics, was discovered. Subject content and distribution found in Farnsworth's text are shown in Table 3.

Table 3. Subject Content and Distribution in Farnsworth's (1969) The Social Psychology of Music.

SUBJECTS in decreasing order of number of subject index entries	Number of pages allotted	Percent of total text length	Number of subject index entries
1. Listening behavior	91	44%	166
2. Psychophysics	17	8%	132
3. Musical properties	19	9%	83
4. Ethnomusicology	2	<1%	53
5. Testing, measurement	38	19%	38
6. Ability	33	16%	38
7. Applied music psychology	2	<1%	8
8. Development, music learning	5	2%	5

The subject of listening behavior is obviously the most-discussed area in Farnsworth's text. With 166 subject index citations and 91 pages (44%) of text utilized for its coverage, this area holds a position of importance comparable to that of the subject of psychophysics in Lundin's text. The prominence of the subject of listening behavior in Farnsworth's text seems to be due more to breadth of coverage than to depth. Subjects discussed in Farnsworth's text which were not found in Lundin's include designative meaning and language aspects of music, chromasthesia, and musical imagery.

The second-ranking subject in Farnsworth's text is the area of psychophysics. The text contains 132 subject index entries concerned with this topic, but only 17 pages (8%) of text. Within this area, the presentations of Farnsworth and Lundin substantively differ only in Farnsworth's omission of the topic of loudness.

The third subject area in Farnsworth's ranking is the discussion of properties of music. There are 83 citations in the subject index concerning musical properties, and 19 pages (9%) of the text are devoted to their discussion. The subject indices of Farnsworth's and Lundin's texts indicate that Farnsworth devoted almost four times as much consideration to the subject of modal qualities as did

Lundin, and almost three times as much attention to the topic of vibrato.

Fourth in this list is a subject which was not found in Lundin's text: ethnomusicology. Farnsworth provided 53 subject index citations concerned with such areas of inquiry as African music, American Indian music, Asian music, Negro soul music, and jazz. Equally important, there is no chapter heading or sub-heading in the table of contents of Farnsworth's text which alludes to these discussions. In each case, these references were tangential to related discussions. In order that the sampling procedure be consistent, lines of text related to ethnomusicological considerations were counted. The sum of lines equalled 2 pages (<1%) of text length.

Fifth-ranked is Farnsworth's treatment of testing. Thirty eight index entries are offered, referring to musical aptitude, musical achievement, musical taste, and physiological-reaction tests. Text coverage amounts to 38 pages (18%) of the total text length.

Farnsworth alloted sixth ranking to the topic of ability. The dissimilarity of the ranking of ability between Farnsworth's and Lundin's texts is noteworthy: there exists an asymmetrical relationship between the two texts regarding numbers of citations compared with text percentages. Lundin's citations for this subject rank third, with a fairly unbalanced ranking of sixth in length of text coverage. Conversely, Farnsworth's text allocates a very respectable percentage of text to this topic without a notable increase in subject index citations: 76 citations are presented, along with 33 pages (16%) of text coverage. Again, the notable increase in text length found in Farnsworth's discussion of ability seems to reflect breadth rather than depth of coverage. Topics found in Farnsworth's text which were not found in Lundin's include: (1) the relationship between abnormality and musicality, (2) child prodigies, (3) the faculty of absolute tempo, (4) creativity, and (5) the relationship of musical aptitude to other artistic abilities.

Farnsworth also accorded relatively little text space to the topic of applied music psychology. His citations concerning music therapy and music in industry total 8; a little less than two pages (<1%) of total text length are devoted to this topic.

Seventh and least discussed is the topic of musical development and music learning. Farnsworth cites pertinent subjects a total of 5 times, and devotes a total of 5 pages (2%) of text length to this discourse.

One subject given passing mention by Farnsworth is drugs; the subject index enters this subject three times, although it is included in no chapter headings or subheadings. Lundin made no reference to this topic.

Table 4 is a comparison of the subject contents and distributions in Farnsworth's and Lundin's texts.

Table 4. Comparison of Subject Contents and Distributions in Lundin's (1967) and Farnsworth's (1969) Texts.

SUBJECTS in alphabetical order	Number of pages allotted		Percent of total text length		Number of subject index entries	
	Lundin	Farnsworth	Lundin	Farnsworth	Lundin	Farnsworth
1. Ability	17	33	6%	16%	64	38
2. Applied music psychology	28	2	11%	<1%	31	8
3. Development, music learning	16	5	6%	2%	27	5
4. Ethnomusicology	0	2	0%	<1%	0	53
5. Listening behavior	44	91	17%	44%	68	166
6. Musical properties	44	19	17%	9%	62	83
7. Psychophysics	81	17	30%	8%	79	132
8. Testing, measurement	36	38	13%	19%	51	38

Table 4 shows several differences in the content and distribution structures of these texts. Some of these differences may be attributed to the authors' individual interests. Much of Farnsworth's experimental work has been devoted to the study of composer eminence, and to taste preferences with regard to musical style and to music of various style periods. This type of research is best categorized under the general heading of listening behavior. Lundin's research has been devoted primarily to the investigation of musical abilities. His musical aptitude tests, which are cited by Farnsworth, are some of the more widely used and cited tests in the field. Thus, the two authors' strongest individual interests appear to be reflected in the structures of their texts.

A Comparative Content Analysis of Five General Twentieth Century Music Psychology Texts

Prior to the publication of Farnsworth's and Lundin's texts, the three most widely-read general music psychology texts were by Mursell (1937), Seashore (1938), and Schoen (1940). Until the publication of the first edition (1953) of the Lundin work, there was a lapse of more than a decade in the updating of English-language texts in the field, due primarily to the channeling of research by psychologists and acousticians toward military technology during World War II.

This 13 year silence in the field of music psychology did not reflect a complete absence of experimentation; however, it was a manifestation of a major diversion of attention. Since these three pre-war books were necessarily treated as the most-advanced general literature in the field for such a lengthy period, their historical importance is great. In an attempt to trace the outer perimeter of the many-faceted field of music psychology as presented by these three texts, subject indices were searched and subject titles recorded. A comparison of the relative amount of discussion by each author of the resulting list of subjects was made (Table 5). The sampling method was the counting of actual numbers of pages of text devoted to discussion of the various subjects. An identical sampling was taken of Farnsworth's and Lundin's texts; since these two texts were reprinted in revised editions, both the first and second editions of these two texts are included in the comparison.

Table 5. Comparison of Topic Distributions in Five Twentieth Century General Music Psychology Texts.

TOPICS (Listed alphabetically)	Amounts of discussion given in numbers of pages.						
	Mursell (1937)	Seashore (1938)	Schoen (1940)	Lundin (1953)	Lundin (1967)	Farnsworth (1958)	Farnsworth (1969)
ability	4	13	15	18	19	37	26
abnormality and musicality	2	0	0	0	0	0	2
absolute pitch	11	3	4	4	2	6	5
absolute tempo	0	0	0	0	0	0	3
acoustics	2	10	0	0	0	0	0
affective domain (affective response to music)	2	0	26	33	45	74	73
animal musicality	6	0	0	0	0	0	0
art abilities related to musical abilities	1	0	0	0	0	1	2
child prodigies	0	0	0	0	0	1	4
chromaesthesia	3	0	0	0	0	3	2
consonance	11	9	18	11	12	5	15
creativity	31	0	3	0	0	5	10
designative meaning; language aspects of music	29	7	16	0	0	20	45
development; music learning	5	25	14	17	27	5	9
drugs	0	0	0	0	0	1	2
esthetics	2	10	20	12	14	6	8
ethnomusicology	15	14	1	0	0	3	2
finality effects (gestalt, neurological, other)	4	0	0	0	0	2	10
fusion, tonal	6	2	12	2	2	1	2
GSR, other physiological measures of responses	6	3	5	7	10	0	2
harmonics, partials	16	48	6	5	6	1	1
harmony	22	5	43	8	5	4	4
hearing, binaural	0	0	0	0	0	0	0
hypnosis	1	0	0	0	0	0	0
imagery	3	18	0	0	0	4	3
inheritance	5	16	0	0	4	1	0
IQ (relationship to musical ability)	5	8	0	5	3	1	3
listening behavior	13	3	15	7	8	7	7
loudness perception	3	14	4	13	16	7	12
melody and harmony	18	0	25	33	33	54	35
mode	13	9	5	6	3	5	11
modulation/key centers	3	1	4	0	6	3	5
mood	19	0	12	5	6	7	17
music in industry	0	0	0	15	11	3	3
music performance	5	65	1	37	24	0	0
music therapy	0	6	0	17	18	4	5
"musical mind"	9	13	42	9	9	1	6
pedagogy/guidance	1	16	0	0	0	0	0
pitch perception	8	23	11	20	24	12	56
principles of psychology and their relativity to music	7	18	0	0	0	2	3
race	3	14	0	3	4	2	5
rhythm	49	16	0	19	21	13	18
testing	11	28	25	37	44	48	38
thinking, feeling, imagining	3	20	0	0	0	0	1
timbre	11	47	6	11	11	0	18
time perception	2	5	6	0	4	0	1
tuning/temperament	7	3	7	0	8	2	27
vibrato	4	20	13	0	4	7	11
volume	12	4	0	2	2	0	0

Information Sources, II: Periodical Literature

Music psychology texts have tended to cite publications found in three general bodies of periodical literature: psychological, musical, and acoustical. In an attempt to determine the focus of research activity in music psychology as observed and catalogued by psychologists, a sample of music-related entries was taken from a number of volumes of Psychological Abstracts. A total of 69 entries was gleaned from the Music index of volumes 17-19 (1943-45). Volumes 32-34 (1958-60) contain a total of 52 music entries, and volumes 46-48 (1971-September 1972) contain a total of 98 music entries. These particular volumes of Psychological Abstracts were chosen for sampling because taken as three separate parcels of data they furnish information concerning changing centers of investigation, if any, between the World War II period and the present date, and taken together they provide a suitably large number of samples for quantitative investigation. The 219 entries contained in these nine volumes of Psychological Abstracts were categorized topically as were the texts represented in Tables 2 and 3; in making these subject-matter discriminations, abstracts were consulted when titles were thought not to be definitive. Table 6 shows the relative weightings found in this sample. The column at the extreme right of the table shows the averages of percents of the three sample groups.

Topic listings in Tables 6 (infra, p. 35), 7 (infra, p. 37), 8 (infra, p. 39) and 9 (infra, p. 43) are ordered by decreasing amount of coverage. For purposes of comparison, these tables are organized as were Tables 2 (supra, p. 19) and 3 (supra, p. 24). All subject areas found in Psychological Abstracts, and in all other journals surveyed in this chapter, were included in one or more of the general texts discussed earlier (supra, Table 5, p. 32).

Table 6. Subject Content and Distribution of Music-Related Articles in Selected Volumes of Psychological Abstracts.

SUBJECTS in decreasing order of total coverage	Volumes 17-19; 69 entries		Volumes 32-34; 52 entries		Volumes 46-48; 98 entries		Total Sample; 219 entries	
	Number of entries	Percent of samples (69)	Number of entries	Percent of samples (52)	Number of entries	Percent of samples (98)	Total entries	Percent of total samples (219)
1. Applied music psychology	34	49%	19	37%	43	44%	96	44%
2. Listening behavior	19	28%	20	38%	33	34%	72	33%
3. Ability	7	10%	7	13%	12	12%	26	12%
4. Psychophysics	3	4%	4	8%	9	9%	16	7%
5. Musical properties	6	9%	2	4%	1	1%	9	4%
6. Development, music learning	0	0%	0	0%	0	0%	0	0%
7. Testing, measurement	0	0%	0	0%	0	0%	0	0%

In an attempt to determine the focus of inquiry in music psychology as approached by musicians, surveys identical to that applied to Psychological Abstracts were made of articles in the Journal of Music Theory and the Journal of Research in Music Education. Volumes 1 through 15 (1956-1971) of the Journal of Music Theory. The 15 existing volumes of this periodical contain a total of 137 articles. A total of 27 (20%) deal with one or more of the six topic areas shown in Tables 2 (supra, p. 19), 3 (supra, p. 24), and 6 (supra, p. 35).

Below is a table of subject population produced by this count. As was the case in the sampling on the previous page, and as will be the case in subsequent topic-weighting tallies, abstracts were consulted or entire articles read when titles were thought not to be definitive.

Table 7. Subject Content and Distribution of Psychology Related Articles in Selected Volumes of the Journal of Music Theory.

SUBJECTS in decreasing order of numbers of articles	Number of articles	Percent of music psychology articles	Percent of total number of articles reviewed (137)
1. Listening behavior	12	44%	9%
2. Musical properties	11	41%	8%
3. Psychophysics	3	11%	2%
4. Applied music psychology	1	4%	<1%
5. Ability	0	0%	0%
6. Development, music learning	0	0%	0%
7. Testing, measurement	0	0%	0%

Volumes 1 through 20 (1953-72) of the *Journal of Research in Music Education* were surveyed and found to contain a total of 383 articles, of which 159 (41.5%) dealt primarily with one of the six subject areas. The topic distribution in these articles is represented in Table 8.

Table 8. Subject Content and Distribution of Music Psychology Related Articles in Selected Volumes of the *Journal of Research in Music Education*.

SUBJECTS in decreasing order of numbers of articles	Number of articles	Percent of music psychology articles	Percent of total number of articles reviewed (383)
1. Development, music learning	47	30%	12%
2. Listening behavior	44	28%	11%
3. Testing, measurement	31	19%	8%
4. Ability	23	14%	6%
5. Musical properties	10	6%	3%
6. Psychophysics	3	2%	1%
7. Applied music psychology	1	<1%	<1%

Since the publication of Stumpf's *Tonpsychologie* (1883-90), psychoacoustical investigation has been placed in a role of primary importance by music psychologists. The foremost English language periodical which deals with documents related to psychoacoustical research is the *Journal of the Acoustical Society of America*. Necessarily, the counting procedure applied to volumes of the *Journal of the Acoustical Society of America* differed from that applied to preceding journals which were surveyed. Unlike all other journals included in this census, the *Journal of the Acoustical Society of America* is only marginally concerned with the domain of music. Moreover, the indexing procedure utilized in the compilation of the *Analytic Subject Index* of this journal includes the practice of multiple citations of individual papers, in an admirable attempt to deal with the problem of research documentation in a field which is many-faceted in its investigative domain, and in which a single paper may be of value in more than one of these facets. The average volume of the *Journal of the Acoustical Society of America* contains entries for almost 400 papers; a survey of the number of volumes of this journal comparable to the earlier three surveys would result in a much greater number of papers sampled. A survey of only one volume of the *Journal of the Acoustical Society of America* would provide inadequate breadth.

In addition, a preliminary investigation of this journal disclosed a striking similarity of content and emphasis of topics to that of experimental literature compiled in the bibliography which comprises *Volume II* of this dissertation. Although experimental design and measuring devices have undergone modification during the last century, topics of investigation have not.

For these reasons, the three latest volumes (*48*, *49*, and *50*; 1970-71) were polled and a tally made of papers cited in the analytic subject index. A total of 1198 papers were cited in these volumes, 162 (13.5%) of which dealt with subjects relevant to the study of music psychology. Of the nine papers in these three volumes which were indexed under *Music*, three actually dealt in any way with musical perception. In all three cases, 'musical perception' meant only the perception of musical elements such as pitch and loudness of complex tones out of musical context. There were no articles in these volumes of the *Journal of the Acoustical Society of America* which dealt with perception of musical systems.

Predictably, a much greater number of papers was concerned with psychoacoustical problems; none of these papers was indexed under the heading of *Music*. Table 9 shows the five major psychoacoustical subsections as given by the analytic subject index.

Table 9. Subject Content and Distribution of Music Psychology Related Articles in Selected Volumes of the Journal of the Acoustical Society of America.

SUBJECTS in decreasing order of numbers of papers	Number of papers	Percent of papers relevant to music psychology (162)	Percent of total number of papers surveyed (1198)
1. Psychophysics			
Hearing theory	92	57%	7.7%
Properties of sound (including properties of musical sound and absolute pitch in the physical or nonmusical sense)	33	20%	2.8%
Binaural hearing and auditory localization	18	11%	1.5%
Physiology of the ear	16	10%	1.3%
Total Psychophysics	159	98%	13.3%
2. Musical properties	3	2%	0.3%
3. Listening behavior	0	0%	0%
4. Ability	0	0%	0%
5. Applied music psychology	0	0%	0%
6. Development, music learning	0	0%	0%
7. Testing, measurement	0	0%	0%

A composite array of the various subject distributions found in these four journals is represented in Table 10.

Table 10. Subject Contents and Distributions of Articles Related to Music Psychology Found in Selected Volumes of _Psychological Abstracts_, the _Journal of Music Theory_, the _Journal of Research in Music Education_, and the _Journal of the Acoustical Society of America_.

SUBJECTS In decreasing order of average percent of coverage	Psychological Abstracts Percent of total abstracts	JMT Percent of total articles	JRME Percent of total articles	JASA Percent of total papers	Average percent of subject distributions among the four journals
1. Psychophysics	7%	11%	2%	98%	29%
2. Listening behavior	33%	44%	28%	0%	26%
3. Musical properties	4%	41%	6%	2%	13%
4. Applied music psychology	44%	4%	1%	0%	12%
5. Development, music learning	0%	0%	30%	0%	8%
6. Ability	12%	0%	14%	0%	7%
7. Testing, measurement	0%	0%	19%	0%	5%

The Topography of Current Music Psychology

It will be noticed that topics listed in Table 5 (supra, p. 32) vary greatly both in degree of generality and in degree of exclusiveness. That is, "ability" is a much more general topic than is "abnormality and musicality," while "consonance" may or may not be considered apart from "listening behavior," depending upon the viewpoint of the author.

It should also be apparent from an examination of Table 5 that little uniformity in subject emphasis exists among the texts surveyed; each text exhibits a unique design indicative of the interests of its author. The subject distributions found in the four journals surveyed were dissimilar (supra, Table 10, p. 45).

None of the five texts or four journals surveyed contains a comprehensive presentation of the topography of the study of music psychology; it was anticipated that, when taken together, the topics discussed in the texts and journals would afford definition of the field. It was also anticipated that such a comprehensive body of topics could be ordered in such a way that a hierarchical listing of these topics, which did not include idiosyncratic subject emphases, would result. In general, a need for such a hierarchical list exists if one is to conduct an organized study of the field of music psychology. Specifically, this topography was considered to be necessary for the orderly indexing of documents in the bibliography which comprises Volume II of this dissertation.

The construction of the hierarchical listing was implemented with the assistance of several faculty members of The Ohio State University whose scholarly activities necessitate their reading of music psychology and auditory perception literature: Professor Dean Owen of the Psychology Department and Professors Henry Cady, Peter Costanza, Norman Phelps, and William Poland of the School of Music.

Each topic name given in Table 5 (supra, p. 32) was transcribed on an index card, and sets of cards were given to each of the above gentlemen, with directions to: (1) sort the cards according to their topical relevance to one another, (2) invent category names for each group of cards sorted, and (3) suggest names of topics or of topic categories which were not represented but which were, in the estimation of the faculty member, integral to the comprehensive study of music psychology. Names of topics and topic categories which were suggested by the five faculty members and myself were compared for similarity, as were the resulting sets of sorted cards. Table 11 is a topical-hierarchical outline of the topics presented in the texts of Mursell, Seashore, Schoen, Lundin and Farnsworth, ordered on the basis of similarity patterns which were seen and agreed upon by the five faculty members and myself.

The outline in Table 11 was used to subject index all documents entered in the bibliography in Volume II. It is, to my knowledge, the only comprehensive and systematic outline description of the study of music psychology.

Table 11. Comprehensive Hierarchical Outline of Topics Presented in Five Twentieth Century General Music Psychology Texts.

I. CLASSICAL PSYCHOPHYSICS
A. Description of stimulus properties
1. frequency
2. duration
3. intensity, amplitude
4. harmonics (tone partials)
5. spatial properties
B. Corresponding perceived attributes (perceptual content)
1. pitch
2. time
3. loudness, volume (voluminosity)
4. timbre
5. auditory localization: binaural hearing process
6. altered perceptions: interactions of elements when combined
C. Testing: methodology, results

II. MUSICAL ELEMENTS AND CONSTRUCTS
A. Musical elements: perceived auditory attributes (musical content)
1. isolated elements
a. pitch (including tuning/temperament)
b. timbre
c. density (texture)
d. loudness, amplitude, volume
e. sound direction (direction of perceived sound source)
2. interactional elements
a. pitch/loudness
b. pitch/sound source direction (Doppler effect)
c. harmonics/harmonics: consonance
B. Musical constructs
1. melody
2. harmony
3. rhythm
4. mode
5. modulation/key centers
6. recurrence, pattern, formal attributes

III. MUSICAL PERCEPTION: music and nonmusic association
A. Musical association
1. perception of elements (isolated and in combination)
2. perception of constructs
B. Nonmusical association (affective response to music)
1. mood
2. designative meaning, language aspects
3. thinking/feeling/imagining (not directed toward musical stimulus)
a. imagery
b. synesthesia (including chromesthesia)
c. emotion (non-designative meanings)
4. finality effects
5. esthetic reaction: perception of beauty

IV. ABILITY (achievement at a given time)
A. "The musical mind": manifestations of musical ability
1. performance
2. creativity
3. others?
B. General ability vs. musical ability
1. IQ vs. musical ability
2. art ability vs. musical ability
3. "abnormality" vs. musical ability
a. neurotic, psychotic tendencies
b. physical abnormalities
c. "idiot-savant"
C. Ability vs. capacity
1. inheritance
2. genius, child prodigies
3. absolute pitch, absolute tempo
4. race
5. cross-cultural relationships

V. APPLIED MUSIC PSYCHOLOGY
A. Clinical
1. music therapy
a. physical
b. emotional
c. psychological
2. music combined with other therapeutic devices
a. drugs
b. hypnosis
B. Music in Industry
C. Education
1. pedagogy/guidance
2. development/music learning

VI. APPLIED MUSIC PSYCHOLOGY
A. Individual
1. listening behavior
2. performance behavior
3. creative behavior
B. Social
1. ethnomusicology
2. race
3. nationalistic trends

VII. TESTING, EXPERIMENTAL METHOD
A. Testing as a subject
1. validity
2. standards of rigor
3. experimental method vs. empirical method
B. Testing and experimentation, APPLIED: relative to each subsection within the above five sections. A test is to be interpreted as a standardized, nonexperimental polling.

Conclusions

Confusion has existed and continues to exist in the literature of music psychology. To a degree, this confusion is the result of terminological difficulties; to a greater degree, it is the result of the misinterpretation of psychological data by musicians. Examples of confusion at the most elemental level of inquiry were presented in this chapter; if problems exist at this level, problems at more complex levels of inquiry, such as the perceptual attributes of musical systems, are inevitable.

It is impossible to conduct an orderly study of music psychology, or of any complex field of inquiry, without first knowing its boundaries and its internal structure. Since their earliest investigations, music psychologists have operated without this knowledge. Although there is some agreement between the two authors of the currently widest-read general music psychology texts concerning the most general substantive content of the domain of music psychology, each author emphasized general topical areas of his special interest. A sampling of specific topics discussed by five widely read general music psychology texts disclosed that the boundaries of the field are difficult to define. No two of these texts were uniform in the specific topics which were chosen for presentation.

Considering the lack of uniformity evident in the subject presentations of the general music psychology textsbooks which were investigated, it can be expected that scholarly journals of primary importance in the field would also reflect an imbalance in subject content; there currently exists no English language journal which relates specifically and solely to the study of music psychology. The Journal of the Acoustical Society of America deals almost exclusively with psychoacoustical literature. The Journal of Music Theory is primarily concerned with properties of music and with listening behavior. Music-related literature indexed by Psychological Abstracts deals principally with music therapy and other applied studies. The Journal of Research in Music Education primarily includes pedagogical and developmental literature. Although these four journals constitute or index the most available and widest read body of periodical literature relating to music psychology investigation, the journals will not, singly or as a group, provide a comprehensive presentation of literature related to all areas of investigation in music psychology.

Table 11 (supra, p. 49) may be viewed as a standard of comprehensiveness and balanced internal structure for the organized study of music psychology. This table offers a comprehensive perspective which is (1) necessary for the full understanding of the scope of the field of music psychology, (2) not offered by the content of any single existing general music psychology text, and (3) not even hinted at by existing specialized music psychology texts or scholarly journals. The construction of the topography shown in Table 11 provided a basis for the organization of the bibliography in Volume II by subject areas. The historical insights provided by this organization, in turn, were the conceptual foundation of the following chapter.

CHAPTER TWO

MOST ACTIVE AREAS OF INQUIRY IN MUSIC PSYCHOLOGY IN THE NINETEENTH AND TWENTIETH CENTURIES

Introduction

During the past one hundred and ten years, several areas of inquiry have dominated the thought of music psychologists. These areas have been the focus of experimental, empirical, and philosophical investigation; this investigation has led to no general consensus of opinion in any area of inquiry.

These areas of inquiry, ranked in decreasing order of amounts of experimental investigation devoted to their study, are (1) perception of musical elements, specifically pitch, timbre, and consonance, (2) affective domains of music, and (3) ability. The evidential bases for this assertion are the subject distribution tables found in Chapter One and the numbers of entries related to these areas of inquiry found in the bibliography in Volume II of this dissertation.

In order to investigate the developmental characteristics of each of these fields of interest, it will be the purpose in this chapter to (1) study the nineteenth century literature in each of these areas of inquiry, (2) search for earliest literature in each area, and (3) investigate chronological and nationalistic identity features of the literature.

Perception of Musical Elements: Pitch

The most recent comprehensive survey of experimental literature concerning the musical attributes of pitch and timbre is by Ward (1970). Ward stated:

> Music is, of course, an involved sequence of highly complex musical sounds. The complexity is so great that one must begin by simplifying the situation, even at the risk of oversimplification. The traditional method has been to study short sequences of one or two pure tones (sinusoids). If it sometimes turns out that results of experiments on pure tones are poor predictors of musical perception, it is more often the case that results with complex tones modify rather than negate those with pure tones. At any rate, the bulk of musical research has been done with pure tones. (p. 408)
>
> Though harmonic distortion of 0.3 percent in a single sustained tone can be detected by suitable techniques, it must be more than ten times greater in order to affect real music. Clearly, we must be most careful in the way we interpret (extrapolate) our results in talking to musicians. . . . Above all, let us remember that what we can find out in the laboratory has no bearing on what music should be. The physicist, W.H. George (1961) is most critical of gratuitous and unfounded value judgments by scientists. He takes others to task, for example, for arbitrarily calling strike noises of percussion instruments "undesirable."

Whether or not they are must be determined by preference tests, not by authoritarian decree. Future studies in musical perception might well keep in mind this observation of George's . . . : "The mixing of philosophy with studies in musical acoustics results in nothing but confusion in a subject which is already sufficiently complex by its essential connection with subjective data." (pp. 442-3)

If it may be said that an investigative domain may have a national heritage, then the investigation of pitch and timbre perception is a product of German scholarship. The work of Mueller (1838), Seebeck (1841), Helmholtz (1863), Stumpf (1883-90), Meyer (1896-7), and Wundt (1873) are reported at length in <u>Chapter 3</u> (infra, pp. 94-103), together with the work of the non-Germans Bell (1811) and Fourier (1822). Probably the earliest experimental work concerning pitch perception, however, was undertaken by Delezenne (1827). Delezenne's work was developed by Weber (1834, 1846):

> The smallest perceptible difference of the pitch of two tones, (which are really in unison), that a musician perceives, if he hears two tones successively, is according to Delezenne 1/4 <u>Komma</u> (81/80) 1/4. A lover of music according to him distinguishes only about 1/2 <u>Komma</u> (81/80) 1/2. If the tones are heard simultaneously we cannot, according to Delezenne's experiments, perceive such small tonal differences . . . In music we apprehend the relations of tone, without knowing their rate of vibration (i.e., their absolute pitch); in architecture, the relation of spatial magnitudes, without having determined them by inches; and in the same way we apprehend the magnitudes of sensation or of force in the comparison of weights. (Dennis, 1948; pp. 194-6)

The ratio 80:81 cited by Delezenne and Weber refers to the Didymic comma. Apel (1966, p. 166) equates the ratio 80:81 to the difference of 22 cents, which is three cents less than a quarter of an equal-tempered semitone. Delezenne and Weber may be said to have stated, then, that the just noticeable difference of perceived pitch of inequal frequencies for musicians was 5.5 cents, or about one twentieth of an equal-tempered semitone; the just noticeable difference of perceived pitch of inequal frequencies for nonmusicians was 11 cents, or about one tenth of an equal-tempered semitone.

The findings of Delezenne, as reported by Weber, have not been disputed; they are duplicable, external, and highly elementistic. Upon the completion and acceptance of this type of descriptive work, investigators turned to the problem of detailing the functional aspects of pitch perception. This problem caused wide divergence of opinion among experimentalists. At the end of the nineteenth century, there were no fewer than five theories which dealt with pitch perception (see infra, p. 109). There still exists some disagreement concerning the process of pitch perception; for a detailed account of this disagreement, see pages 13-16.

The theory of pitch perception first detailed by Helmholtz (1863) holds that the pitch information in a stimulus tone is entirely encapsulated in the frequency of the fundamental of that tone; that is, we get our pitch information from the fundamental of a complex tone, and our timbre information from the overtones. English and English (1958) defined the resonance theory, also known as the frequency-pitch theory, from a physiological point of view: "The Resonance Theories . . . suppose that the different portions of the basilar membrane are tuned to different frequencies corresponding to those of the sound wave." (p. 237)

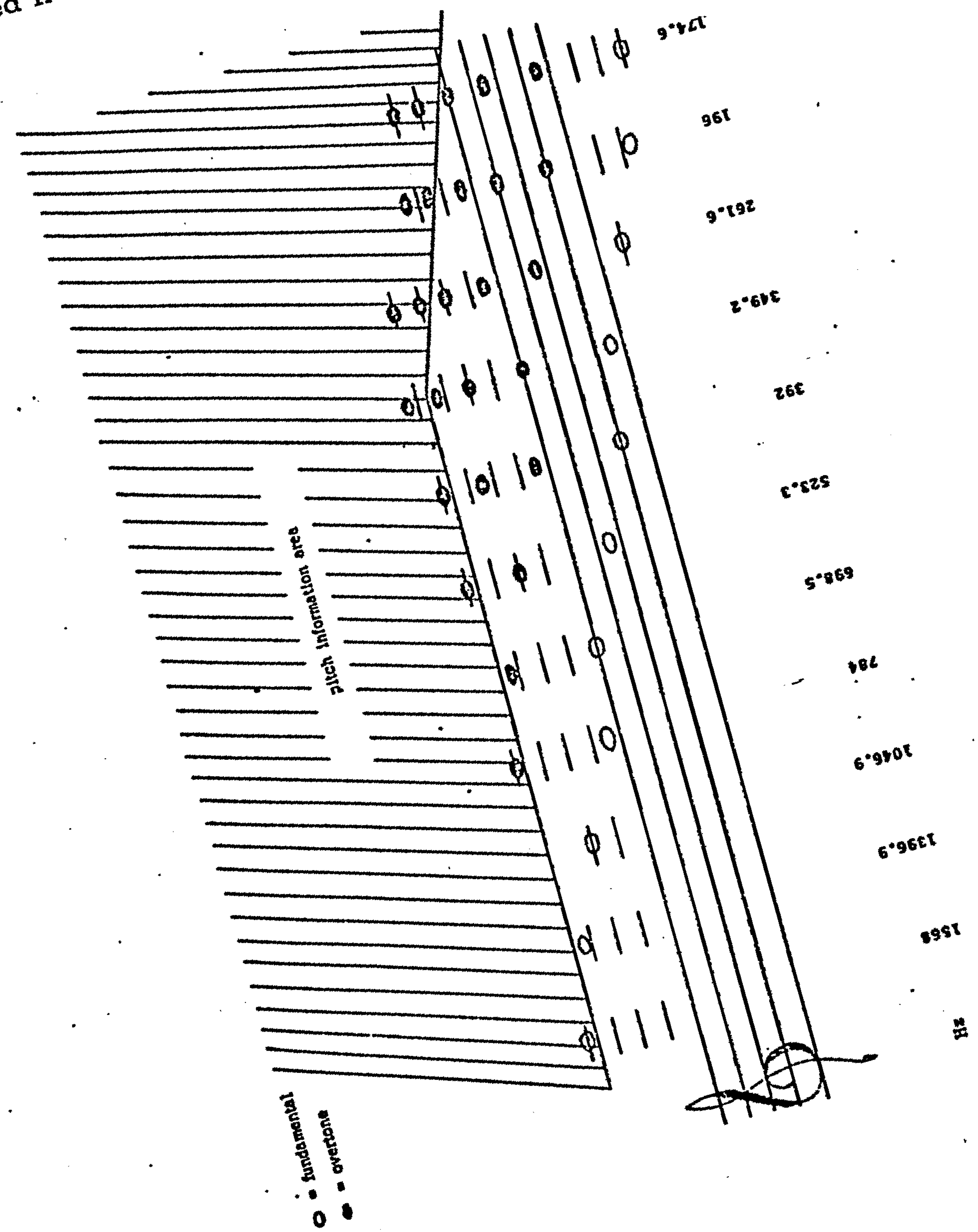
The alternative to the resonance theory of pitch perception was the "telephone" theory, or frequency theory of hearing popularized by Wundt (1880). "Frequency Theories . . . suppose that the basilar membrane as a whole vibrates in tune with the sound wave and transmits the vibrations to the brain." (English and English, 1958; p. 237) Wundt's basic disagreement with the resonance theory of pitch perception involved his inability to accept Helmholtz's concept of a division of the basilar membrane into minute portions, each portion functioning as a sympathetic vibrator to only one stimulus frequency. Wundt proposed that the entire basilar membrane vibrates sympathetically with any acoustical stimulus. In other words, the periodicity, or relative duration of each wave period, is the determining factor in perceived pitch. The strongest argument for this theory is the phenomenon of subjective tones, the observable and duplicable finding that a perceived pitch can result from a tone complex which does not contain any physical energy at the corresponding point in the frequency spectrum.

Plomp (1964 et.seq.) has demonstrated experimentally that these two theories of pitch perception, together with subsequent theories which may be viewed as developments of either the resonance or frequency theory, may be reconciled. Plomp (1967) showed that pitch perception is a function of either frequency-fundamental (resonance theory) perception, or of periodicity-characteristic (frequency theory) perception, depending upon the frequency of the stimulus tone:

> For fundamental frequencies of up to about 1400 Hz, the pitch of a complex tone is determined by the second and higher harmonics and not by the fundamental, whereas beyond this frequency the opposite holds; this is the case both for tones with harmonics of equal amplitude and for tones with harmonics of which the amplitudes fall by 6 dB/oct.
>
> For fundamental frequencies of up to about 700 Hz, the pitch is determined by the third and higher harmonics; for frequencies up to about 350 Hz, by the fourth and higher harmonics.
>
> The experimental results strongly suggest that the pitch of complex tones is based upon periodicity rather than of frequency; it is reasonable that this also holds for simple tones. (Plomp, 1967; p. 1532)

A musician would interpret this data to mean that notes above the pitch level of f''', fourth space above the treble clef, carry their pitch information within the fundamental of the complex tone. Pitches within the range of f'' to e''' carry their pitch information within the second and higher partials; the frequency of the fundamental within this octave is not the pitch information carrier unless, of course, the stimulus tone is a simple wave. Within the range of f' to e'', the third and higher harmonics of the stimulus tone transmit pitch information; within the range of e' and below, the fourth and higher harmonics transmit pitch information. A graphic representation of this phenomenon is found in Figure 1.

Figure 1. Pitch Information Threshold for Complex Tones Developed from Data Given by Plomp (1967, p. 1532).



Nearly all musical tones are complex tones. Within the domain of music, then, pitch perception is a function of both fundamental frequency perception and periodicity perception. Using frequency equivalents for equal-tempered tones, such as those provided by Olson (1967) and given in Figure 1, it becomes evident that any complex tone above f''', which is approximately 1400 Hz, is perceived through the same audition process: only the fundamental functions as pitch information carrier. Complex tones of lower pitch range carry pitch information only within the harmonics.

Perception of Musical Elements: Timbre

The most recent comprehensive survey of timbre perception literature is given by Ward (1970). In assessing the role accorded timbre perception in relation to the roles assigned other musical elements, Ward stated:

> The four attributes of auditory events having the most relevance to musical perception are pitch, loudness, timbre, and duration. Pitch and loudness are primarily functions of the physical parameters of frequency and intensity, respectively. . . . Timbre, which is a function of the harmonic content of the sound and hence ought not to apply to sinusoids at all, is often used as a wastebasket category; if two sounds are "different" though having the same pitch and loudness, then they must differ in timbre. (1970, pp. 408-9)

Ward then emphasized that timbre can be too general and simplistic a category of tonal description, and that such parameters as density and voluminosity do indeed exist, but only as unquantified and subjective descriptors at the present time.

Experimental data concerned with timbre perception dates back to the work of Willis (1830), who advanced the premise that the harmonics of a complex tone are the source of timbre characteristics, and demonstrated that the timbre characteristics of a tone correspond to the patterns of amplitude peaks of that tone. Bindseil (1839) substantiated Willis' findings concerning the relationship of harmonic structure and timbre perception. However, there was at this time some disagreement as to how the ear mediates the timbre information contained within the overtone stimulus structure. Opposing views were held by Ohm (1843) and Seebeck (1841, 1843); Tonndorf (1971) summarized this conflict:

> G.S. Ohm postulated in 1843 that the ear performs a Fourier analysis upon the incoming signal -- a logical assumption since a listener is able to discern the various partials of a complex tone. Helmholtz in 1863, endorsed Ohm's 'acoustic law' and at the same time suggested a <u>mode</u> by which the cochlea might execute the required analysis. . . . There was, of course, some criticism of [Ohm's] hypothesis. Seebeck (1841), a contemporary of Ohm's, studied the perception of complex tones produced by a siren. He felt that some of his results were incompatible with the assumption of a Fourier analysis, but rather indicated a <u>waveform</u> or <u>time analysis</u>. It is a curious fact that Ohm (1843), who apparently did not conduct acoustic experiments of his own, cited Seebeck's findings in support of his own thesis. Seebeck (1843), in turn

> wrote a rebuttal, but it found little attention in his own time. Apparently, the Fourier principle with its clear-cut mathematical formulation was too powerful to be put aside. In recent times, Schouten (1938, 1940a, 1940b), Small (1955), de Boer (1956), Schouten et. al. (1962), and others have taken up Seebeck's experiments again, confirmed his results, and expanded upon his concepts. (Tonndorf, 1970; p. 206)

Donders (1864) expanded Willis' investigation of the relationship of amplitude peaks and timbre perception; Hermann (1894) coined the term formant in reference to the Willis-Donders amplitude peak phenomenon, while attempting to refute Koenig's (1881) hypothesis that timbre perception depends primarily upon the phase pattern of the stimulus tone. Surveys of timbre perception work during this period were written by Stumpf (1883-90, 1896, 1898), Maclean (1895), Meyer (1896-7, 1898), and Bonnier (1900).

Perception of Musical Elements: Consonance and Dissonance

The definitive body of literature concerning consonance and dissonance since the second World War has been that of Cazden (1945, 1948, 1954, 1958, 1961). The central premise which pervades Cazden's work is that consonance is a product of human behavior; i.e., the only natural laws which govern consonance are those which govern man.

> Perceptions of interval qualities, though they do not arise on natural foundations, are neither arbitrary nor accidental. They are conditioned responses derived

> from the structural relations of a specific musical language and its history. . . . Thus the materials of musical art are not to be discovered in natural phenomena taken in isolation, in tones and the responses to them, but in the more complex systems of tonal relations which are the historical products of human culture. (1945, p. 10)
>
> Musical response is not essentially a logical process in the abstract, but a psychological process, and its conditions are set by the history of music in a given culture and not by the requirements of pure calculations. The starting point of music is not the resounding tone, as some of our theorists would have it. In the beginning was the musical activity of social groups of human beings. (1954, p. 31)
>
> The Pythagorean principle, in its most general sense, states that man functions within limiting conditions set by the universal laws of nature. The Aristoxenian principle in the same sense declares that man imposes his own values and purposes on his natural environment, through methods determined by his own history, which is largely the history of his arts, taking these in their broadest sense. The lesson of the consonance problem is that the data of human activity may not be reduced to the one-dimensional data of acoustics, for arts that are demonstrably subject to the exigencies of historical change in human societies cannot be comprehended by focussing attention on the unchanging natural conditions of their media. (1958, p. 105)

Lundin (1947) virtually mirrored Cazden's cultural concept of consonance; Prout (see infra, p. 88) anticipated this position by sixty years. The argument as to whether consonance is a product of physics, mathematics, physiology, or behavior dates back to Pythagoras and Aristoxenus. Mentz (1895), Moore (1914), Seashore (1919), and Bugg (1930) conducted experiments on the behavioral bases of consonance prior to Cazden's earliest literature. Experiments concerning the physical bases of consonance and dissonance have not been abandoned in the wake of Cazden's work; recent psychophysical work with consonance has been done by Plomp and Levelt (1965), Plomp (1967), and Plomp and Steeneken (1968). However, Cazden has provided the most extensive and most eloquent expression of the cultural viewpoint concerning consonance.

The two most important experimentally-based theories of consonance during the nineteenth century were proposed by Helmholtz (1863) and Stumpf (1883-90, 1897, 1898, 1898-1901). Helmholtz classified an interval as consonant if the overtones of the complex tones involved produce relatively few phase discrepancies, or beats. His theory of Klangverwandtschaft holds that if one or more overtones of a complex tone relates to one or more overtones of a second complex tone at the unison or octave, the interval between those two complex tones may be classified as consonant. Stumpf's criterion of consonance was the perceptual blending of two tones, or Tonverschmelzung; an interval is held to be consonant to the extent that the tones outlining that interval produce the auditory illusion of the unison.

Chladni (1799, 1800-1) had experimented with beat tones and their relationship to consonance. Dove (1839) had experimented with dichotic beat tone perception, as had Brandt (1861). Although all three of these earlier experimenters were cited at one time or another in Helmholtz's <u>Tonempfindungen</u> (see 1954 ed., pp. 559, 561), none of their works were cited in the presentation of his theory of consonance (1954 ed., Ch. 10; pp. 179-197).

Judging from the available literature of the late nineteenth century, experimental activity related to one or the other of these theories of consonance were predominantly German, as shown in Table 12.

Table 12. Experimental Studies of <u>Klangverwandtschaft</u> (Relationship of Tones) and <u>Tonverschmelzung</u> (Tonal Fusion) in the Perception of Consonance; Ordered Chronologically by Decade and by Nationality.

KLANGVERWANDTSCHAFT			TONVERSCHMELZUNG	
German				
Morgan	(1864)			
Hostinsky	(1879)			
Michaelis	(1879)			
Hermann	(1891)			
Schaefer	(1891)			
Hermann	(1894)		Cornelius	(1892-3)
Hermann	(1896)		Faist	(1897)
Mach	(1898)		Meinong and Witasek	(1897)
Angell	(1899)		Lipps	(1898)
Krueger	(1899)		Meyer	(1898)
Krueger	(1900)		Buch	(1899)
Non-German				
Heffernan	(1877-8):	English	none	
Bosanquet	(1881):	English		
Cross and Goodwin	(1893):	American		

The fact that the theories of Helmholtz and of Stumpf are dissimilar in their specific premises of physical foundations of consonance is not as important as are the facts that these theories were elementistic and that they were the definite center of experimental investigation of consonance during the last three decades of the nineteenth century. The concept of _Klangverwandtschaft_ was physical and non-behavioral in that the degree of consonance of an interval could be derived nonperceptually. Other than Stumpf's theory of _Tonverschmelzung_, only the work of Mentz (1895) can be found to represent any sort of experimental effort to show a relationship between human behavior and the concept of consonance. Experimental investigation of consonance judgment behavior during the first four decades of the twentieth century was almost as rare.

Affective Domain

During the nineteenth century, the study of the physical, physiological, moral, and therapeutic affects of music was conducted at a pace and scope which has not been equalled during this century. The investigation of musical affects was, more than any other topics considered in this chapter, one of truly international dimensions. No single nation can be considered the center of activity. Tables 13 (infra, p. 70), 14 (infra, p. 71), and 15 (infra, p. 72) are the grouping of literature related to the affective properties of music according to specific nature of inquiry and nationality. American and English documents are shown in the same columns in these tables; American documents will be offset with an asterisk. Table 13 shows studies of the utilization of music as a disease cure. Table 14 shows studies of the physiological and motor affects of music. The interpretation of these tables follows their presentation.

Table 13. Studies of the Utilization of Music as a Disease Cure; Grouped by Nationality, in Chronological Order by Decade.

French		English, *American		German		Other	
Desessarts	(1802)			Weber	(1801-2)		
Mojon	(1803)			Atlee	(1804)		
				Lichtenthal	(1807)		
				Erdmann	(1809)		
Fournier	(1819)			Lichtenthal	(1811)		
				Bach	(1817)		
				Becker	(1821)	Ferrario	(1825): Italy
				Franck	(1835)		
				Schneider	(1835)		
				Bauer	(1836)		
Seguin	(1846)			Anonymous	(1840)		
				H.S.K.	(1847)		
Berthoud	(1853)						
Rolland	(1853)						
Laurent	(1860)						
Seguin	(1866)						
		*Chomet	(1875)				
		Engel	(1876)				
Soula	(1883)	*Beardsley	(1882-3)	Molldur	(1880)	Marquis	(1884): Italy
		*Wimmer	(1889)				
		Cutter	(1891)				
		*Hadden	(1896)	Bryk	(1894)		
Hospital	(1897)	*Corning	(1899)			Gordon and de Acosta	(1898): Spain
Destouches	(1899)	Davison	(1899)				
		Dixon	(1899)				

Table 14. Studies of the Physiological and Motor Effects of Music; Ordered Chronologically by Nationality.

French		English, *American		German		Other		
Roger	(1803)							
Anonymous	(1843)							
LaPommerays	(1857)							
Pontecoulant	(1868)							
Couty and Charpentier	(1874)			Bernstein	(1871)			
Gretrey	(1875)							
		Buchner	(1880)	Dogiel	(1880)			
Fere and Londe	(1887)	*Lombard	(1887)	Urbantschitsch	(1888)			
Tarchanow	(1894)	*Stearns	(1890)	Wallaschek	(1891)			
Billroth	(1894)	Warthin	(1894)	Wallaschek	(1892)			
Binet and Courtier	(1895a)			Wallaschek	(1893)			
Binet and Courtier	(1895b)			Wallaschek	(1894)			
Binet and Courtier	(1896)			Mentz	(1895)			
Henri	(1896)					Dutto	(1896):	Italy
Guenon	(1898)	*Baker	(1897)			Patrizi	(1896):	Italy
Guiband	(1898)	*Talbot and Darlington	(1897-8)			Ferrari	(1897):	Italy
Rochas	(1900)	Parr	(1900)					

Table 15. Studies of the Moral Effects of Music; Ordered Chronologically by Nationality.

French		English, *American		German		Other
				Wendt	(1808-9)	none
				Horstig	(1824)	
		*Rush	(1839)	Anonymous	(1830)	
				Raudnitz Fink Katterfeldt	(1845)	
Rambosson	(1876-7)					
		Haweis	(1888)	Kalischer	(1888)	
		Smith	(1895)			

Tables 13, 14, and 15 show all documents related to the study of the therapeutic, physiological, and moral affects of music which are contained in the bibliography in Volume II. The most-explored affective domain of music during the nineteenth century, judging from the varying numbers of studies shown in each of these tables, was its medical and therapeutic uses. One of the more curious aspects of Table 12 is the contrast to be found in the dates of the studies. Although the bodies of literature from France, England, and Germany are nearly the same size, only the works in French seem evenly spread across the century; there is one work from almost every decade, and never more than two articles from any single decade. The English and American literature is all dated within the last quarter of the century, and more than half of this is found within the last decade. Most revealing are the dates on the German articles; 12 of the 14 works are dated during the first half of the century, during the period that the field of psychology was still speculative.

In contrast to studies of physical and medical affects of music, which were either speculative or empirical - anecdotal in their evidence, studies of the physiological and motor affects of music tended almost entirely to refer to data emanating from controlled experiments. Consequently, it is expectable that most of these studies would have been conducted during the last third of the nineteenth century, the post-Fechnerian era. The preponderance of works dealing with the physiological and motor affects of music emanated from France.

The study of chromasthesia was one almost completely dominated by the French during the nineteenth century. This inquiry was the most-investigated single affective domain of music during the nineteenth century, as shown by Table 16. By the end of the first decade of the twentieth century, investigative activity in this area had slowed almost to a standstill. Music psychology texts make passing reference to the phenomenon; these texts tend to cite only pre-World War I studies. Table 16 has been ordered alphabetically since the dates of all studies contained in the bibliography in Volume II and shown in this table are confined to the last 20 years of the century. The vast majority of studies of chromasthetic phenomena were conducted during the last decade of the nineteenth century.

Table 16. Studies of Chromasthetic Phenomena; Ordered Chronologically by Nationality.

French		English, *American		German		Other	
Faratoux	(1888)	*Brinkerhoff	(1892)	Grueber	(1893a)	Ovio	(1898): Italy
Beaunis and Binet	(1892)	Colman	(1894)	Grueber	(1893b)	Vescovi	(1897): Italy
Benoist	(1899)	Colman	(1898)	Metz	(1898)		
Binet	(1892)	Goddard	(1894)	Moch	(1898)		
Binet	(1894)	MacDougall	(1898)	Molldur	(1880)		
Binet and Philippe	(1892)	Thorp	(1894)				
Breton	(1897)	Whomes	(1887)				
Claparede	(1900)						
Clavier	(1899)						
Coxeaut	(1897)						
Caubresse	(1900)						
Favre	(1900)						
Flournoy	(1892)						
Flournoy	(1893)						
Galton and Grueber	(1893)						
Grafe	(1897)						
Grafe	(1898)						
Grueber	(1893a)						
Grueber	(1893b)						
Lauret	(1887)						
Milet	(1892)						
Pedrono	(1882)						
Philippe	(1894)						
Suarez-Mendoza	(1890)						

Ability

The most influential figure in the history of the study of musical ability is undoubtedly Carl Seashore. His *Measures of musical talent* (1919) are probably the most-cited music tests ever developed. His opinions regarding the extent to which heredity and musical ability are linked, as stated in *The psychology of musical talent* (1919) and in *The psychology of music* (1938) have been the focus of controversy since their introduction. Seashore's position regarding the inheritance of musical ability is given succinctly in the following quote:

> Family pride, musical and social history, investments in musical education, the making or breaking of a career, hinge upon an adequate evaluation of talent; and talent, by definition, is an inherited trait . . . The concept of inheritance must have a place in a psychology of music. (1938, p. 330)

Seashore's hereditarian views are reflected in the studies of Feis (1910), Terry (1929), Mueller (1930), Reser (1935), Schoen (1940), Drake (1957), Kwallwasser (1955), Wing (1963), and Shuter (1968). Leading the attack on Seashore's hereditarian stance were Mursell (1932, 1937), Farnsworth (1931), and Lundin (1947).

The only nineteenth century literature dealing with heredity and musical ability was the sixth chapter of

Wallaschek's (1893) Primitive music. This is not surprising, since Galton's revolutionary concept of inherited abilities was only a little more than a generation old at the time Wallaschek published. The greatest number of nineteenth century studies of musical abilities were published in France during the last decade of the nineteenth century; the chronology and national origins of this literature are shown in Table 17.

Table 17. General Studies of Musical Ability; Ordered Chronologically by Nationality.

French	English, *American	German	Other
		Stumpf (1883-90)	
Dauriac (1892)	Wallaschek (1893)		
Dauriac (1895a)			Calucci (1894): Italy
Dauriac (1895b)			
Foiree (1898)	*Seashore (1899)	Peterson (1898)	
Bronislawski (1900)			

There are a number of works entered in the bibliography in Volume II which deal with more-specific considerations of music ability. A large amount of work was devoted to analysis of the abilities of major composers and the relationship of musical ability and abnormality. Pringscheim (1873), Puschmann (1873), and Hermann (1873) attempted a psychological analysis of Richard Wagner. Gerber (1898) attempted to describe Mozart's 'musical ear,' and Schaafhausen (1885) attempted a similar description of Schumann. Cabanes (1899) and Probst (1899-1900) investigated the relationships between creative abilities in music and physical and psychiatric normality. Legge (1894) investigated the musical abilities of lunatics. The majority of these studies were published in Germany during the last quarter of the nineteenth century: the chronology and national origins of this body of literature are given in Table 18.

Table 18. Specialized Studies of Musical Ability; Ordered Chronologically by Nationality.

French	English, *American	German	Other
Cabanes (1899)	Legge (1894)	Hermann (1873)	none
		Pringsheim (1873)	
		Puschmann (1873)	
		Schaafhausen (1885)	
		Gerber (1898)	
		Probst (1899-1900)	

There has long been a wide variety of opinions among both musicians and psychologists concerning the relationship of music ability and the possession of absolute pitch. Stumpf described some of his own pitch perception experiments in his Tonpsychologie (1883-90), and interpreted them as a measure of musicality; he did not, however, test specifically for absolute pitch discriminations. Abraham's "Das absolute Tonbewusstsein: Psychologischmusikalische Studie" (1901-2) is conventionally the earliest cited study in recent absolute pitch literature. However, the earliest studies of the perceptual phenomenon of absolute pitch were written by von Kries (1891-2), Jadassohn (1899), and Meyer (1899.)

Music psychologists who developed the widest-used measures of musical ability (Seashore, 1917, 1919; Revesz, 1913, 1926; Kwallwasser and Dykema, 1930) offered differing definitions of the absolute pitch faculty. All agreed, however, that a measure of perfect pitch or relative pitch ability is by itself a simplistic and invalid measure of musical ability. Musicians tend to agree with psychologists on this point; the Absolute pitch entry in the Harvard dictionary of music (1966) is suitable evidence.

Conclusions

Since the middle of the nineteenth century, three areas of experimental investigation have dominated the interest of music psychologists: (1) perception of musical elements, (2) the affective properties of music, and (3) musical ability.

The earliest experimental literature relating to the study of pitch perception (Delezenne, 1827) was a measurement of just noticeable differences. Several conflicting theories of pitch perception were presented; recent evidence was presented which indicates that musical pitch information is derived from the fundamental when pitches lie above approximately f''', and from combinations of overtones when musical tones below this pitch level are heard.

The earliest experimental study of timbre was by Willis (1830), who demonstrated the existence of what later (Hermann, 1894) came to be known as formants. Regardless of the amount of experimental work devoted to the study of timbre, an important investigator (Ward, 1970) stated that timbre research has resulted in an unsatisfactory understanding of the phenomenon.

The earliest important psychoacoustical investigations of consonance were by Helmholtz (1863) and Stumpf (1883-90). These studies contained assertions based on the evidence of psychoacoustical data; current psychoacoustical research concerning consonance was cited. The psychoacoustical investigation of consonance was principally a product of German scholarship during the last decade of the nineteenth century. An alternative to these elementistic and sensationalistic theories of consonance is the cultural theory of consonance, most extensively presented by Cazden (1945, 1948, 1954, 1958, 1961); Prout (1889) anticipated this viewpoint.

Investigation of the affective properties of music during the nineteenth century was directed principally toward the study of the medical and therapeutic powers of music. This investigation was principally conducted in Germany during the first half of the century, in France throughout the century, and in England and America during the last quarter of the century. The investigation of the physiological and motor affects of music was principally undertaken in France; English, American, and German literature related to this study date almost entirely within the period 1880-1900. The investigation of the moral affects of music was conducted principally in Germany; there is no single decade during which a noticeably great amount of study in this area occurred. The most active investigation of a single musical affect was the study of chromasthesia. The greatest body of chromasthesia literature was published in France during the last decade of the nineteenth century.

A preponderance of the general investigation of musical ability is found in French literature, almost all published after 1890. Specialized studies of musical ability, i.e., studies which addressed relationships of musical ability to nonmusical data and attempts to describe the special abilities of eminent musicians, were written during the last three decades of the nineteenth century, almost entirely in Germany.

The most striking features exhibited by Tables 12 (supra, p. 67), 13 (supra, p. 70), 14 (supra, p. 71), 15 (supra, p. 72), 16 (supra, p. 75), 17 (supra, p. 78) and 18 (supra, p. 80) are their unbalanced chronological and national distributions. It is evident in these tables that experimental research in the studies of consonance, therapeutic properties of music, physiological, motor and moral affects of music, chromasthesia, and music ability, that is to say some of the most active areas of inquiry in music psychology during the nineteenth century, shared the same historical feature: each area of inquiry was, during some period in the nineteenth century, the center of the collective attention of the investigators of a single nation. Although one can but surmise its cause or causes, there appears to have existed pronounced nationalistic scholarship in these areas of inquiry.

The psychophysical study of pitch, timbre, and consonance was principally conducted in Germany during the nineteenth century. The historical relationships of music scholarship and psychophysical investigation during this period are investigated in the following chapter.

CHAPTER THREE

INSTANCES OF INTERRELATIONSHIP IN THE NINETEENTH CENTURY: MUSIC AND PSYCHOPHYSICS

Introduction

It is the intent in this chapter to give historical evidence that the field of music psychology did, during the nineteenth century, exert some measure of influence upon both the fields of music theory and of music performance. The field of music theory was most noticeably influenced by the writings of Helmholtz; music performance concepts were most directly influenced by intonation-calibrating methods devised will show evidence that, in several instances, those in the field of psychophysiology adopted intonation calibrating procedures resulting from studies undertaken by music performers. I will also attempt to trace influential research in the defined fields of psychoacoustics and music psychology throughout the nineteenth century.
Pre-nineteenth century literature which is thought to be of primary importance in the development of nineteenth century works will be included in this presentation.

Historical evidence provided by Boring (1942, 1950) will be used extensively in this chapter; the dimensions of the task of independently gathering pertinent historical data which were available in the Boring works would in themselves be of dissertation proportions.

Helmholtz's Influence on Music in the Nineteenth Century

The field of music psychology is today ill-defined and often misunderstood. That its boundaries are hazy is evidenced by the fact that the terms "music psychology," "psychomusic," "experimental esthetics of music," "psychophysiology," and "psychoacoustics" are commonly used interchangeably. I am not aware of any person who professes to know music psychology's precise role in the various fields of music composition, music performance, and music theory. Yet, one is able to find historical accounts of reaction, within these various fields, to findings emanating from music psychology research.

In the nineteenth century, the greatest amount of reaction seems to have surrounded the work of Helmholtz. His 1863 treatise _On the sensations of tone_ was of some influence in England, and was the source of major controversy in Germany and in France.

> A decade after Stainer's book [1878. Treatise on harmony] came Prout's [1889. Harmony, its theory and practice], which is reviewed thoughtfully and at some length in M[usical] T[imes] of November 1889. Whilst . . . Prout adopted a good deal of the Day [Alfred Day, M.D. 1845. Treatise on harmony] theory, he departed from it (and from a good deal of theory based purely on acoustical fact) in the following important respect: 'Mr. Prout has adopted the dictum of Helmholtz, that "the system of scales, modes, and harmonic tissues does not rest solely upon unalterable natural laws, but is at least partly also the result of aesthetical principles which have already changed, and will still further change with the progressive development of humanity."' In other words, 'rules' of harmony rest as much on a psychological basis as on a physical one, and, consequently, alter or develop indefinitely as the mentality of the musical community develops or alters. (Scholes, 1947, v. 2; p. 710)

An account of Helmholtz's influence in the field of music theory was given by Rummenhoeller (1967), who stated:

> ". . . since the [eighteen] sixties no new thought in music theory has appeared which did not have its point of origin in Hauptmann and Helmholtz." (1967, p. 69)

Rummenhoeller asserted that "Hauptmann denied the right of Helmholtz's Tonempfindungen to be called a musical theory in spite of his admiration for the latter's accomplishments in the physiological and physical-acoustical realm" and quoted Hauptmann:

> Helmholtz's book certainly earns all due praise accorded to it, if one is to make a differentiation between the physiological and the psychological -- Helmholtz thinks nothing of the latter, it seems to me, and if he is of the opinion that anything even touching music theory is in his book, then he is wrong and has no knowledge of what is important in this matter. (1967, p. 70f)

The following quote indicates that Hauptmann found some agreement with his views in France.

> HELMHOLTZ (Hermann-Louis-Ferdinand), German doctor and physiologist, born in Potsdam, August 31, 1821; studied medicine at the Charity Hospital in Berlin, practiced medicine at Potsdam, and was successively professor of anatomy and physiology at Berlin, at Heidelberg and at Bonn. His important physiological works on the sensory perceptions have value and are considerably esteemed both by his countrymen and by people abroad. We cannot hope, in this amount of space, to occupy ourselves with his experiments and discoveries related to acoustics, and above all his theory of auditory perception, a remarkable theory which alone sufficed to make his name in science, and through which he wrongly wished to present, moreover, a harmonic system whose elements are absolutely inadmissable. As do all scholars who occupy themselves with acoustics, Helmholtz wished, in his demonstrations to musicians, to show that he could discount the ever-so-delicate sensations of the artistic ear through the benefit of the essentially brutal calculating intellect, and he would thus have ruined just as wantonly his system, if that system had not been solid enough to resist the errors and speculations, however hazardous, of its inventor. (Fétis, 1881; pp. 457-459. Eng. trans. by D. Butler)

The content of the above paragraph is a peculiar mixture of accolade and strong disagreement. The fact that Helmholtz was accorded a relatively lengthy entry in Fétis' work, some 240 lines, indicates that his historical prominence was rather great. The second paragraph of the Fétis entry is of some bibliographic value:

> This system was founded by Helmholtz in an important work published in 1863 which, in 1868, was translated into French and appeared under the title: Théorie physiologique de la musique fondée sur l'étude des sensations auditives. [f. 1:] Translated from the

German by M.G. Gueroult, former student at the polytechnical school, with the concurrence for the musical portion, of M. Wolff, of the house of Pleyel, Wolf and Cie (Paris: Victor Massan, 1868: in octavo with illustrations). (Fétis, 1881; p. 457. Eng. trans. by D. Butler)

Helmholtz was also cited in Riemann's (1889) _Geschichte der Musiktheorie im XI-XIX Jahrhundert_: Helmholtz's (1863) _Tonempfindungen_ is cited on pages 492 and 516ff. The citation on page 492 relates to Helmholtz's data on combination tones; the second citation of Helmholtz's work appears in Riemann's discussion of consonance, and includes an evaluation of Helmholtz's _Tonempfindungen_ by Riemann:

> Helmholtz's one-sided derivation of tonal relationships [_Tonverwandtschaft_] from the combinations of overtones (in his _Lehre von den Tonempfindungen_, 1863) which could not prove perfect consonance for minor chords -- notably this is the weak point of Helmholtz's system -- points for the first time to a conception of the minor chord which is, of course, not as Helmholtz thinks, always necessary, but which indeed should, under certain circumstances, become possible and correct for the further development of the theory of the meaning of harmonies." (1898, p. 516)

More notably, Helmholtz was not the only experimentalist to be cited in Riemann's text. Hostinsky's (1879) _Die Lehre von den musikalische Klaengen_ is cited on page 521, as evidence for Riemann's assertions concerning the consonance of the minor triad. On page 157, Riemann cited Dechevrens' (1898) _Etudes de science musicale_ in his enumeration of theories of rhythm. Riemann cited several of Stumpf's experimental investigations and texts: Stumpf's tonal fusion theory of consonance, as presented in his Tonpsychologie (1883-90), is reviewed on page 522. Stumpf's Geschichte des Consonanzbegriffs (1898-1901) and Die pseudo-aristotelischen Probleme ueber Musik (1897) are both cited on page 1 of Riemann's text in his discussion of the boundaries of the field of music theory. Stumpf's theory of tonal fusion, as presented in his Ueber Konsonanz und Dissonanz (1898) is cited on page 396, in relation to Salinas' (1577) discussion of discrimination of intervals.

Pre-Helmholtz Psychophysics Literature, I: Before 1800

Helmholtz's treatise of 1863 was not the first study to generate controversy as to whether behavior and music theory could or should be related. Rather, the controversy was well under way at this time. The earliest foundation of music psychology would have to be attributed to Aristoxenus, in his work of about 350 B.C., entitled The harmonics (edited and translated by Macran, 1902). Aristoxenus stated that the musicality of tones actually lies in their perception, instead of within the mathematical postulates formulated by Pythagoras and which, incidentally, have been the principal basis of authority for music theories from Pythagoras' era to the twentieth century. But:

> The [Greek] economic system, which included slave

> labor, made it possible for the elite to give themselves fully to the advancement of a civilization to which the modern westerner owes an immeasurable debt. It was not, however, a civilization adapted to the emergence of experimental science. It favored intuition, insight, and the intellectual processes, but not the extraction of secrets from nature by mechanical contrivance and experimental technique. (Boring, 1950; pp. 6-7)

The means of "extraction of secrets from nature by mechanical contrivance and experimental technique" were neither available to Aristoxenus, nor can it be assumed that they would have been favored by him. Quantitative analysis within Aristoxenus' realm was to wait more than two thousand years.

The history of music theory since Aristoxenus' time has never been far from the philosophical question of whether music is within or beyond the realm of quantitative analysis. This is a question which pervaded the nineteenth century, and which is still very much alive today. Related to this line of thought is the question of whether Helmholtz and other nineteenth century scientists in his field thought of themselves as investigators of concepts which could be applied by others to music psychology or as investigators of music psychology. This is a moot question. Evidence given later (infra, p. 108) in this chapter indicates that the developments within the fields of psychophysics and music psychology during the nineteenth century were not mutually exclusive. Helmholtz is the historical figure who first codified bonds between the two fields.

The findings of several pre-nineteenth century experimentalists had become axiomatic knowledge by the time that Helmholtz wrote his Tonempfindungen. Before Guericke's treatise (1657), it had not been experimentally determined exactly how sound travelled from its source to the ear. Guericke was able to show that sound could not be generated in a vacuum, and intuited that air was the acoustic medium; later studies demonstrated that liquids and solids could also function in this capacity. Experimental findings of Galileo (1624), Mersenne (1636), and Hooke (1681) demonstrated a relation between frequency and pitch. Saveur (1701) established the physical existence of overtones, and in so doing coined the terms fundamental, harmonic, and node. Tartini (1714) discovered the perceptual basis of the combination tone, which he called a 'terzo suono' (third sound). Lagrange (1759) determined that the combination tone was made up of the same "beats" which had been described by Sauveur. Young's experiments (1800) corroborated Lagrange's findings. Haller, in his Elementa physiologiae (1757-1766) gave a full discussion of the senses. Chladni (1787) experimented extensively in acoustics during the late eighteenth century.

Pre-Helmholtz Psychophysics Literature, II: After 1800

Boring (1942) lists four nineteenth century documents which were sources of important influence on Helmholtz as he wrote his Tonempfindungen:

> The resonance theory of hearing, a scientific achievement of first importance and one which has dominated work in this field since its inception, was formulated by Helmholtz in his Tonempfindungen in 1863. . . . To make the theory Helmholtz drew upon four bodies of information until then largely unrelated. (1) . . . he knew the physiological acoustics of the ear . . . thus his theory depended upon Charles Bell's observations about the function of the round window (1809) and Flourens' establishment of the non-auditory function of the semi-circular canals. . . . (2) . . . Helmholtz had . . . some knowledge of the microscopic anatomy of the inner ear; this was due to the work of Corti (1851) and others. . . . (3) Then he had for use Mueller's doctrine of specific nerve energies, a rule that difference of conducting sensory fiber always means difference in quality. (4) Finally, Helmholtz had Ohm's law of 1843, which depended in turn upon Fourier's theorem of 1822. . . . Put in this way it seems almost as if Helmholtz's elaborate argument for the theory amounted to little more than a statement of the obvious, but it was Helmholtz's achievement to bring unrelated data together and in so doing make their mutual significance obvious. (Boring, 1942; pp. 404-406)

Haller's (1757-66) treatise was not cited by Helmholtz; yet Haller's findings were a secondary influence upon the writing of Helmholtz, with Bell (1809) serving as mediator.

> Sir Charles Bell in his Anatomy of the Human Body in 1809 discussed the topic of hearing at length, repeating the standard anatomical facts that Haller had cited. Supposing the entire labyrinth to be the organ of hearing, he suggested that the cochlea, so much more highly developed in quadrupeds and man, may function

> for the finer auditory discriminations and for musical perception. Since there are, he supposed, from 400 to 500 distinguishable pitches, and also as many loudnesses, the cochlea would have to respond differentially to as many as 20,000 different tones. (Boring, 1942; p. 402)

Although Bell is more noted in the historical literature for his Toward an anatomy of the human brain in 1811, the quote above is most noteworthy in that it presents the germ of the resonance theory proposed by Helmholtz in 1863. Had Bell developed this germ into a workable hypothesis, one might wonder how Helmholtz's historical position might have been altered.

Fourier's discovery is important enough to merit further investigation:

> In 1822, Baron Fourier . . . found that any continuous function or curve, no matter what its shape or how irregular (provided it does not return on itself), can be represented as the sum of a series of sine curves, in which the separate terms vary in length (period), in height (amplitude), and in phase relation to one another, and in which the wave-lengths are even fractions (1/2, 1/3, 1/4, etc.) of the wave-length of the function being represented. He proved that this infinite series is convergent; the original function can be represented with any degree of approximation by adding enough terms in the analysis. Because it provided a mathematical theory of the vibrating string, this discovery had presently a great effect upon physical acoustics. While Sauveur had made it certain that a string vibrates in a great many different ways at once . . . as a whole, in halves, in thirds, etc. -- no one had made it clear how the composition of so many modes of vibration takes place. Now Fourier's series provided an analogue: the pattern of the vibration components that represent the various harmonics involved. Nor was this new principle only synthetic; it was also analytic, for it showed that any periodic

> motion at all can be reduced to the sum of a series of simple harmonic vibrations. . . . This kind of analysis was given a psychophysiological meaning by G.S. Ohm in 1843. . . . Ohm argued . . . that for any complex wave-form the ear 'hears out' the simple harmonic components, the same components that Fourier's analysis of resonance would give. Ohm's acoustic law thus asserts that it is possible to pay separate attention to the simple harmonic components of any irregular sound wave. The law has been generally accepted. Providing the basis for Helmholtz's theory of hearing, Ohm's law along with Helmholtz's theory dominated all theoretical discussion in the field of audition for at least sixty years (1863 et. seq.). (Boring, 1942; p. 325-7)

A great deal of the experimental literature of the early nineteenth century dealt with the concept of just noticeable difference. In other words, how much change in quality or quantity can a stimulus undergo before an observer becomes aware of this change? In France, the most prominent experimenter, and possibly the earliest, in this investigation seems to have been Delezenne.

> Just before the period of these experiments Delezenne [1827. Recueil des travaux de la société des sciences de Lille], who was working in the field of acoustics, had hit upon the fact that if a wire of a certain length and tension was struck, and its pitch compared with that of a similar but slightly longer wire, a constant difference in the length of the wires was necessary to make possible a correct pitch discrimination. He worked with 240 vibrations per second as a standard, and found how much higher the pitch of the second tone had to be in order to enable the subject to distinguish it from the standard. Weber seized upon this observation as another instance of his law. But, as Delezenne had used only one standard, Weber was mistaken in utilizing this conclusion in support of his own. From the results of all the experiments noted, Weber believed that his general principle was founded on facts from the skin, muscle, eye and ear. (Murphy, 1932; p. 83)

Mueller (1826) and Bell (1809) seem, on the basis of historical evidence, to form a peculiar scholarly relationship. Grossly simplified, Mueller's most important experimental literature was a reiteration of findings of which Bell had written a full quarter-century earlier. Bell, however, did not make his findings public.

> Johannes Mueller (1826) divided the sensory field into five by his doctrine of the specific energies of nerves. Aristotle had already made the division, of course, but Mueller (Bell anticipated him, but that was not recognized at the time) gave physiological meaning to the difference by asserting that each sense has its own specific energy and can respond only with its own peculiar quality. Pressure on the eye gives light, light on the skin gives warmth, a blow on the ear produces sound. Here again classification stimulated research. (Boring, 1942; p. 8)

Mueller-Freienfels (1935) gave a short account of the content and concept of Mueller's doctrine of specific nerve energies:

> The basis of all study of sensation is the Law of Specific Energy of Nerves established between 1830 and 1840 [all of the other history sources of which I am aware give the date as 1838. DB] by Johannes Mueller. It is formulated today as follows: "A sensory nerve always reacts in its own particular manner to any possible stimulus that can cause it to react, and therefore registers only its own specific type of sensation." But it has also become basic for the psychology of sensation the problem of which was to learn which various experiences of consciousness could be determined by stimulating definite organs and varying the stimuli. Johannes Mueller's law must not be understood in the sense that the stimulus itself is completely irrelevant. It simply defines the relation of specific neurones. (Mueller-Freienfels, 1935; p. 47)

Boring stated, however, that Mueller's was not the last word on the concept of specific nerve energies.

> Mueller . . . applied the principle [of specific nerve energies] only to the differentiation of the five senses, but Natanson in 1844 extended the principle to separate qualities within the single sense -- to red, yellow, blue, temperature, touch, sweet, sour, bitter, and the simple smells. When, however, Natanson lacked the boldness to suggest that every pitch must have its own specific energy, that extension of the principle was left for Helmholtz to make. That Helmholtz had such courage of conviction as to suppose the existence of more than 5000 specific energies for hearing (with a separate fibre, of course, for every energy) was one reason why both Mueller's doctrine and Helmholtz's theory became so important. The logic was sound, but it contradicted habitual modes of thought. (Boring, 1942; pp. 403-4)

Another facet of Mueller's experimental literature is his investigation of the phenomenon of auditory localization, an investigation generally thought at that time to be within the domain of the empirical philosophers.

> The empiricists -- Berkeley, James Mill and Bain -- all attributed the localization of sound to experience. In the application of this principle they could be most explicit about heard distance, for there they argued that a sound whose intensity is known can have its distance inferred from the loudness with which it is perceived. On the means by which auditory direction is perceived they were more vague, but in general they held that other sensations must assist. Bain asserted, for instance, that, if one man speaks from among a row of persons, we cannot identify the speaker unless we recognize the quality of his voice or see his lips move. Johannes Mueller (1838), noted that the perception of direction must depend upon the different position of the two ears; it must be, he said (hitting incompletely on the truth), the difference in intensity of the sound at the two ears or the change of intensity at one ear when the head is moved which provides the cue for direction. As showing how visual perception may determine the perceived direction of a sound, he also cited ventriloquism, an ancient art.

(Boring, 1942; p. 383)

Boring (1942, pp. 384-5) gave evidence that the topic of auditory localization remained controversial, and that no comprehensive theory dealing with this phenomenon proposed during the remainder of the nineteenth century was universally accepted.

Flugel (1933) summarized the extent to which scientific research of auditory and musical phenomena had developed during the first third of the nineteenth century.

> Nor was there [in 1833] such an intimate knowledge of the actual end-organs of sense (the terminations of the auditory nerve in the organ of Corti) as existed in the case of vision. Probably owing to this, there was no well-known theory concerning the elementary qualities of auditory sensation to correspond with Young's and Goethe's colour theories. Helmholtz, when later on he came to formulate his famous theory of hearing, had no older theory of standing to build upon, as in the case of vision. Of the three great psychological correspondences between the nature of the stimulus and the resulting sensation (the amplitude of the air vibrations corresponding to intensity or loudness, their wavelength corresponding to pitch and their shape corresponding to timbre) the first two were known and clearly stated in Mueller's Textbook, the last one not. (Flugel, 1933; p. 63)

During the 1840s, Ohm related the separate findings of Mueller and Fourier, and gave them musical significance.

> The question of analysis of compound wave-forms, the question that largely determined Helmholtz's theory of hearing, was not to be satisfactorily dealt with by Mueller. . . . Bell, although extremely vague, is thought to have come nearer the truth, as Helmholtz saw it, by guessing that the ear must be something like a musical instrument with strings of different lengths.

> The solution to this problem had been available since 1822, when Fourier showed that any irregular periodic wave-form can be resolved in a sum of sine components. The necessary insight came in 1843 when G.S. Ohm applied this principle to hearing, noting that the ear hears for an irregular or "complex" wave-form the Fourier sine-components. This is Ohm's acoustic law. It became later, of course, the basis for Helmholtz's resonance theory of hearing, for analysis by resonance gives the same result as Fourier's analysis. Mueller wrote without this knowledge. (Boring, 1950; p. 109)

Another experimenter whose work was influential in Helmholtz's formulation of his resonance theory was Ernst Heinrich Weber. Perhaps one of his more important investigations was that of sense modality:

> Weber (1834, 1846) distinguished between the Tastsinn [sense of taste] and the Gemeingefuehl [thought perception], dividing the Tastsinn into Durchsinn [sense of weight], Temperatursinn and Ortsinn [sense of locality]. Helmholtz, however, provided a method for settling this difficulty by defining modality as a class of sensations connected by qualitative continua. Colors lie in a single modality because they can be placed in a single three-dimensional continuum, the color solid. Tones form a modality, but touch does not, for at least pressure, temperature and pain are discrete. (Boring, 1942; p. 10)

Weber also contributed some observations on the phenomenon of auditory localization. His experimental technique was somewhat informal by today's standards: he placed two watches in equal proximity to an observer's ears, and found that not only could the watches be heard simultaneously, but the watches could correctly be referred to their respective proper sides. I assume that the identifiable factors for each watch would have been some aural cue such as the loudness or pitch or timbre of its peculiar tick. For background, see Boring (1942, p. 323) and Murphy (1932, p. 80).

A contemporary of Weber was Gustav Theodor Fechner. Their names are commonly linked, in the psychophysical literature, through the Weber-Fechner law of smallest perceptible differences. The law was the product of Weber's research in muscle senses, and his research technique centered around the lifting of weights: the determination of the threshold of sensitivity to weight difference. The law was first stated as a simple factual observation: the just noticeable difference between two weights can be stated as a constant ratio. Fechner expanded this concept to include the perceived difference of lengths of lines and pitches of musical tones.

Fechner is commonly thought to be the "father" of experimental psychology. The following quote is quite colorful prose, but should elucidate this point.

> Many psychologists regard as the birthday of all modern psychology the morning of October 22, 1850, when Gustav Theodor Fechner, lying in bed, realized the possibility of measuring the intensity of sensations and bringing these numerical measurements into causal relationship with the numerical measurements of external stimuli. Whether it is right to celebrate that particular day is doubtful; first of all, because Fechner was not without predecessors in his procedure, and secondly, because his results have been too badly belabored by modern criticism, although this, of

> course, does not necessarily invalidate their historical significance. In any event, the dignified figure of Fechner has the right to claim a place of honor in every history of psychology, even if the most profound impetus for his methodology, which strove toward the maximum of exactitude, was of a metaphysical and speculative nature. (Mueller-Freienfels, 1935; p. 48)

Flugel found Fechner most important for his "discovery" of the application of scientific measurements to the study of the human mind, and relegated Fechner's role in the development of the Weber-Fechner law to a level of importance secondary to his fathering of modern psychology. Flugel did, however, raise an important consideration of Fechner's concept of smallest perceptible differences.

> Fechner's . . . contribution was one that had been implicit in Weber's work, i.e., the concept of the limen or threshold itself. . . . The initial threshold, as Fechner understood it, required the theoretical existence of negative (subliminal) sensations, too feeble to affect consciousness, while the same applied to subliminal differences of sensation in the case of the differential threshold. . . . It soon became apparent that in practice the initial threshold has in many cases some of the characteristics of a differential threshold. This is notably so in the case of hearing. Even in a completely sound-proof room (a very rare feature even of the modern psychological laboratory) a sound of minimal intensity is heard, not against a background of complete silence, but against one of physiologically determined sound of low intensity; and the same, to some extent, is true of vision, for it is impossible to do away with the "retina's own light." Nevertheless, the background sensations are in such cases usually of different quality, or have different temporal and spatial characteristics from those of the experimental stimulus proper, so that some important distinctions between the initial and differential thresholds still remain. (Flugel, 1933; pp. 164-5)

One remaining important document was Lotze's

Medicinische Psychologie, which was published in 1852. Boring cited Lotze and Helmholtz's early literature concerning timbre:

> In 1852 Lotze . . . noted that sensory series correspond to stimulus series, although there is no exact proportionality between. He discussed what were to become later the four basic attributes: quality, intensity, extension and duration. He laid down certain general principles about mixture or simultaneous stimulation. Two stimuli of the same quality acting on the same nerves summate, he said, yielding a stronger sensation. Two stimuli of different qualities may or may not arouse an intermediate quality: colors usually do (red and yellow, though not blue and yellow), tones do not. These differences must depend upon the different ways in which stimuli affect nerves. Qualities from different senses, however, never yield an intermediate quality, he added, but only a division of attention.
>
> It was subsequently Helmholtz who saw that, since all sounds can be reduced to a complex of harmonic components, there are only three dimensions to the auditory stimulus: the frequency, the amplitude, and the combination of different frequencies. So he looked to the pattern of partials in a musical note to explain its _Klangfarbe_. Actually his first paper on this subject (1859) was an attempt to account for the _Klangfarbe_ of the different vowel sounds in terms of the relative strength of particular partials in each of the principal vowels. Later in the _Tonempfindungen_ this theory led to his identification of _Klangfarbe_ with the pattern of partials. His logic was simple. If musical instruments, human voices and vowels can differ in timbre from one to another at any pitch and at any loudness, then there is nothing left but the pattern of the different pitches to distinguish them. This theory has stood the test of time. (Boring, 1942; p. 87, 358)

The Development of Precisely Controlled Sound Generators

An important development related to Helmholtz's experimental work was the response to the practical problem of musical intonation which stimulated the development of devices to measure more precisely tonal stimuli. Boring stated:

> . . . music, aided by recent physics, was able to furnish the new experimental psychology in the middle of the nineteenth century with pretty good specifications for the tonal stimuli. Thus, there was an interest, on the parts of both musicians and physiologists in the development of some sort of standard by which pitch could be regulated. (1942, p. 3)

The tuning fork was the mechanical means of pitch standardization most used by physiologists and musicians in the nineteenth century. The invention of the tuning fork is attributed to a musician in the early eighteenth century.

> Shortly after the coronation of George I in 1714, John Shore, who had been sergeant trumpeter at the coronation and had been made Lutenist in the Chapel Royal, invented a tuning-fork -- "a pitch-fork," as he humorously called it -- by which to tune his lute. The law of beats was discovered about the same time (1700). Thus there actually existed, before Bach wrote his music for the well-tempered clavier, a possibility of accurate tuning, although it was not generally utilized until later. (Boring, 1942; p. 319)

No historical evidence was found to indicate major advances in the development of mechanical or technological means of instrument tuning for more than a century after Shore's invention. However, the second third of the nineteenth century was a period of notable advances in the area of musical instrument tuning, and evidence indicated that psychophysicists largely adopted these tuning devices for the calibration of tonal stimuli during this period.

> It was in the middle of the nineteenth century -- the "century of science" -- that accurate calibration of musical notes was undertaken. By then the tuning fork had developed into an instrument of precision. Thus in 1834 J.H. Scheibler was able to construct a tonometer of 56 tuning forks for the purpose of calibrating musical instruments. Marloye, a famous instrument-maker in Paris, put the tuning forks on resonance boxes in 1839, and his even more famous successor, Rudolph Koenig, who took over his business in 1858, developed the precision of the tuning fork to such a degree that Koenig forks came to be known throughout the scientific world and cherished in physical and psychological laboratories. Meanwhile, in 1840, A. Seebeck constructed a siren which proved a convenient instrument of calibration because its frequency was easily determined by its speed of rotation and the number of holes in its rotating disc. Subsequently, in 1866, A. Toepler employed a stroboscopic method for the study of the vibration of singing flames, and A. Kundt devised the dust method for computing the frequencies of tones. Altogether, the forty years from 1830 to 1870 constituted a period in which great advances were made in the control of the frequency of the tonal stimulus. That the unsatisfactoriness of meantone temperament should have been admitted at this time was, thus, no accident, or that equal temperament should have come into general use in the 1840's. (Boring, 1942; pp. 319-320)

Boring's statement that equal temperament came into general use in the 1840s is imprecise; it would be more realistic to state that equal temperament had come into general use by the 1840s. Barbour (1932, 1951), who is probably the most important contributor to the study of the history of tuning and temperament, found that adoption of equal temperament took much longer than a single decade.

> . . . it is not possible to sketch an orderly evolution [of equal temperament] except in the broadest outlines. One can get some notions of the intricacy of one problem by reflecting that a Dutch writer, Simon Stevin, about 1600. . ., had described equal temperament with perfect accuracy and had advocated it for all sorts of instruments, and yet this theory of tuning was not universally accepted in England until after 1850. (Barbour, 1932; p. 24)

Barbour (1951) later deduced, from examining the ranges of modulations found in a number of musical specimens, approximate dates of the adoption of equal temperament, for different types of fixed-pitch musical instruments and in different European locales: the lute and viol music of Italian, French and Spanish composers suggests that "lutes and viols did employ equal temperament from an early time, perhaps from the beginning of the sixteenth century." (1951, pp. 187-8) Barbour asserted that the adoption of equal temperament in the manufacture and tuning of keyboard instruments came about a century or more later in Italy and in Germany:

> There is ample evidence that in Italy during the first half of the eighteenth century equal temperament or its equivalent was being practiced. (1951, p. 193)

> An equal temperament was needed for the keyboard works of Bach, both for clavier and for organ. It is generally agreed that Bach tuned the clavier equally . . . In [Bach's organ works] is a host of examples of

> triads in remote keys that would have been dreadfully dissonant in any sort of tuning except equal temperament. (1951, pp. 195-6)

Psychophysicists adopted the Koenig tuning forks as laboratory instruments because the tones produced by them were precisely calibrated and because the stimulus tone exhibited pure sinusoidal characteristics. The only uncontrolled portion of the tone generated by tuning forks was its intensity, and it was for this reason that the tuning fork was eventually replaced in psychophysical laboratories by electric oscillators. The electric oscillator was, however, not developed until well into the twentieth century; tuning forks were the primary sound stimulus generators in psychoacoustical experimentation until the 1920s.

Helmholtz's Most Important Theories

Regardless of the almost reverent attitude that some historians, Boring included, take when discussing Helmholtz, it would be incorrect to suppose that his Tonempfindungen (1863) was immediately and universally accepted. Indeed, historical evidence demonstrates that this was not the case. Quotations of objections raised by Hauptmann (supra, p. 88) and Fetis (supra, p. 89) attest to the fact that Helmholtz was attacked for the philosophic tenets of his Tonempfindungen; a half century after the objections of Fetis and Hauptmann were written, Vernon (1934-5) stated:

> Helmholtz's work (together with that of most of his opponents) is imbued with extreme nineteenth - century elementism; and owing to his great prestige, the psychology of auditory perception has advanced but little from the stage in which he left it in 1863. (1934-5, p. 124)

The opponents to whom Vernon alluded were not musicians such as Fetis and Hauptmann; instead, they were other physiologists of the late nineteenth century. The two psychophysically-based theories proposed by Helmholtz which stimulated the greatest amount of research and controversy were his resonance theory of hearing and his tonal relationships theory of musical consonance. Helmholtz's theory of musical consonance and reactions to it were discussed earlier (supra, Chapter 2, p. 65). Helmholtz's resonance theory of hearing holds that the different portions of the basilar membrane resonate sympathetically with different frequencies corresponding with those of the sound wave stimulus. Negative reaction by physiologists to Helmholtz's resonance theory of hearing took the form of alternative theories. Boring (1942) offered a comprehensive enumeration of these theories:

1. Place-resonance theories: specific fibers at different places along the cochlea are stimulated by partials of the complex tone stimulus.

2. Pattern-resonance theories: also known as pressure-pattern theories; the most important of these seems to be Waller's theory (1891). Instead of relying on the specific nerve energies concept, Waller and others stated that the basilar membrane responds to the tone stimulus much in the way that Chladni's vibrating plate formed dust patterns ; different characteristics of vibration form different patterns in dust or silt which has been placed on the vibrating plate. The pressure-pattern analogy seems to be the forebearer of the periodicity hearing theories which have been proposed in the twentieth century.

3. Frequency-non-resonance theories: also known as the telephone-analogy theories and leather chair-seat analogy theories, these theories essentially hypothesize that the basilar membrane is strictly a frequency conductor, and resonance plays no part in the activities of the basilar membrane. Rutherford's theory (1886) has popularly been referred to as the telephone theory, and Max Meyer's theory (1896) has been given the common title of the leather chair-seat theory.

4. Place-non-resonance theories: Hurst (1895) agreed with Rutherford and other such frequency-non-resonance proponents that the basilar membrane is not a resonating member in function; but he hypothesized that the basilar membrane was excited because of sound waves passing up through the vestibular canal and back down the tympanic canal. The contrasting excitation produced by the bidirectional motion of sound waves sets up a standing wave at some specific point or place on the basilar membrane.

5. Frequency-resonance theories: Wilhelm Wundt (formerly Helmholtz's assistant at Heidelberg) proposed (1893) his alternative to Helmholtz's theory: his theory differed from Helmholtz's theory only in that Wundt believed that the auditory fibres themselves contained a certain "beat frequency." . . . Wundt evidently felt prepared to defend the statement that a person can, without any operation of the outer ear, still hear subjective difference tones.

6. The Duplicity theory was not formulated until the early twentieth century; its first proponent was Jaensch (1913). Jaensch proposed that man has two separate hearing apparati: he hears tones, and therefore music, through the cochlea, and hears noise through the vestibular canal.

Boring gave his summary of the theories posed as alternatives to Helmholtz's theory of hearing:

> Helmholtz's original contribution was, to be sure, a great advance; his clear thinking and sound physics worthy of admiration; but not nearly so favorable a verdict can be given of his critics. Sincere and industrious, they nonetheless dealt naively with a complicated problem of physical dynamics, and there can be little doubt that they were partially blinded to the deficiencies of their theories by their own ingenuities. In that respect they were being little more than consistent with the period in which they wrote, the period when theories were validated almost as much by the personalities of their authors as by their supporting facts. So important, indeed, were theories before 1920 that even an inadequate one seemed better than none at all. (Boring, 1942; pp. 418-419)

Helmholtz was not without his critics because of controversies which some statements in his <u>Tonempfindungen</u> (1863) generated. One such controversy involved the differentiation of music and noise. Jaensch's theory (1913), in asserting that man possesses separate faculties for the audition of music and noise, does not seem so ludicrous in light of evidence that Helmholtz had held the same opinion at the time of the publication of his <u>Tonempfindungen</u>.

> Helmholtz, who in 1863 described the tonality of noises, was inclined to the view that there might be different organs for tone and noise, that the ampullae of the semi-circular canals or perhaps the vestibular organs might mediate the perception of noise. Holding that periodic waveforms give rise to tones and aperiodic waveforms to noise, he implied a continuity between noise and tone, for there can obviously be intermediates between these two extremes. In 1875 Exner, using Savart's spoke . . . found that the successive noises of a card or a piece of wood, striking the rotating spoke, could be distinguished when the interval between hits was greater than .002 sec. In other words, tonality begins to come in, as Savart's spoke speeds up, before noise completely disappears. So impressed was Helmholtz by this evidence of continuity that he changed his mind in 1877 about the organ of noise, concluding that noise like tone is mediated by the cochlea. He stressed then the fact that the aperiodic vibrations of noise are more or less indeterminate in pitch, whereas the periodic vibrations, no matter how complex, are determinate. Stumpf in 1890, relying as usual on his expert introspection, argued that noise is not pitch, even though one of them may enter into a perception as the other passes out, and that their perceptual disparity indicates the existance of separate organs for them. Kulpe (1893) supported the essentials of Helmholtz's final conclusion. (Boring, 1942; pp. 363-364)

Post-Helmholtz Music Psychology Literature

A major figure first discussed in this chapter within the last quote was Carl Stumpf. Stumpf is popularly called the "father of music psychology," most likely because his Tonpsychologie (1883-90) was the first comprehensive text in the field. A fair account of Stumpf's Tonpsychologie, and its consequent influence, is offered by Murphy (1932, p. 180). Murphy pointed out that Stumpf's work was not dependent upon the findings of Wilhelm Wundt. This seemingly pointless remark acquires meaning only when one finds evidence that there was, in the last third of the nineteenth century, a growing schizm in schools of thought within the field of music psychology. One school of thought was that music psychology, and all of psychology for that matter, ought to stay within the bounds of sensory measurement. To stray outside these bounds, the proponents of this view felt, was to indulge in speculation at best, and at worst to be misleading. The opposing school of thought was that sensory measurement was good analysis for what it was worth, but it was not all of psychology. During the last decade of the nineteenth century, this ideological dispute was taken as the basis for a controversy which flared between Wundt and Stumpf. Wundt's argument was that the only reliable music psychology data was that obtained through controlled experimentation. Stumpf's rebuttal was that if experimental data contradicted incontrovertible musical knowledge, then the experimental data should not be held above suspicion.

There is historical evidence that there existed, in England during the 1880s, a music theory analogue to the controversy between the internalists and externalists in the field of psychology. Gurney (1880) stated:

> My chief object . . . has been to examine . . . the general elements of musical structure, and the nature, sources, and varieties, of musical effect. Since the publication of Helmholtz's Tonempfindungen, an epoch-making book in the branch of physics which deals with musical sound, the study of that subject has been widely popularised. But while the indispensable material of musical phenomena has thus met with exceptionally complete treatment, and has been in its salient points exceptionally well understood in this country, little attempt has been made to apply scientific treatment to the musical phenomena themselves. (1880, pp. xvii-xviii)

Cobb (1884), in a lecture to the Royal Musical Association which dealt with the evidential bases of music theory, asserted that:

> Musical sounds may be considered under three aspects: (1) Their cause and mode of transmission. (2) Their reception by our external sense, the ear. (3) Their effect, after that reception, on our internal sense or musical feeling. (1884, p. 125) . . . there is the physical world, the physiological, and the psychical . . . the logical origin of music is most unquestionably psychical and not physical, and theories which take as their basis the axiom that what is physically provided and physiologically received is necessarily productive of certain psychological

> effects, are not theories which can meet with approval from an educational point of view. (1884, p. 150)

Boring (1942) cited three new areas of investigation during the late nineteenth century: the study of musical rhythm, the investigation of form-quality in music, and the relationship of music to animal psychology.

One of the early attempts to analyze rhythm in music was made by Wundt:

> Wundt, when he first formulated his system in 1874 [W. Wundt, Grunzuege der physiologischen Psychologie, 1st ed., 1874; pp. 717-719 and 6th ed., pp. 330-345], conceived of consciousness as having a given spread over what he called the Blickfeld (focus margin), containing within it the Blickpunkt (focus) of clear attention. The span of the Blickpunkt constituted the range of apperception, which Wundt later measured by the amount of differentiated material correctly reproducable after tachistoscopic presentation. The span of the Blickfeld was the range of consciousness, which Wundt thought was measured by the content of a perception which can be identified as a whole without specification of its parts. Later he employed rhythmical groups as representative of this sort of perceptual material. Six unrelated beats constitute, he believed, the maximal range of consciousness, for six such beats can be perceived as different from five or seven even though they have not been counted. (Boring, 1942; pp. 583-584)

Boring then cited investigations of other aspects of musical rhythm:

> The objective conditions of rhythm have been worked out by a number of investigators. The most important conditions are relative intensity of the members of the group (accent), relative duration of the members and relative duration of the intervals between members. Meumann in 1894, contributing a pioneer paper in this field, varied the relative loudness of sounds

> and concluded that a loud sound tends to lessen the subjective interval preceding it, to increase the subjective interval following it, and thus in general to conclude the rhythmic foot. A series of sounds at equal objective intervals would thus be heard as an iambic, not a trochaic rhythm, but Meumann's conclusion was not confirmed by subsequent workers. (Boring, 1942; p. 584)

The original document is: E. Meumann. 1894. Untersuchungen der Psychologie und Aesthetik des Rhythmus, Philosophischen Studien, 10, 249-322, 393-430.

As for the investigation of musical form-quality:

> We must, however, note briefly the rise and decline of another antecedent of Gestalt psychology, the school of form-quality. Von Ehrenfels in 1890 [C.v. Ehrenfels, Ueber Gestaltqualitaeten. Vierteljahrschrift fuer wissenschaftlichen Philosophie, 14, 249-292] pointed out that the fact of melodic transposition means that a melody exists independently of the tones which constitute it. If you change all the tones and keep their relations the same, you have still the same melody. So with other temporal and spatial lines which form it. Such elements -- the tones, the lines -- are the Fundamente of perception, von Ehrenfels said. They form all together its Grundlage. When they are put together, however, a Gestaltqualitaet emerges, a form-quality which is actually perceived. This form-quality is really a secondary element of higher order. (Boring, 1942; pp. 16-17; [ ] material op. cit., p. 47))

Lundin (1967, pp. 319-320) stated that a music psychology experiment led to Pavlov's discovery of the classical conditioned response phenomenon. However, Lundin's statement was not documentated, nor could it be substantiated by other music psychology texts or historical source works available to me.

Nineteenth century literature concerning animal psychology as an experimental music psychology method was found to be scarce. This was, it seems, a study which was thought to be feasible in the very last years of the century, but which was actually first explored in the first years of the twentieth century.

> The rise of animal psychology (1898 *et. seq.*), in the days when psychology was so sensationalistic, meant that animals must be examined as to their sensory endowments. That aspiration was realizeable. If an animal can discriminate one tonal frequency from another, can learn to take food or to salivate for one frequency and to reject the food-box or not to salivate for another frequency, then presumably he hears in the two cases different pitches. (Boring, 1942; p. 11)

Summary and Conclusions

Helmholtz was historically most important to musicians because of the psychoacoustically based assertions concerning music theory which were contained in his *Tonempfindungen* (1863).

Helmholtz's treatise was (1) variously described as one of primary importance in the stimulation of inquiry in music theory (Rummenhoeller, 1967) and in the obstruction of inquiry in music psychology (Vernon, 1934-5); (2) the focus of a great amount of controversy both regarding hearing theory (supra, p. 109) and the investigation of musical consonance (supra, pp. 65); (3) attacked by Hauptmann (c. 1878) and Fétis (1880) on ideological grounds. Fétis (supra, p. 89) denied the applicability of physiological measures to musical inquiry. Hauptmann (supra, p. 88) asserted that Helmholtz's work related neither to music nor to psychology. In short, reaction to Helmholtz's work was as varied as it was pronounced.

Although his tone perception premises were based primarily on data furnished by Bell (1809), Fourier (1822), Mueller (1838), and Corti (1851), Helmholtz's work was at least indirectly based on the findings of Galileo (1624), Guericke (1657), Mersenne (1681), Hooke (1681), Sauveur (1701), Tartini (1714), Lagrange (1759), Haller (1757-66), Chladni (1802), and Young (1800). One conclusion not made in any history of psychology of which I am aware is the unrecognized value of Bell's (1809) treatise, which contains intact the germ of Helmholtz's resonance theory of hearing. Had Bell published his monograph, one can only speculate on how the history of psychoacoustical investigation would have been altered during the nineteenth century.

The development of means by which auditory stimuli could be accurately calibrated was greatly advanced with the invention of the tuning fork by a musician, John Shore, in 1714. No historical evidence of revolutionary developments or refinements of the tuning fork during the remainder of the eighteenth century was found. In the nineteenth century, the tuning fork underwent a number of scientific and musical developments, principally during the second third of the century.

Music psychology literature written during the last third of the century indicates the existence of a number of controversies. No fewer than six theories of hearing were proposed during this period. At the end of the century, there was no common agreement concerning the processes involved in the audition of music and noise. Helmholtz (1863) first proposed the existence of separate organs for the perception of music and noise, but revised his viewpoint (1877), stating that the cochlea mediates both. The existence of Jaensch's theory (1913) of separate organs for the perception of music and noise indicates that Helmholtz's revised viewpoint had not been universally accepted at the end of the century.

A more general controversy during the late nineteenth century concerned the method of gathering music psychology data. Gurney (1880) and Cobb (1884) stated that psychological processes in music cannot be defined by physiological measurement. During the following decade, the dispute between Wundt and Stumpf defined the controversy most clearly: Wundt asserted that psychophysical data are the only reliable bases for psychological assertions; Stumpf argued that psychophysical data are an inadequate body of evidence for such assertions. Vernon's criticism (supra, p. 108), voiced in 1934, is evidence that the spirit of the Wundt-Stumpf dispute still existed at the end of the first third of this century.

A broadening range of interest may be seen in the music psychology literature of the late nineteenth century. Three new areas of study during this period were the investigation of the psychological bases of musical rhythm and of form quality, and the investigation of music related to animal behavior.

CHAPTER FOUR

A STUDY OF TWO SETS OF POLARITIES: FOUR CRITICAL STREAMS OF THOUGHT IN MUSIC THEORY DURING THE NINETEENTH CENTURY

Problem

In outlining the development of the evidential bases of many music theories which were advanced during the nineteenth century, vague patterns of similarity and dissimilarity became discernible. Many theories of harmony offer as their ultimate evidence the mathematico-acoustic, or "law-of-nature," basis of music: That is, the ratio relationship system of the harmonic partials of a complex tone. A fundamental concept in the theory of music probably since about 500 B.C., the ratio-relationship concept has, to various degrees, been considered the fundamental and ultimate generator, or source, of the harmonic relationships of tones in music. This ideology is commonly known as the Pythagorean basis of music theory; although none of his writings survived, Pythagoras is credited with discerning the ratio relationship characteristics of the tones produced by stretched strings.

Conversely, a second and again very general group of theories of music has held human behavior as its evidential basis. Historically traceable at least to 300 B.C., this school of music theory recognizes the existence of the aforementioned ratio relationship as a characteristic of the stretched string, but denies that this system is the source of order in music. Order, the behavior-oriented music theorist states, is something which is only lent and perceived by humans. This ideology is commonly known as the Aristoxenean school of music theory.

Although we have no access to any writings of Pythagoras, a few of Aristoxenus' treatises are available. Most noteworthy are the _Harmonic elements_ fragments, translated by Macran (1902).

In essence, natural law theories of music have tended to state that music has its fundamental basis in nature, independent of man; psychological theories have tended to state that music has its basis ultimately in man, and cannot exist independently of him.

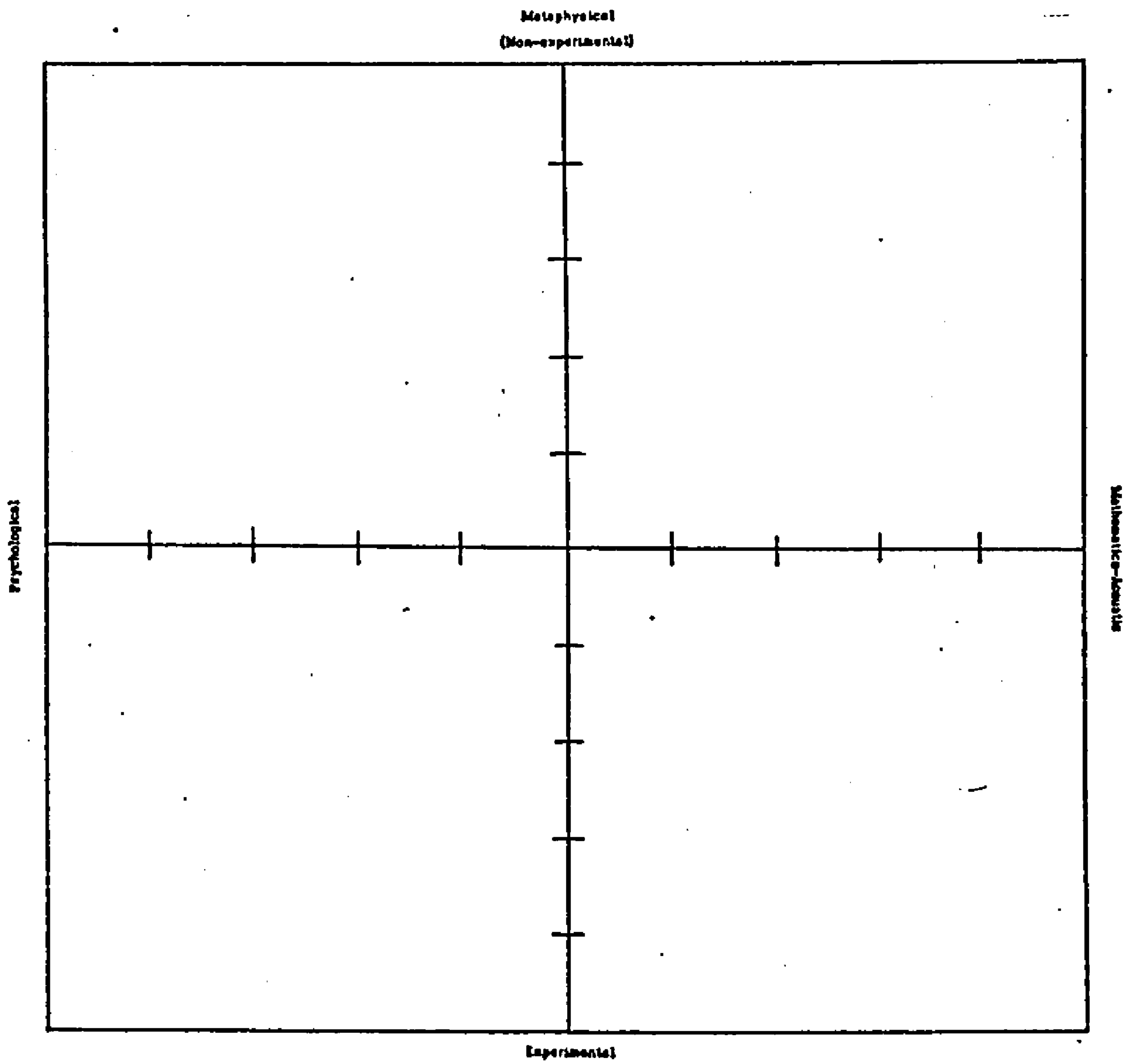
Methods of Inquiry

A classification of several nineteenth century theories of music will be made according to their correspondence to the schools of thought defined above. Music theorists in the nineteenth century, as in any other century since the time of Aristoxenus, were to some degree advocates or non-advocates of the mathematico-acoustic basis of harmony proposed by the followers of Pythagoras. That is to say, each theorist attempted to codify the most basic discriminable elements of music and in doing so set some fairly definite limit regarding the borderline of music and nonmusic. This distinction taken as his premise, the theorist then presented his evidence; in all cases, the evidence ultimately turned out to be either the ratio relationship of the harmonic partials of the musical tone, or contrarily the behavioral values of men occupied with music composition, criticism, performance, or listening.

In order to assess (1) the type of evidence presented by each theorist and (2) his method of gathering evidence, a graphic representation, using two sets of orthogonal polarities, will be constructed. The orthogonal design of the graph allows the representation of four possible extreme combinations of these two variables: (1) a theory of music based upon mathematico-acoustic evidence obtained metaphysically, (2) a theory of music based upon mathematico-acoustic evidence obtained experimentally, (3) a theory of music based upon psychological evidence obtained experimentally, or (4) a theory of music based upon psychological evidence obtained metaphysically.

Such a graph would be valuable if two theories of music which seem in a general, qualitative way, to be different would indeed be accorded different positions on such a two-dimensional scale. An example of such a graph may be found in Figure 2, below. Criteria for the use of this graph will be presented on the following pages.

Figure 2. Example of the Orthogonal Graph Design.



Definitions of terms used to denote polar concepts:

1. Psychological and Mathematico-acoustic theories of music.

   The characteristic features of these two types of theories of music should both demonstrate their polarity and offer definite boundaries for their application.

   A. Mathematico-acoustic theories: A theory of music will be considered a mathematico-acoustic theory to the degree that its ultimate authority, when primary terms are defined (such as harmonic/non-harmonic, tonal/non-tonal, music/non-music), is found to be the ratio relationship of the harmonic series or an equivalent; common terms are "nature's chord," "the harmonic overtone series," "Pythagorean ratio." The degree to which a theory of music approaches the mathematico-acoustic pole on the chart spectrum indicates the degree to which the theorist implies that harmony exists independently of any type of human activity.

   B. Psychological theories: A theory of music will be classified as a psychological theory of music to the degree that its ultimate authority, when primary terms are defined, is found to be human behavior. The degree to which a theory of music approaches the psychological pole on the chart spectrum indicates the degree to which the theorist implies that harmony exists in complete dependence upon human behavior.

2. Metaphysical and Experimental method.

   It is conceivable that either a behavioral-oriented or a mathematico-acoustic-oriented theory of music could be based upon premises which are either metaphysical or experimental; in fact, historical evidence seems to indicate that this is the case. Evidence of behavioral theories derived both from speculative and from experimental bases will be shown, as will both bases for mathematico-acoustic theories of music.

   A. Experimental bases: Experimental method may be described as aphilosophical or inductive. Its evidence is the result of controlled investigation. Its premises are characteristically generalizations based upon specific evidence.

B. Metaphysical bases: Metaphysical method may be variously described as speculative, non-experimental, deductive, and/or philosophical. Its premises are characteristically specific statements drawn from general concepts.

The second section of this chapter (infra, p. 130) is a presentation of historical evidence of bases and approaches of several nineteenth-century music theorists. This evidence consists of statements or paragraphs which were submitted as the evidential bases of the foundational premises in the several theoretical works. Since the number of such citations of authority vary from one theorist to the next, the number of excerpts will vary correspondingly. Each excerpt is suffixed with an annotation which is an interpretation of its place along the metaphysical - experimental and psychological - mathematico - acoustic continua. Each of these annotations should furnish a clear description of the excerpt, since the qualifications will be of the yes-no sort: for instance, either an excerpt is or is not a citation of experimental evidence.

These annotations will be counted and interpreted in an orthogonal graph in Figures 3 (infra, p. 133), 4 (infra, p. 137), 5 (infra, p.139), 6 (infra, p. 141), 7 (infra, p. 145), and 8 (infra, p. 151) at the end of the entry for each theoretical work. A comparative graph (Figure 9, infra, p.

153) and its interpretation may be found at the end of this chapter.

There exist two critical variables which must greatly affect the validity of a quantification study such as that undertaken in this chapter. The first is the method of counting: a strict word-count would be misleading, since some theorists tend toward understatement, others toward evangelism. The second critical variable is the quantity of evidence. It is probable that the degree to which any given theorist subscribes to one of the polar concepts might show differently on the orthogonal graph as more historical evidence is amassed.

In attempting to account for the variables described in the preceding paragraph, I have adopted a point of view toward quantifying conceptually-packaged information which was outlined by Polya (1954).

> Strictly speaking, all our knowledge outside mathematics and demonstrative logic (which is, in fact, a branch of mathematics) consists of conjectures . . . We secure our mathematical knowledge by demonstrative reasoning, but we support our conjectures by plausible reasoning . . . The difference between the two kinds of reasoning is great and manifold. Demonstrative reasoning is safe, beyond controversy, and final. Plausible reasoning is hazardous, controversial, and provisional. Demonstrative reasoning penetrates the sciences just as far as mathematics does, but it is in itself (as mathematics is in itself) incapable of yielding essentially new knowledge about the world around us. Anything new that we learn about the world involves plausible reasoning, which is the only kind of

reasoning for which we care in everyday affairs. Demonstrative reasoning has rigid standards, codified and clarified by logic (formal and demonstrative logic), which is the theory of demonstrative reasoning. The standards of plausible reasoning are fluid, and there is no theory of such reasoning that could be compared to demonstrative logic in clarity or would command comparable consensus. (1954, p. v)

We arrive . . . at formulating a conjecture. We find this conjecture by <u>induction</u>. That is, it was suggested by observation, indicated by particular instances. Each verification that lengthens [a] table [of verifications] renders it more credible, adds to its plausibility. Of course, no amount of such verifications could prove the conjecture. (1954, p. 7)

'Comparisons are of great value in so far as they reduce unknown relations to known relations. Proper understanding is, finally, a grasping of relations. But we understand a relation more distinctly and more purely when we recognize it as the same in widely different cases and between completely heterogeneous objects.' (Arthur Schopenhauer) You should not forget, however, that there are two kinds of generalizations. One is cheap and the other is valuable. It is easy to generalize by <u>diluting</u>; it is important to generalize by <u>condensing</u> . . . Generalization by condensing compresses into one concept of wide scope several ideas which appeared widely scattered before. (1954, p. 30)

If Polya's premises are valid, then the approach taken in the quantification of information given in this chapter is also valid.

Representation on the graph scale (Figure 9, infra, p. 153) is accounted for only by specific definition bases and concept bases, and is tallied by ratio; i.e., if one of three definitions given by a theorist is explicitly based upon the authority of mathematico-acoustic law and the other two definitions cite no authority, that theorist would be assigned to a corresponding position on the continuum toward the Mathematico-acoustic pole. Contradictory bases given for the same definition will be understood to be self-cancelling.

The choice of theories of music surveyed in this chapter was made on the following bases: (1) the theory text was widely read, and was therefore historically prominent, (2) the theory text was written during the nineteenth century, and (3) the theory text was available in an English translation. The only text selected which did not meet all of these standards was the Catel (1802) Traite d'harmonie, which is not available in full English translation. This exception was made because of two important factors: (1) Catel's text is of great historical importance since it was the text used by the Paris Conservatory during nearly the entire first half of the nineteenth century, and (2) an excellent translation of the portion of Catel's text relevant to this investigation (Packard, 1952) is available.

Presentation of Data

Hugo Riemann. 1895. Harmony simplified . . . Eng. trans., London: Augener, Ltd.

1. The natural laws for such connection can be indicated with certainty only if the notes of single chords be regarded not as isolated phenomena, but rather as resulting from the motions of the parts; chord successions arise from simultaneous melodic motion of several parts. --p. 1

    Acoustical phenomena are cited with no reference to perception or judgment; no experimental evidence is cited.
    Mathematical-acoustic/metaphysical

2. The notes of this fundamental scale stand in such relation to one another as the ear can apprehend with certainty, and as are expressed in acoustics and mathematics by certain simple numerical ratios . . . The verdict of the ear declares those intervals simplest, i.e., understands them with the greatest certainty, and requires pure intonation for them most inexorably -- which mathematics and physics reduce to the simplest numerical ratios. --pp. 1-2

    Mixed bases; Riemann declares a correspondence between perceptual and physical phenomena. No experimental evidence is cited.
    Mathematical-acoustic/metaphysical
    Psychological/metaphysical

3. Melody is the logically rational and aesthetically satisfactory motion of a part through notes of different pitch. --p. 1

    "Rational" and "satisfactory" used in this context are behavioral terms; no experimental evidence is cited.
    Psychological/metaphysical

4. Such simple ratios of vibrating strings or columns of air enclosed in tubes, or -- if we put aside reasoning on physical grounds and only take into consideration perception by hearing -- such relations of notes to one another (recognized by the ear) as allow of their appearing musically intelligible and rational when sounded in succession, are called harmonic. --p. 2

Psychological/metaphysical

5. Every note of a melody owes its aesthetic effect in great measure . . . to its harmonic meaning. And by the harmonic meaning of a note we understand its relation, as accurately perceived by the ear, to other notes of the same melody -- or in composition in several parts -- to notes of other accompanying melodies. --p. 2

Psychological/metaphysical

6. In the overtone series the notes marked * are, according to the verdict of our ears, too flat compared with the corresponding ones in our note system; in the undertone series they are too sharp. It is, therefore, evident that the attempt to fill up the octave with the intermediate degrees thus gained, must have a result contradictory to that of our musical experience. --p. 4

Psychological/metaphysical

7. The ear entirely rejects the replacing of the fundamental scale by either of the above [examples of the over- and undertone series from partials 8 through 16], because in both the seconds from the 8th to the 16th partial tone continually become smaller (!), while the fundamental scale, as already remarked, is a mixture of major and minor seconds. The ear altogether fails to understand the seventh, eleventh, and thirteenth and fourteenth tones of the harmonic natural scales, and refuses to recognise the intervals, formed by them with their neighbouring notes and their fundamental note (I), as fit for musical use. The rise and foundation of the natural melodic scale cannot be fathomed in this manner. --p. 5 [ ] mine; italics and (!) his.

Psychological/metaphysical

8. Of all the primary related notes, our ears recognise only the first ones (up to 1/5 and 5 respectively) . . . and refuse to recognise all the following ones . . . '<u>There are only three directly intelligible intervals: octave, major third, and perfect fifth</u>' (Moritz Hauptmann). All other intervals are to be explained musically and mathematically as the results of multiplication and involution of these three. --p. 6

> Although this excerpt is predominantly perceptual in basis, there is reference to mathematical evidence; this should result in mixed interpretation, as did the second excerpt on the previous page.
> <u>Psychological/metaphysical</u>
> <u>Mathematico-acoustic/metaphysical</u>

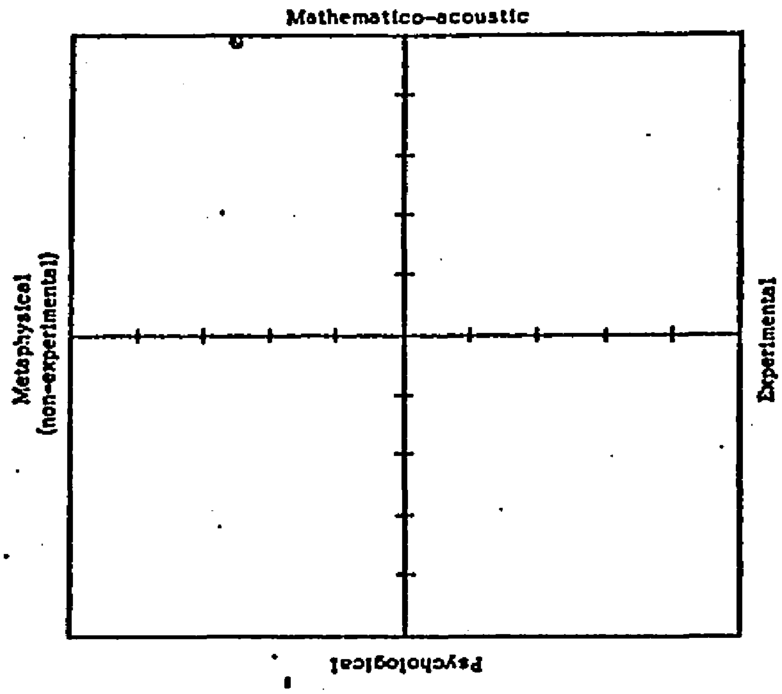
9. <u>The ear comprehends a tone with its direct relatives (third and fifth or their octaves) on the same side . . . as belonging together in closer unity, and distinguishes them from all more distant relatives as forming one compound sound</u> . . . Tones which belong to one and the same clang and represent it, are consonant (they blend together, appearing only as the component parts of that one clang). --p. 7

> <u>Psychological/metaphysical</u>

10. Thus dissonant chords arise from the circumstance that, besides tones which represent one clang . . ., other tones (one or more) are sounded which do not belong to the same clang, and can be understood only mediately, as representatives of another clang. --p. 7

> ". . . understood only mediately" is the primary condition cited by Riemann as a basis for dissonance.
> <u>Psychological/metaphysical</u>

Figure 3. Evidential Bases and Investigative Methods Found in Riemann's Harmony simplified . . .



Total number of evidential bases:	12
Total number of psychological bases:	9
Total number of mathematico-acoustic bases:	3
Total number of experiments cited:	0
Ratio representation on mathematico-acoustic/psychological continuum:	25/75
Ratio representation on experimental/metaphysical continuum:	0/100

Moritz Hauptmann. 1888. The nature of harmony and meter. Trans. and ed. by W.E. Heathcote. London: Swan Sonnenschein and Co.

1. . . . thus the question cannot be only of more or less comprehensibility, of a no more than quantitative distinction must be traced. Now where these first determinations are yet to seek, we certainly cannot expect a theoretical establishment of the laws governing the connexion and succession of chords, from such data only as the acoustic ratios. --p. xxxviii

   Mixed bases; acoustic ratios are interpreted as a necessary condition, but not a sufficient condition. No explicit reference to perception is made; no experimental evidence is cited. Mathematical-acoustic/metaphysical

2. The contents of this book do not run counter essentially to any practical method of composition, so far as its teaching is right. But still less should they run counter to that, which to sound human perception seems musically sound and natural; which, if not always and everywhere in the rules of the text-books, we at least meet with always and everywhere in sound composition. --p. xxxix

   Psychological/metaphysical

3. . . . It is our intention to seek a natural establishment of the laws governing harmony and metre, the principle from which the manifold expansions in all directions issue determined from within, and developing are shaped into the phenomena known to us and again addressing us inwardly. --p. xxxix

   The basis cited in this excerpt is somewhat mixed; Hauptmann cites a natural-law basis for human perception. No experimental evidence is cited. Psychological/metaphysical

4. In the broadest relations of the expanded musical work, so far as it is one whole, as in the narrowest particular, the smallest member of it, in all elements of its harmonic-melodic, as also of its metrical-rhythmical existence, there will always be only the <u>one</u> law to be traced for its right and intelligible construction. Again, this law cannot be exlusively musical, but it is rather the wholly universal law on construction, which operates everywhere, in that operation of it which attains to musical manifestation. --p. xxxix

<u>Mathematical-acoustic/metaphysical</u>

5. Music is universally intelligible in its expression . . . The triad is consonant for the uneducated as well as for the educated; the dissonance needs to be resolved for the unskilled as well as for the musician; discordance is for every ear something meaningless. --p. xl

As in excerpt three, Hauptmann proposes a natural law basis for musical perception; no explicit reference is given to acoustical bases of consonance or dissonance. No experimental evidence is cited.
<u>Psychological/metaphysical</u>

6. "To pronounce upon the purity of musical intervals requires no technical skill; the feeling for it is born in us, is given in the nature of humanly reasonable existence." --p. xl

This excerpt is interpreted as were excerpts three and five.
<u>Psychological/metaphysical</u>

7. "That which is musically inadmissible is not so because it is against a rule determined by musicians, but because it is against a natural law given to musicians from mankind, because it is logically untrue and of inward contradiction. A musical fault is a logical fault, a fault for the general sense of mankind, and not for a musical sense in particular." --p. xl

Hauptmann states that musical behavior is

determined by larger human behavior modes; he makes no reference to mathematico-acoustic properties.
Psychological/metaphysical

8. "The notion of an artificial system of notes is a thoroughly worthless one. Musicians were not able to determine intervals and invent a system of notes, any more than grammarians to invent the words of the language in which they speak, and the constructions they use in explaining constructions." --p. xl

Mathematico-acoustic/metaphysical

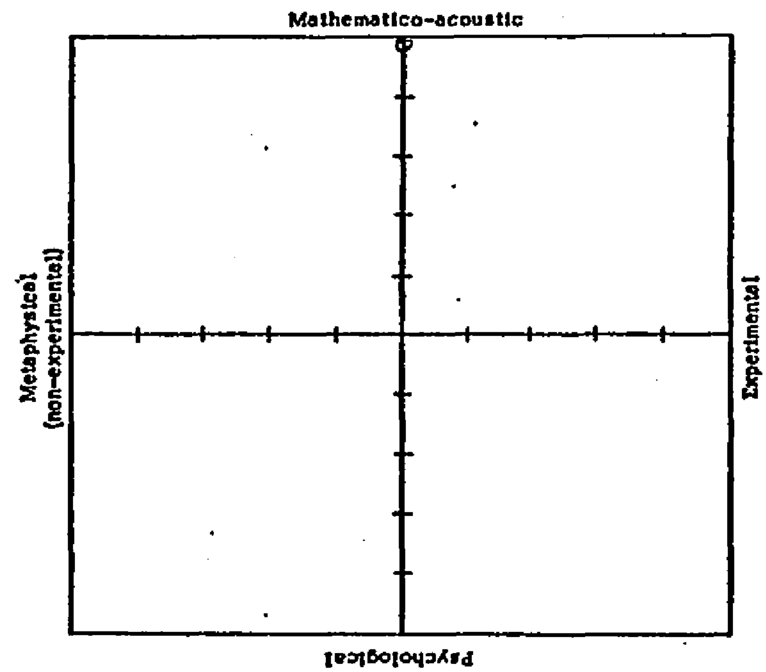
9. "That which does not rest upon determination universal and everywhere valid, cannot be everywhere and universally understood. That which is musically right, correct, addresses us as being humanly intelligible. That which is faulty, but it addresses us in fact not at all; it finds no sympathetic resonance in our interior." --p. xli

Mathematico-acoustic/metaphysical

10. "Rightness or correctness of phrase is the condition under which generally a sense can be uttered. This rightness, i.e., reasonableness of the shape taken by music, has for its law of formation Unity, with the opposite of itself and the removal of the opposite: -- immediate unity, which through a moment of being at two with itself passes into mediated unity. There must always be the repetition of this process on that which is assumed as immediate unity or given as the result of previous process. Thus the unity of sound correlated with itself gives rise to the triad, and the unity of the triad correlated with itself to the key." --p. xlii

Mathematico-acoustic/metaphysical

Figure 4. Evidential Bases and Investigative Methods Found in Hauptmann's (1888) The nature of harmony and meter.



Total number of evidential bases: 10

Total number of psychological bases: 5

Total number of mathematico-acoustic bases: 5

Total number of experiments cited: 0

Ratio representation on mathematico-acoustic/psychological continuum: 50/50

Ratio representation on experimental/metaphysical continuum: 0/100

Charles-Simon Catel. 1802. _Traité d'harmonie_, from Packard (1952).

1. "Catel's theory of chords may be stated very briefly: 'Il n'existe en harmonie qu'un seul accord qui contient tous les autres.' [footnote: 'There exists in harmony but one chord which contains all the others.'] From the first nine harmonics of a string sounding contra-g, Catel derives the major ninth chord, G B D F A. In this sonority, he observes the following five chords: the major, minor, and diminished triads, the dominant seventh, and the leading tone seventh. By extending the harmonic series to the seventeenth partial, Catel finds an Ab which will permit him to complete his list of chords the minor ninth, G B D F Ab, and diminished seventh B D F Ab. The eight chords just named, along with their inversions, constitute what Catel calls _simple_ or _natural harmony_." --pp. 103-4

    Mathematico-acoustic/metaphysical

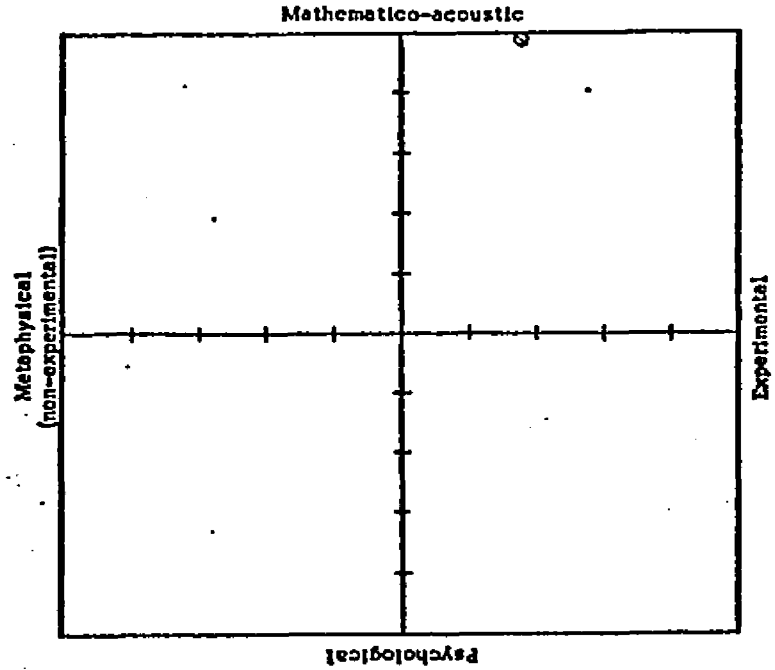
2. "The monotony of the _natural harmony_ of triads and sevenths may be relieved, says Catel in his next section, by introducing either passing tones or suspensions." --p. 108

    This excerpt is interpreted as an assertion that compositional activity is governed by listening behavior.
    Psychological/metaphysical

3. "In accounting for the fact that some suspended notes are actually consonant with the bass, Catel assures us that they are consonant only in appearance; they are actually dissonant since they are foreign to the chord with which they appear." --p. 114

    Mathematico-acoustic/metaphysical

Figure 5. Evidential Bases and Investigative Methods Found in Catel's (1802) _Traité d'harmonie_.



Total number of evidential bases:	3
Total number of psychological bases:	1
Total number of mathematico-acoustic bases:	2
Total number of experiments cited:	0
Ratio representation on mathematico-acoustic/psychological continuum:	67/33
Ratio representation on experimental/metaphysical continuum:	0/100

Adolph Marx. 1852. Theory and practice of musical composition. Eng. trans. and ed. by Herman Saroni. New York: F.J. Huntington and Mason & Law.

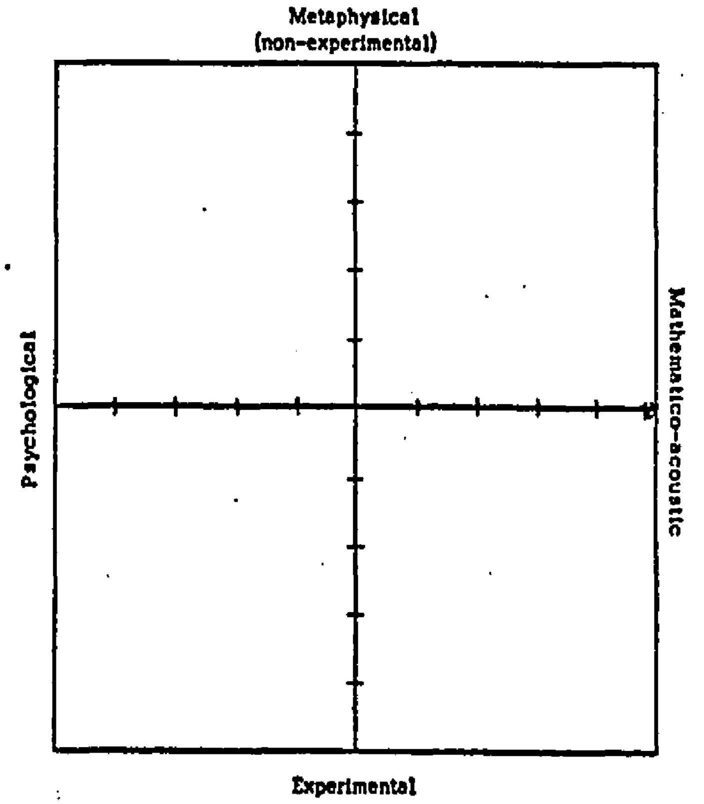
1. "Music is the art of combining sounds agreeable to the ear" is the general definition given of the word. Not every sound, however agreeable to the ear, is a musical sound; nor is a combination of such sounds always music. It follows, then, that our first task must be to distinguish musical sounds, or sounds agreeable to the ear, from such sounds as constitute Music. We know that the ear is the organ which is most directly affected by Music. Every vibration of air caused by a collision of bodies, or other means, sufficient to affect the ear, we designate by the general name of SOUND. We know, also that Music is produced by the human voice, as well as by instruments of various kinds -- Flutes, Trumpets, Violins, &c. These instruments distinguish themselves from one another by the quality of their sounds. Finally, we perceive on one and the same instrument, that the sounds produced upon it vary in regard to pitch. Thus, for instance, are the sounds produced on the shorter strings of a Harp more acute than those produced on a longer string. When we consider a sound in this respect, we must call it PITCH." --p. 15

Psychological/metaphysical

2. "Our first objective is now to find harmonies for the complete scale. Here we are directed at once to the first harmonic mass, the importance and regularity of which we have already seen. This regularity consists in the position of its three tones (c,e,g), which are placed in thirds, one above the other. The combination of three or more tones to a harmony is called a "Chord." The lowest tone in such a chord (c) is called "Fundamental Tone." It is the most important tone of the chord, because it serves as basis for the whole construction. Therefore the proportions of the other tones of the chord are regulated and designated by it. The next note (e) is called the "Third," and the next one is called the "Fifth," i.e., of the fundamental tone." --pp. 94-95

Marx assigns an acoustical event, the "fundamental tone," the role of regulator and designator of all other chord tones.
Mathematico-acoustic/metaphysical

Figure 6. Evidential Bases and Investigative Methods Found in Marx's (1852) <u>Theory and practice of musical composition</u>.



Total number of evidential bases:	2
Total number of psychological bases:	1
Total number of mathematico-acoustic bases:	1
Total number of experiments cited:	0
Ratio representation on mathematico-acoustic/psychological continuum:	50/50
Ratio representation on experimental/metaphysical continuum:	0/100

Ebenezer Prout. 1889. <u>Harmony: Its theory and practice</u>. London: Augener, Ltd.

1. "A musical sound is produced by the periodic vibration of the air, that is to say, its motion at a uniform rate. When the air moving at a uniform rate comes in contact with the nerves of hearing, there is produced, provided the motion is sufficiently rapid, what is called a musical sound, or note. The <u>pitch</u> of a sound (that is, its being what is called <u>high</u> or a <u>low</u> note), depends upon the rapidity of the vibration." --p. 1

   Prout gives a psychophysical rather than a strictly physical presentation of acoustical phenomena.
   <u>Psychological/metaphysical</u>

2. "The rules herein given, though in no degree inconsistent with the theoretical system expounded, are founded, not upon that, nor on any other abstract system, but upon the actual practice of the great masters; so that even those musicians who may differ most widely from the author's theoretical views may still be disposed to admit the force of practical rules supported by the authority of Bach, Beethoven, or Schumann." --p. iv

   <u>Psychological/metaphysical</u>

3. "The system of theory propounded in the present volume is founded upon the dictum of Helmholtz, quoted in Chapter II of this work (p. 42), that 'the system of Scales, Modes, and Harmonic Tissues does not rest solely upon unalterable natural laws, but is at least partly also the result of aesthetical principles, which have already changed, and will still further change with the progressive development of humanity.' While, therefore, the author follows Day and Ouseley in taking the harmonic series as the basis of his calculations, he claims the right to make his own selection, on aesthetic grounds, from these harmonics, and to use only such of them as appear neeful [sic] to explain the practice of the great masters. Day's derivation of the chords in a key from the tonic, dominant, supertonic is adhered to, but in other respects his system is extensively modified, its purely physical basis being entirely abandoned." --p. iv

<u>Psychological/metaphysical</u>

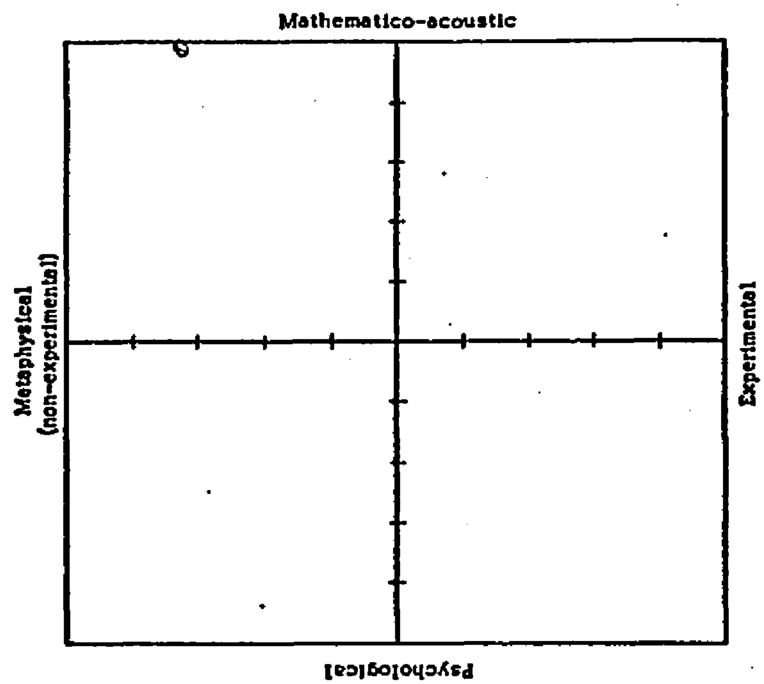
4. "In the vexed question of the minor tonic chord, Helmholtz is followed to a considerable extent; but Ouseley's explanation of the harmonic origin of the minor third is adopted. Truth is many sided; and no writer on harmony is justified in saying that his views are the only correct ones, and that all others are wrong. No such claim is made for the system herein set forth; but it is hoped that it will at least be found to be intelligible, perfectly consistent with itself, and sufficiently comprehensive to explain the progressions of the advanced modern school of composers." --p. iv

Mixed bases.
<u>Psychological/metaphysical</u>
<u>Mathematico-acoustic/metaphysical</u>

5. "Most intelligent students of harmony have at times been perplexed by their inability to reconcile passages they have found in the works of the great masters with the rules given in the text-books. . . . No doubt examples of very free part-writing may be found in the works of Bach and Beethoven, or even of Haydn and Mozart; several such are noted and explained in the present work. But the principle must surely be wrong which places the rules of an early stage of musical development above the inspirations of genius! . . . In other words, practice must precede theory. The inspired composer goes first, and invents new effects; it is the business of the theorist not to cavil at every novelty, but to follow modestly behind, and make his rules conform to the practice of the master. It is a significant fact that, even in the most recent developments of the art, nothing has yet been written by any composer of eminence which a sound theoretical system cannot satisfactorily account for . . ." --first page (unnumbered) of preface to the first edition

<u>Psychological/metaphysical</u>

Figure 7. Evidential Bases and Investigative Methods Found in Prout's (1889) Harmony: Its theory and practice.



Total number of evidential bases:	6
Total number of psychological bases:	5
Total number of mathematico-acoustic bases:	1
Total number of experiments cited:	0
Ratio representation on mathematico-acoustic/psychological continuum:	17/83
Ratio representation on experimental/metaphysical continuum:	0/100

H.L.F. von Helmholtz. 1863. On the sensations of tone as a physiological basis for the theory of music. Eng. Trans and ed. by Alexander J. Ellis. London and New York: Longmans, Green and Co., 1895 (3rd ed.).

1. "In the present work an attempt will be made to connect the boundaries of two sciences, which, altogether drawn towards each other by many natural affinities, have hitherto remained practically distinct -- I mean the boundaries of physical and physiological acoustics on the one side, and of musical science and esthetics on the other . . . The horizons of physics, philosophy, and art have of late been too widely separated, and, as a consequence, the language, the methods, and the aims of any one of these studies present a certain amount of difficulty for the student of any other of them; and possibly this is the principal cause why the problem here undertaken has not been long ago more thoroughly considered and advanced towards its solution." --p. 1 of introduction

Psychological/experimental

2. ". . . but, up to the present time [the] apparent connection of acoustics and music has been wholly external, and may be regarded rather as an expression given to the feeling that such a connection must exist, than as its actual formulation. Physical knowledge may indeed have been useful for musical instrument makers, but for the development and foundation of the theory of harmony it has been hitherto totally barren." --p. 1 of introduction

Psychological/experimental

3. ". . . I am not aware that any real step was ever made towards answering the question: <u>What have musical consonances to do with the ratios of the first six numbers</u>? Musicians, as well as philosophers and physicists, have generally contented themselves with saying in effect that human minds were in some unknown manner so constituted as to discover the numerical relations of musical vibrations, and to have a peculiar pleasure in contemplating simple ratios which are readily comprehensible. Meanwhile musical esthetics has made unmistakable advances in those points which depend for their solution rather on psychological feeling than on the action of the senses, by introducing the conception of movement in the examination of musical works of art." --p. 2 of introduction

<u>Psychological/experimental</u>

4. "But all such [musical] investigations, however fertile they may have been, cannot have been otherwise than imperfect and uncertain, so long as they were without their proper origin and foundation, that is, so long as there was no scientific foundation for their elementary rules relating to the construction of scales, chords, keys, and modes, in short, to all that usually contained in works on 'Thorough Bass.' In this elementary regimen we have to deal not merely with unfettered artistic inventions, but with the natural power of immediate sensation. Music stands in a much closer connection with pure sensation than any of the other arts." --p. 2 of introduction

<u>Psychological/experimental</u>

5. "This theory of the sensations of hearing belongs to natural science, and comes in the first place under <u>physiological acoustics</u>. Hitherto it is the <u>physical</u> part of the <u>theory of sound</u> that has been almost exclusively treated at length, that is, the investigations refer exclusively to the motions produced by solid, liquid, or gaseous bodies when they occasion the sounds which the ear appreciates. This <u>physical acoustics</u> is essentially nothing but a section of the theory of the motions of elastic bodies." --p. 3 of introduction

<u>Psychological/experimental</u>

6. "The only justification for devoting a separate chapter to acoustics in the theory of the motions of elastic bodies, to which it essentially belongs, is, that the application of the ear as an instrument of research influenced the nature of the experiments and the methods of observation." --p. 4 of introduction

Psychological/experimental

7. ". . . we have to investigate the various modes in which the nerves themselves are excited, giving rise to their various sensations and finally the laws according to which these sensations result in mental images of determinate external objects, that is, in perceptions. Hence we have secondly a physiological investigation for sensations, and thirdly, a specially psychological investigation for perceptions. Now whilst the physical side of the theory of hearing has been already frequently attacked, the results obtained for its physiological and psychological sections are few, imperfect, and accidental. Yet it is precisely the physiological part in especial -- the theory of the sensations of hearing -- to which the theory of music has to look for the foundation of its structure." --p. 4 of introduction

Psychological/experimental

8. "In these first two parts of the book, no attention is paid to esthetic considerations. Natural phenomena obeying a blind necessity, are alone treated. The third part treats of the construction of musical scales and notes. Here we come at once upon esthetic ground, and the differences of national and individual tastes begin to appear. Modern music has especially developed the principle of tonality, which connects all the tones in a piece of music by their relationship to one chief tone, called the tonic. On admitting this principle, the results of the preceding investigations furnish a method of constructing our modern musical scales and modes, from which all arbitrary assumption is excluded." --p. 5 of introduction

Psychological/experimental

9. "The altered nature of the matters now to be treated betrays itself by a purely external characteristic. At every step we encounter historical and national differences in taste. Whether one combination is rougher or smoother than another depends solely on the anatomical structure of the ear, and has nothing to do with psychological motives. But what degree of roughness a hearer is inclined to endure as a means of musical expression depends on taste and habit; hence the boundary between consonances and dissonances has been frequently changed." --p. 234

<u>Psychological/experimental</u>

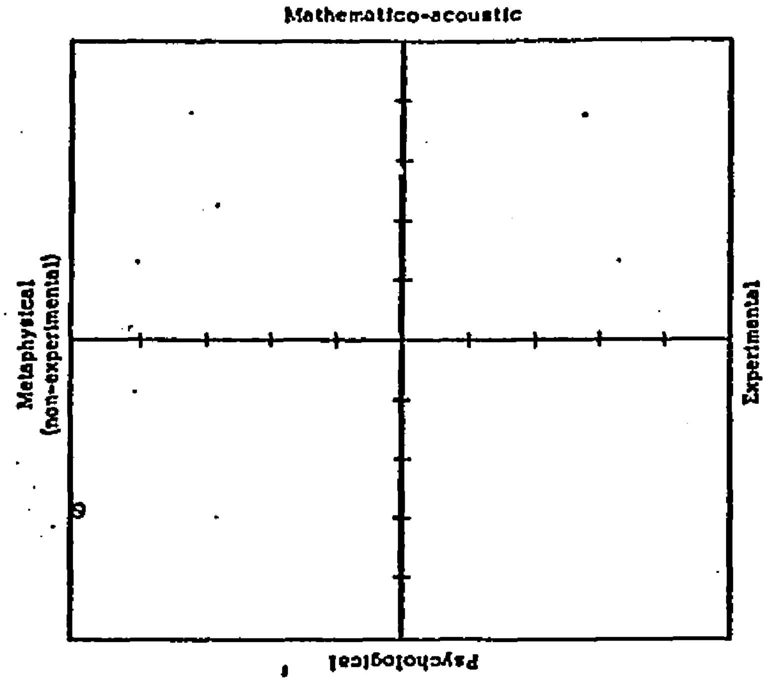
10. "<u>The system of Scales, Modes, and Harmonic Tissues does not rest solely upon inalterable natural laws, but is also, at least partly, the result of esthetical principles, which have already changed, and will still further change, with the progressive development of humanity</u>. But it does not follow from this that the choice of those elements of musical art was perfectly arbitrary, and that they do not allow of being derived from some more general law. On the contrary the rules of any style of art form a well-connected system whenever that sytle has attained a full and perfect development. These rules of art were certainly never developed into a system by the artists themselves with conscious intention and consistency. They are rather the result of tentative exploration or the play of imagination, as the artists think out or execute their plans, and by trial gradually discover what kind or manner of performance best pleases them. Yet science can endeavour to discover the motors, whether psychological or technical, which have been at work in this artistic process. Scientific <u>esthetics</u> have to deal with the psychological motor; scientific <u>physics</u> with the technical." --p. 235

<u>Psychological/metaphysical</u>

11. "As the fundamental principle for the development of the European tonal system, we shall assume that <u>the whole mass of tones and the connection of harmonies must stand in a close and always distinctly perceptible relationship to some arbitrarily selected tonic, and that the mass of tone which forms the whole composition, must be developed from this tonic, and must finally return to it</u>. The ancient world developed this principle in homophonic music, the modern world in harmonic music. But it is evident that this is merely an esthetical principle, not a natural law. The correctness of this principle cannot be established <u>a priori</u>. It must be tested by its results. The origin of such esthetical principles should not be ascribed to a natural necessity. They are the inventions of genius, as we previously endeavoured to illustrate by a reference to the principles of architectural style."
--p. 249

<u>Psychological/metaphysical</u>

Figure 8. Evidential Bases and Investigative Methods Found in Helmholtz's (1863) <u>On the sensations of tone as a physiological basis for the theory of music</u>.



Total number of evidential bases: 11

Total number of psychological bases: 11

Total number of mathematico-acoustic bases: 0

Total number of experiments cited: 9

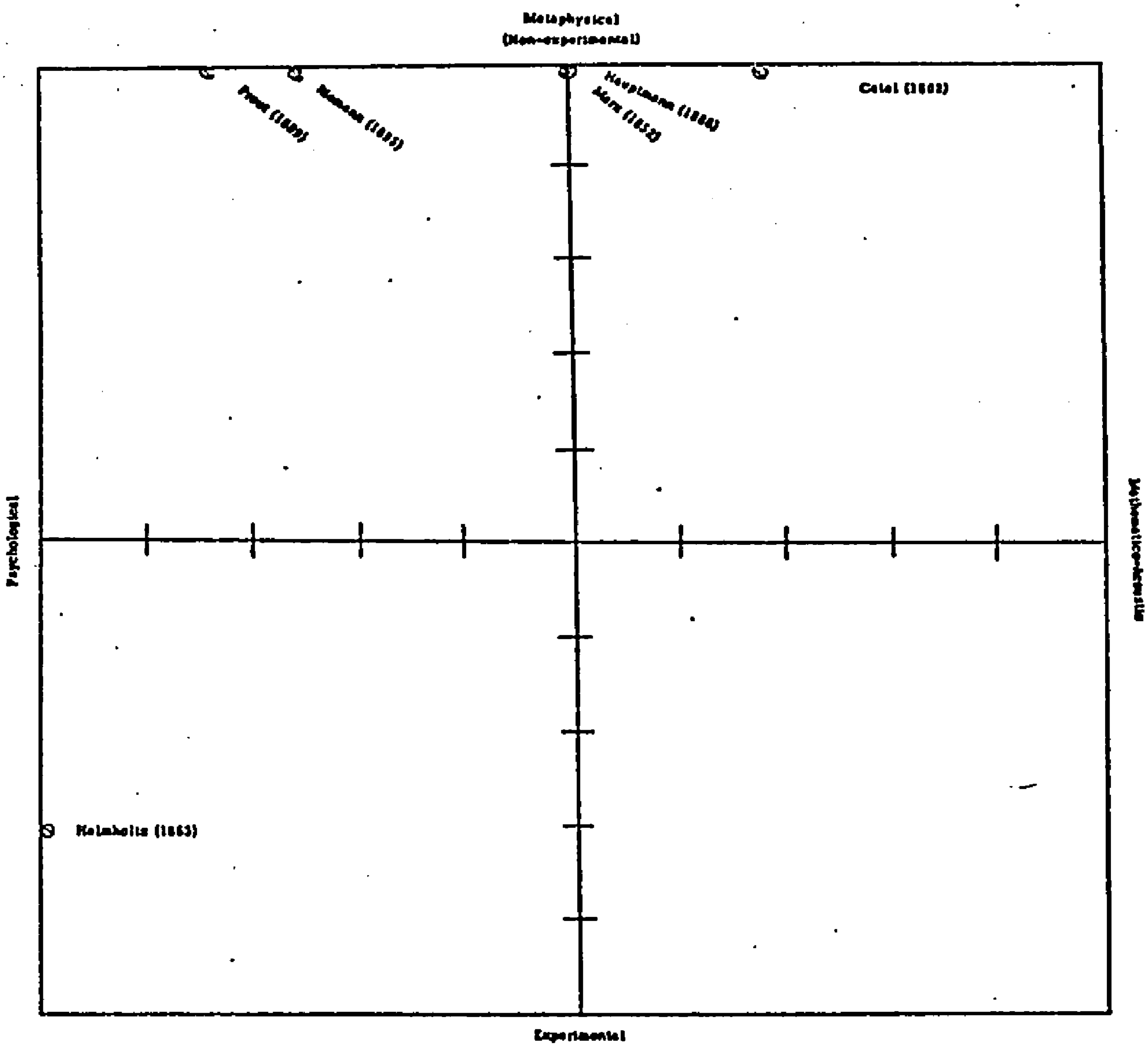
Ratio representation on mathematico-acoustic/psychological continuum: 0/100

Ratio representation on experimental/metaphysical continuum: 81/19

Helmholtz provided experimental substantiation for all sections from which excerpts 1 through 9 were drawn. Excerpts 10 and 11 are historical or empirical, and are not purely speculation.

The evidential bases and data gathering bases used by the theorists studied in this chapter are shown in Figure 9.

Figure 9. Evidential Bases and Investigative Methods of Six Nineteenth Century Music Theorists.



Conclusions

The relevance of this study to the others undertaken in this dissertation is best summarized by asking the question: To what degree was the study of music theory influenced by data and by methods of inquiry provided by the concurrent study of music psychology?

The answer to this question, as shown in Figure 9 (supra, p. 153) is that the existence of music psychology data had pronounced effect on the evidential bases offered by Prout and Riemann, both of whom wrote their theories of music in the late nineteenth century, and had limited effect on the writings of Marx and Catel, who wrote earlier. Hauptmann, who wrote at nearly the same time as did Prout and Riemann, denied the applicability of psychological measurement to music theory (see supra, Chapter 3, pp. 88). Figure 9 also shows that Prout's evidential bases for his theoretical assertions were derived from psychological data to a greater extent than were Riemann's. The availability of experimental method had no effect on the data gathering methods of any of these theorists.

Helmholtz, who more than any music theorist studied in this chapter based his theoretical assertions upon psychophysical evidence, was the only music theorist to gather his evidence through controlled experiments. The mainstream nineteenth century method of inquiry in the theories of music surveyed was speculation.

The interpretation of data furnished by a sampling method such as that introduced in this chapter must be tempered by two conditions: (1) the number of music theories sampled, and (2) the number of text excerpts selected.

The result of this survey was not the discovery of historical evidence, but the re-ordering of existing and available evidence in order to better see historical relationships.

CHAPTER FIVE

SUMMARY

It is the purpose in this study to describe the development of the field of music psychology in the nineteenth century by:

1. presenting a comprehensive bibliography of music psychology literature published during the period 1800-1900;
2. extracting from that bibliography evidence of both individual studies and trends of investigation which are relevant to current investigation in music psychology;
3. showing the relationships of the literature of music psychology during the nineteenth century to current research in the field, tracing developments of areas of investigation which have been most extensively investigated during the past and present century;
4. showing what effects psychological data had on music theory investigation during the nineteenth century;
5. investigating the ideological bases of inquiry of several important theories of music written during the

nineteenth century, showing the degree to which several leading nineteenth century music theorists were influenced by psychophysical data or by evidence derived from psychological investigation.

As far as can be determined, this dissertation is the first historical investigation of the early development of music psychology. It is the intent in this investigation to provide a research base for the study of nineteenth century music psychology, to detail areas of investigation and to identify important investigators during that period. This dissertation should not be interpreted as an attempt to exhaust the literature of any subject that is discussed; such investigations would entail the translation, critical reading, and evaluation of hundreds of items including books, journal articles, pamphlets, monographs, and letters. The work necessary to complete such an historical investigation is beyond the proportions of a single dissertation or the time and energy of one scholar. This study should, however, provide two bodies of information necessary to continued historical investigations in music psychology: (1) an orderly presentation of the field of music psychology in an historical perspective, and (2) a comprehensive bibliography of early music psychology literature.

Chapter Summaries

Chapter 1 is an investigation of the boundaries and internal structure of the field of music psychology as presented in several twentieth century general music psychology texts, and in several scholarly journals which contain articles of primary importance to the field. Texts investigated included those by Farnsworth, Lundin, Mursell, Schoen, and Seashore. Journals investigated included the *Journal of the Acoustical Society of America*, the *Journal of Music Theory*, the *Journal of Research in Music Education*, and *Psychological Abstracts*. It was found that no one of these texts or journals offered a survey of the field of music psychology which coincided with any one of the others. It was shown that the boundaries of the field of music psychology are not clearly defined, and that its internal structure is noticeably disorganized. A topographical outline which is comprehensive enough to include all pertinent subject areas discussed in these texts and journals, but without the eccentric topic emphases to be found in each, was formulated. This outline was used to index by subject the bibliography which comprises Volume II of this dissertation and to select the nineteenth century documents used as data for assertions in Chapter 2.

Chapter 2 is a study of nineteenth and twentieth century literature belonging to the three most investigated areas of experimental inquiry in music psychology: (1) the perception of musical elements, (2) the affective properties of music, and (3) musical ability.

Pronounced national and chronological patterns were found in the nineteenth century literature for each area of investigation. The experimental literature related to the investigation of the perception of musical elements was predominantly psychophysical literature written in Germany during the second half of the century.

The study of the affective properties of music during the nineteenth century was directed primarily toward the investigation of the therapeutic and medical powers of music. French literature was published throughout the century. German literature was published during the last half of the century; English and American literature was published during the last quarter of the century. The investigation of the physiological and motor effects of music was predominantly French in origin; German, English and American literature was published only through the last two decades of the century. Nearly all literature relating to the moral affects of music was German; this investigation was undertaken throughout the century. The most investigated single affective phenomenon was chromasthesia.

Nearly all literature devoted to this study was French, and was published during the last decade of the century.

Most general studies of musical ability were also French in origin, and were published during the last decade of the nineteenth century. However, most specialized studies of musical ability, such as those examining relationships between musical ability and nonmusical personal traits, and attempts to describe special abilities of eminent musicians, were written in Germany throughout the last three decades of the century.

The national and chronological patterns found in these bodies of nineteenth century music psychology literature indicate the existence of a nationalistic spirit among scholars; there appears, in these areas of investigation, to have been a great amount of correlated study which stopped at national borders.

Chapter 3 is an investigation of the development of music psychology during the nineteenth century. Helmholtz was the most important and most controversial figure in the field of music psychology during the nineteenth century, due to the psychoacoustically based assertions concerning music theory which were contained in his Tonempfindungen (1863). Evidence presented in this chapter indicates that Helmholtz's resonance theory of hearing was the product of his ability to assimilate existing data: earlier studies which were foundational to Helmholtz's resonance theory of hearing were listed and discussed.

It was shown in this chapter that the field of music psychology was filled with controversy during the last third of the nineteenth century. Disputes which were discussed in this chapter include (1) alternative physiological theories of hearing, (2) disagreement concerning the audition of music and noise, (3) denial of the applicability of physiological measurement to music theory, and (4) denial of the applicability of physiological measurement to music psychology.

Evidence given at the end of this chapter indicates that in the late nineteenth century the domain of music psychology was expanded to include the study of the psychological bases of musical rhythm and of form quality, and the study of music related to animal psychology.

Chapter 4 is a study of the influence of the data and methods of inquiry in music psychology on the study of music theory in the nineteenth century. A basis for categorizing the evidential bases and data gathering methods of music theorists is presented, and the theories of Catel, Marx, Helmholtz, Hauptmann, Prout, and Riemann are surveyed. It was found that Helmholtz was the only theorist surveyed to present evidence which was the result of controlled experimentation; the mainstream method for derivation of evidence in the nineteenth century music theories studied was deductive, non-experimental thought. It was also found that the existence of music psychology data had the most pronounced effect on the evidential bases given by Helmholtz for his theoretical assertions. The evidential bases offered by Prout and Riemann reflected a lesser but still marked influence of the existence of psychological data; the existence of this data had only limited influence on the writings of Catel, Marx, and Hauptmann.

The result of this study was the re-ordering of existing and available data in order to better see historical relationships.

Volume II

It is the intent in this bibliographic study to furnish a comprehensive body of nineteenth century music psychology literature for future historical investigators. The bibliography consists of 895 entries, in seven languages, which deal with music psychology investigation. Using computer storage and retrieval techniques, access to documents may be gained through author, date or data range, language, general or specific topics, periodical, publisher, city of publication, or any combination of these categories. An author alphabetized listing and a subject indexed and language indexed listing are presented in Volume II. The bibliography is stored on tape; information concerning acquisition of a copy of this tape may be obtained through The Ohio State University Instruction and Research Computer Center Library. A copy of the coding log used to subject index the bibliography is given in Appendix A (infra, p. 457). A copy of the program used to generate the subject and language index of the bibliography is given in Appendix B (infra, p. 460). The Introduction to the second volume contains a description of the subject and language distributions in the subject indexed and language indexed listing of the bibliography (see infra, p. 176).

REFERENCES

Abraham, Otto. 1901-02. Das absolute Tonbewusstsein; Psycologisch-musikalische Studie. _Sammelbaende der Internationalen Musikgesellschaft_, _3_, 1-86.

Apel, Willi, ed. 1966. _Harvard dictionary of music_. Cambridge, Mass.: Harvard University Press.

Barbour, J. Murray. 1932. _Equal temperament: Its history from Ramis (1492) to Rameau (1737)_. Thesis, Cornell University. Microfilm, Ithaca, N.Y.: Copy Service, Cornell University Libraries, 1964.

__________. 1951. _Tuning and temperament: A historical survey_. East Lansing, Mich.: Michigan State College Press.

Bell, Sir Charles. 1809. _Anatomy of the human body_.

__________. 1811. Idea of a new anatomy of the brain. Reprinted: _Journal of Anatomy and Physiology_, _3_, (1869), 154-157. Also available: Dennis, Wayne. 1948. _Readings in the history of psychology_. New York: Appleton Century Crofts, Inc.

Bell Telephone Laboratories. 1958, 1959. _The science of sound_. New York: Folkways Records and Service Corp., 701 Seventh Ave. Record no. FX6007.

Bindseil, H.E. 1839. _Akustik_. Potsdam: Verlag der Horvath'schen Buchhandlung.

Bonnier, P. 1900. La définition des timbre. _Compte-Rendu Soc. de Biol._, _52_, 300-302.

Boring, E.G. 1942. _Sensation and perception in the history of experimental psychology_. New York and London: D. Appleton Century Croft Co., Inc.

__________. 1950. _A history of experimental psychology_. 2nd ed., New York: Appleton Century Crofts, Inc.

Brandt, S. 1861. Ueber Verscheidenheit des Klangs (Klangfarbe). Annalen der Physik und Chemie, 112, 324-336.

Bugg, Eugene G. 1933. An experimental study of factors influencing consonance judgments. Psychological Monographs, 45(2), 100.

__________. 1939. An analysis of conditions influencing consonance judgments. Journal of Experimental Psychology, 24, 54-72.

Cabanes, L.A. 1899. Les phthisiques celebres. La maladie de Chopin d'après des documents inédits. La chronique médicale, 673.

Cazden, Norman. 1945. Musical consonance and dissonance: A cultural criterion. Journal of Aesthetics and Art Criticism, 4(1), 3-11.

__________. 1948. Musical consonance and dissonance. Dissertation (unpublished): Harvard University, 2 vols., 978 pp.

__________. 1954. Tonal function and sonority in the study of harmony. Journal of Research in Music Education, 2(1), 21-34.

__________. 1958. Pythagorus and Aristoxenos reconciled. Journal of the American Musicological Society, 11, 97-105.

__________. 1961. Sensory theories of musical consonance. Journal of Aesthetics and Art Criticism, 20, 301-319.

Chandler, Albert R., and Edward H. Barnhart. 1938. A bibliography of psychology and experimental esthetics, 1864-1937. Berkeley: University of California Press.

Chladni, Ernst F.F. 1787. Entdeckungen ueber die Theorie des Klangs. Leipzig: Bey Weidmanns erber und Reich. i, 77 pp.

__________. 1800-01. Ueber die wahre Ursache des Consonirens und Dissonirens. Allgemeine musikalische Zeitung 1800/1801, 337, 353.

Cobb, Gerard. 1884. On certain principles of musical exposition considered educationally and with special reference to current systems of musical theory. Proceedings of the Musical Association, 10, 125-151, 153-184.

Cohen, Alexander. 1961. Further investigations of the effects of intensity upon the pitch of pure tones. Journal of the Acoustical Society of America, 33, 1363-1375.

Corti, A. 1851. Recherches sur l'organe de l'ouïe des mammifères. Zeitschrift fuer wissenschaftlich Zoologie, 3, 109-169.

Delezenne, C.E.J. 1827. Sur les valeurs numérique des notes de la gamme. Recueil des travaux de la Société des Sciences, de l'Agriculture et des Arts de Lille, 1-56.

Dennis, Wayne, ed. 1948. Readings in the history of psychology. New York: Appleton Century Crofts, Inc.

Donders, F.C. 1864. Zur Klangfarbe der Vocale. Ann. Phys. Chem., 123, 527-528.

Dove, H.W. 1839. Repertorium der Physik. Berlin: Verlag Veit und Comp.

Drake, R.M. 1957. Manual for the Drake musical aptitude tests. Chicago: Science Research Associates.

English, Horace B., and Ava C. English. 1958. A comprehensive dictionary of psychological and psychoanalytical terms. New York: David McKay Company, Inc.

Farnsworth, Paul R. 1931. An historical, critical and experimental study of the Seashore-Kwalwasser test battery. Genetic Psychology Monographs, 9, 291-393.

__________. 1958. The social psychology of music. 2nd ed., revised, 1969. Ames, Iowa: The Iowa State University Press.

Feis, O. 1910. Studien ueber die Genaeologie und Psychologie der Musikers. Wiesbaden: Bergmann.

Fétis, F. -J. 1881. Biography universelle des musiciens et bibliographie générale de la musique. Paris: F. Didot.

Fletcher, Harvey. 1934. Loudness, pitch and the timbre of musical tones and their relation to the intensity, the frequency and the overtone structure. Journal of the Acoustical Society of America, 1, 311-343.

Flugel, J.C. 1933. A hundred years of psychology: 1833-1933. New York: The MacMillan Company.

Fourier, J.B.J. 1822. Théorie analytique de la chaleur. English trans., 1878.

Galileo Galilei. 1624. Discorsi e dimonstrazioni mathematische intorno a due nuove scienze. Published 1638.

Gerber, P.H. 1898. Mozart's Ohr. Deutsche medizinische Wochenschrift, 24, 351.

Guericke, O. von. 1657. Experimenta nova (ut vocantur) Magdeburgica de vacuo spatio. Published 1672.

Gurney, Edmund. 1880. The power of sound. London and New York: Basic Books, Inc., 1966.

Haller, Albrecht von. 1757-66. Elementa physiologae corporis humani. 8 vols.

Hauptmann, Moritz. 1888. The nature of harmony and meter. Trans. and ed. by W.E. Heathcote. London: Swan Sonnenschein and Co.

Haydon, Glen. 1941. Introduction to musicology. New York: Prentice-Hall.

Helmholtz, Hermann L.F. von. 1863. On the sensations of tone as a physiological basis for the theory of music. 4th ed., 1877. Translated and revised by Alexander T. Ellis. London: Longmans, Green, 1895. 2nd English edition, New York: Dover Publications, Inc., 1954.

Hermann, L. 1894. Beitraege zur Lehre von der Klangwahrnehmung. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 56, 467-499.

Hermann, ? 1873. Richard Wagner. Streiflichter aus Dr. Puschmanns psychiatrischer Studie. Munich.

Jadassohn, Salomon. 1899. _Das absolute Tonbewusstsein: die Lehre von musikalischen Hoeren_. Eng. trans. by Le Roy B. Campbell. Leipzig: Breitkopf und Haertel.

Jaensch, E.R. 1913. Die Natur der menschlichen Sprachlaute. _Zeitschrift fuer Sinnesphysiologie_, _47_, 219-290.

Koenig, R. 1881. Ueber den Ursprung der Stoess und Stoesstoene bei harmonischen Intervallen. _Annalen der Physik und Chemie_, _12_, 335-349.

Kries, J. von. 1891-2. Ueber das absolute Gehoer. _Zeitschrift fuer Psychologie_, _3_, 257-279.

Kwalwasser, J. 1955. _Exploring the musical mind_. New York: Coleman-Ross.

Kwalwasser, J., and P.W. Dykema. 1930. _Kwalwasser-Dykema music tests_. New York: Fischer.

Lagrange, J.L. 1759. _Recherches sur la nature et la propagation du son_. Reprinted in _Oeuvres_, _I_ (1867), 39-148.

Legge, Richard. 1894. Music and the musical faculty in insanity. _Journal of Mental Science_, _40_, 368-375.

Lundin, Robert W. 1947. The development and validation of a set of musical ability tests. _American Psychologist_, _2_, 350.

__________. 1947. Toward a cultural theory of consonance. _Journal of Psychology_, _23_, 45-49.

__________. 1953. _An objective psychology of music_. 2nd ed., 1967. New York: The Ronald Press Co.

Maclean, Charles. 1895. On some causes of the changes of tone-colour proceeding in the most modern orchestra. _Proceedings of the Musical Association_, _21_, 77-102.

Macran, H.S., ed. 1902. _The harmonics of Aristoxenus; edited with translation, introduction and index of words by Henry S. Macran_. Oxford: Clarendon Press.

Mecklenburg, Carl Gregor Herzog zu. 1962. _Bibliographie einiger Grenzgebiete der Musikwissenschaft_. Baden-Baden: Verlag Heitz GmbH.

Mentz, P. 1895. Die Wirkung akustischer Sinnesreize auf Puls und Athmung. Wundt Philosophischen Studien, 11, 61-124, 371-392, 563-602.

Mersenne, Marin. 1636. Harmonie universelle, contenant la théorie et la practique de la musique.

Meyer, Max F. 1896-7. Ueber die Rauhigkeit tiefer Toene. Zeitschrift fuer Psychologie, 13, 75-80.

__________. 1899. Is the memory of absolute pitch capable of development through training? Psychology Review, 6, 514-6.

__________. 1900. Elements of a psychological theory of melody. Psychology Review, 7, 241-273.

Moore, H.T. 1914. The genetic aspect of consonance and dissonance. Psychological Monographs, 17(2), 1-68.

Mueller, G. 1930. Die Kantor Familie Friederich Richter. Neuepaedagogische Studien, 2, 182-189.

Mueller, Johannes. 1838. Handbuch der Physiologie des Menschen. Koblenz: Verlag J. Hoelscher. Eng. trans., 1842.

Mueller-Freienfels, Richard. 1935. The evolution of modern psychology. New Haven: Yale University Press.

Murphy, Gardner. 1949. Historical introduction to modern psychology. New York: Harcourt, Brace and Co.

Mursell, James L. 1932. Measuring musical ability and achievement: A study of the correlations of Seashore test scores and other variables. Journal of Education Research, 26, 116-126.

__________. 1937. The psychology of music. New York: Norton.

Ohm, G.S. 1839. Bemerkungen ueber Combinationstoene und Stoesse. Annalen der Physik und Chemie, 47, 463-466.

__________. 1843. Ueber die Definition des Tones, nebst daran geknuepfter Theorie der Sirene und aehnlicher tonbildener Vorrichtungen. Annalen der Physik und Chemie, 135, 497-565.

Olson, Harry F. 1967. Music, physics and engineering. 2nd ed., New York: Dover Publications, Inc.

Packard, Donald W. 1952. Seven french theorists of the nineteenth century. Rochester: University of Rochester Press.

Plomp, Reinier. 1964. The ear as a frequency analyzer. Journal of the Acoustical Society of America, 36, 1628-1636.

__________. 1965. Beats of mistuned consonances. Proceedings of the Fifth International Congress on Acoustics, Paper A46.

__________. 1965. Detectability threshold for combination tones. Journal of the Acoustical Society of America, 37(no. 6), 1110-1123.

__________. 1966. Experiments on tone perception. Institute for Perception, RVO-TNO, Soesterberg, The Netherlands.

__________. 1967. Beats of mistuned consonances. Journal of the Acoustical Society of America, 42(2), 462-474.

__________. 1967. Pitch of complex tones. Journal of the Acoustical Society of America, 41(6), 1526-1533.

__________. 1968. Pitch, timbre, and hearing theory. International Audiology-Audiologie Internationale, 7(3), 322-344.

__________. 1969. Timbre as a multidimensional attribute of complex tones. Paper read at the Symposium on Frequency Analysis and Periodicity Detection in Hearing at Driebergen, The Netherlands on June 23-27, 1969. 16 pp.

__________. 1970. Old and new data on tone perception. Typescript, 57 pp.

Plomp, Reinier, and W.J.M. Levelt. 1962. Musical consonance and critical bandwidth. Proceedings of the Fourth International Congress on Acoustics, Paper P55.

__________. 1965. Tonal consonance and critical bandwidth. Journal of the Acoustical Society of America, 38(4), 548-560.

Plomp, Reinier, and A.M. Mimpen. 1968. The ear as a frequency analyzer. Journal of the Acoustical Society of America, 43(4), 764-767.

Plomp, Reinier, and G.F. Smoorenburg, eds. 1970. Frequency analysis and periodicity detection in hearing. Proceedings of an International Symposium held at Driebergen, The Netherlands, June 23-27, 1969.

Plomp, Reinier, and H.J.M. Steeneken. 1968. Interference between two simple tones. Letter to the editor in Journal of the Acoustical Society of America, 43(4), 883-884.

__________. 1969. Effect of phase on the timbre of complex tones. Journal of the Acoustical Society of America, 46(2), 409-421.

__________. 1971. Pitch versus timbre. Seventh International Congress on Acoustics, Budapest. 4 pp.

Polya, G. 1954. Induction and analogy in mathematics. Volume I of: Mathematics and plausible reasoning. Princeton, N.J.: Princeton University Press.

Preyer, Wilhelm. 1876. Ueber die Grenzen der Tonwahrnehmung. Jena: H. Dufft.

Pringscheim, C. 1873. Richard Wagner und der "Spezialist der Psychiatrie." Eine Beleuchtung der Puschmannschen Studie. Berlin: Schneider.

Probst, Moriz. 1899-1900. Ueber die Lokalisation des Tonvermoegens. Archiv fuer Psychiatrie und Nervenkrankheiten, 32 (1899), 387.

Prout, Ebenezer. 1889. Harmony: Its theory and practice. London: Augener, Ltd.

Puschmann, Th. 1873. Richard Wagner. Eine psychiatrische Studie. Berlin: Behr.

Rand, Benjamin. 1905. Bibliography of philosophy, psychology, and cognate subjects. Vol. III of: Baldwin, James M., ed. 1901. Dictionary of philosophy and psychology. Reprinted, Gloucester, Mass.: P. Smith, 1960.

Reser, H. 1935. Inheritance of musical ability. Student Pedigree Studies #44: Eugenics News, 20, 8-9.

Riemann, Hugo. 1898. Geschichte der Musiktheorie im XI-XIX Jahrhundert. Leipzig: M. Hasse.

Rummenhoeller, Peter. 1967. Musiktheoretisches Denken im 19. Jahrhundert. Vol. 12 of: Studien zur Musikgeschichte des 19. Jahrhunderts. Regensburg: Gustav Bosse Verlag.

Sauveur, Joseph. 1701. Système générale des intervalles des sons, et son application à tous des systèmes et à tous les instrumens de musique. Mémoires de l'Académie Royale des Sciences, Anne 1701. 2nd ed., Paris, 1743.

Savart, F. 1840. Notes sur des causes qui déterminent le degrée d'élévation des sons. Annales de chimie et de physique, 75, 705.

Schaafhausen, ? 1885. Einige Reliquien beruehmter Maenner. Robert Schumanns Gehirn und Hoerorgane. Korrespondenzblatt der Deutschen Gesellschaft fuer Antropologie, Ethnologie und Urgeschichte, 15(10), 147-9.

Schoen, Max. 1940. The psychology of music: A survey for teacher and musician. New York: The Ronald Press.

Scholes, Percy, ed. 1947. The mirror of music, 1844-1944; a century of musical life in Britain as reflected in the pages of the Musical Times. 2 vols. London: Novello and Co., Ltd., and the Oxford University Press.

Seashore, Carl E. 1919. Manual of instruction and interpretations for measurement of musical talent. New York: Columbia Phonograph Co., and City Educ. Dept. Chicago: C.H. Stoeling and Co.

__________. 1919. The psychology of musical talent. New York: Silver, Burdett, and Company. 288 pp.

__________. 1938. The psychology of music. New York: McGraw-Hill.

Seebeck, A. 1841. Beobachtungen ueber einige Bedingungen der Entstehung von Toenen. Annalen der Physik und Chemie, 53, 417-436.

__________. 1843. Ueber die Sirene. Annalen der Physik und Chemie, 60(ser. 2), 449-481.

Shower, E.G., and R. Biddulph. 1931. Differential pitch sensitivity of the ear. Journal of the Acoustical Society of America, 3, 275-287.

Shuter, Rosamund. 1968. The psychology of musical ability. London: Methuen and Co., Ltd. 11 New Fetter Lane, London EC4.

Stevens, S.S. 1934. Pitch, loudness, volume, and density. Psychological Bulletin, 31, 682-3.

__________. 1935. The relation of pitch to intensity. Journal of the Acoustical Society of America, 6, 150-154.

Stevens, S.S., and H. Davis. 1936. Psychophysiological acoustics: Pitch and loudness. Journal of the Acoustical Society of America, 8, 1-13.

Stevens, S.S., J. Volkmann, and E.B. Newman. 1937. A scale for the measurement of the psychological magnitude of pitch. Journal of the Acoustical Society of America, 8, 185-190.

Strunk, Oliver, ed. 1950. Source readings in music history. New York: W.W. Norton and Co.

Stumpf, Carl. 1883-90. Tonpsychologie. Leipzig: Verlag von S. Hirzel. 2 vols. in 1.

__________. 1896. Ueber die Ermittlung von Obertoenen. Wiedemann's Annalen, LVII, 600.

__________. 1897. Neueres ueber Tonverschmelzung. Zeitschrift fuer Psychologie, 15, 280-303, 354.

__________. 1898. Zum Einfluss der Klangfarbe auf die Analyse von Zusammenklaengen. Beitraege zur Akustik und Musikwissenschaft, 2, 168.

__________. 1898-1901. Geschichte des Konsonanzbegriffs. Munich: Franz. x, 261 pp.

Tartini, G. 1714. Trattato di musica secondo la vera scienza dell'armonia. Published 1754.

Tonndorf, J. 1970. Cochlear mechanics and hydro-dynamics. In: Foundations of modern auditory theory, I, 205-254. New York: Academic Press, Inc. J.V. Tobias, ed.

Wallaschek, Richard. 1893. Primitive music. London: Longmans, Green and Co. xi, 326 pp.

Ward, W. Dixon. 1970. Musical perception. In: Foundations of modern auditory theory, I, 407-447. New York: Academic Press. J.V. Tobias, ed.

Weber, E.H. 1834. De Tactu. Eng. trans. by E.B. Titchener. Available in: E.B. Titchener. 1912. The classical psychologists. New York: Houghton-Mifflin Co. Also available in: Wayne Dennis. 1948. Readings in the history of psychology. New York: Appleton Century Crofts.

__________. 1846. Der Tastsinn und das Gemeingefuehl. Eng. trans. by Benjamin Rand. In: E.B. Titchener. 1912. The classical psychologists. New York: Houghton-Mifflin Co. Also available in: Wayne Dennis. 1948. Readings in the history of psychology. New York: Appleton Century Crofts.

Willis, R. 1830. On the vowel sounds, and on reed organ-pipes. Cambridge Philosophical Society, 3, 231-268.

Wing, H.D. 1963. Is musical aptitude innate? Rev. Psychol. in Music, 1, 1-7.

Wundt, Wilhelm. 1873. Grundzuege der physiologischen Psychologie. 2 vols. 2nd ed., Leipzig 1880: Verlag W. Engelmann.

Young, Thomas. 1800. Outlines of experiments respecting sound and light. Philosophical Transactions, I, 106-150.

VOLUME TWO

A BIBLIOGRAPHY OF NINETEENTH CENTURY MUSIC PSYCHOLOGY LITERATURE

INTRODUCTION TO VOLUME TWO

Compilation and Computer Storage Information

Volume II of this dissertation is a partially annotated bibliography of music psychology literature from the period 1800-1900. An author alphabetized listing and a subject indexed and language indexed listing are provided. To allow selective orderings of entries and to reduce the likelihood of compilation error, the bibliography has been indexed into a computer information storage and retrieval system. This storage procedure allows retrieval of entries by author, date or date range, language, general or specific topics, publisher, journal, city of publication, or any combination of these categories. Since the bibliography consists of 895 entries, the flexibility afforded by this storage system should be of considerable time saving value to those who approach it with specialized scholarly needs.

This computer project was made possible by technical assistance and funding provided by the Instruction and Research Computer Center of The Ohio State University. The bibliography is stored on tape; information concerning acquisition of a copy of this tape may be obtained through

The Ohio State University Instruction and Research Computer Center Library. A copy of the program used to generate the subject indexed and language indexed listing of the bibliography is given later in this volume (infra, p. 460).

Entries in this bibliography are presented in American Psychological Association form, modified only in that the publication date immediately follows the author. Although entry uniformity was judged to be important, available information was judged to be more important; many entries in the bibliography are from sources not generally encountered in normal music psychology reading activities. For this reason, authors' full names are given when available.

Compilation procedures included the survey of references cited in available music psychology texts, experimental music psychology periodical literature, and histories of psychology. The bibliography is based primarily on the holdings of the Information Retrieval System supported by The Ohio State University School of music. Other major bibliographic sources were Chandler and Barnhart's (1938) A bibliography of experimental aesthetics, 1864-1937, Rand's (1905) Bibliography of philosophy, psychology, and cognate subjects, Mecklenburg's (1962) Bibliographie einiger Grenzgebiete der Musikwissenschaft, and the music indices of the catalogues of the New York Public Library and of the Library of Congress. Additional bibliographic data were solicited from leading investigators of music perception phenomena, most notably: Dr. Reinier Plomp of the Institute for Perception TNO, Soesterberg, The Netherlands; Dr. Juan Roederer of the University of Denver, and Dr. W. Dixon Ward of the Hearing research Laboratory, The University of Minnesota.

The bibliography is intended to be a source of literature in a field which has a diffused and largely unknown body of literature. Not all of the documents entered in the bibliography were seen; it is probable that a primary investigation of these documents would result in the discovery of a number of other documents which should be added to the bibliography. It is for this reason that subject and language subsections for which no documents have been found were included in the subject indexed and language indexed listing of the bibliography, rather than deleted entirely.

The subject indexed listing of the bibliography is the product of a subject coding system which was generated by insights provided in the topographical outline of music psychology presented and discussed in Chapter 1 (supra, pp. 9-52) of the first volume. A copy of the coding log used to subject index the bibliography is given later (infra, p. 457). The average number of subject coding designations per entry is two; the greatest number of subject codings for any document is seven. In a simple extension of the program, much more detailed indexing of documents is possible. Table 19 shows distributions of subjects and languages in the subject indexed and language indexed listing of the bibliography.

Table 19. Distributions of Subjects and Languages in the Bibliography.

	Dutch	English	French	German	Italian	Latin	Spanish	Total entries by subject
Psychophysics	0	72	39	207	4	5	1	328
Musical elements and constructs	0	41	7	133	1	0	0	182
Musical perception	0	50	65	158	16	3	0	292
Ability	0	11	7	24	3	0	0	45
Applied music psychology	1	30	15	33	6	3	1	89
Behavioral music psychology	0	31	18	59	10	2	0	120
Testing	0	0	1	0	0	0	0	1
General surveys and texts	0	41	31	102	3	7	1	185
Total entries by language	1	276	183	716	43	20	3	1242

Abbreviations Used in the Bibliography

Abbreviations of journal titles and of publishers found in this bibliography are entirely those found in source works: I did not abbreviate any of this information. The abbreviation n/v is used uniformly in this compilation to indicate that no volume number of a periodical was given in the source entry. Abbreviations of journal titles and publishers commonly found in bibliographic source works are given below:

Ann. chim. phys.: Annales de chimie et de physique (Paris)

Ann. Phys. Chem.: Annalen der Physik und Chemie (Halle, Leipzig)

Arch. Ital. de Biol.: Archives Italiennes de Biologie (Pisa, Rome)

Arch. of Otol.: Archives of Otology (New York)

Allg. Wien. Mus.: Allgemeine Wiener Musikzeitung (Vienna)

Arch. f.d. ges. Physiol.: Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere (Bonn)

B. and H.: Breitkopf und Haertel (Leipzig)

C.R. Acad. Sci.: Comptes Rendus de l'Academie Royale des Sciences (Paris)

Pfluegers Arch.: Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere (Bonn)

Neurol. Centralbl.: Neurologisches Centralblatt (Leipzig)

Phil. Stud.: Wundt Philosophischen Studien (Leipzig)

Vtljschr. f. Mus.: Vierteljahrschrift fuer Musikwissenschaft (Leipzig)

Vtljschr. f. wiss. Phil.: Vierteljahrschrift fuer wissenschaftliches Philosophie (Leipzig)

Ztschr. f. Ohrenh.: Zeitschrift fuer Ohrenheilkunde

Ztschr. f. Psych., Physiol.: Zeitschrift fuer Psychologie und Physiologie des Sinnesorgane

BIBLIOGRAPHY

Abraham, Otto, and Bruehl, L.J. 1898. Wahrnehmung kuerzester Toene und Geraeusch. _Zeitschrift fuer Psychologie, 18_, 177-217.

Note: Mecklenburg shows journal as "_Z. fuer Psych. und Physiol._ ..."

Abraham, Otto, and Schaefer, Karl L. 1898. Ueber die maximale Geschwindigkeit von Tonfolgen. _Zeitschrift fuer Psychologie, 18_, 408-416.

Abraham, Otto and Schaefer, Karl L. 1900/1904. Studien ueber Unterbrechungstoene. _Archiv fuer die gesammte Physiologie, n/v_, no pp.

Abbutt, T.C. 1893-4. Music, rhythm, and muscle. _Nature, 49_, 340.

Alberti, Fr. 1890. _Schwindel als Symptom von Ohrkrankheiten_. Halle: no publisher given.

Alberts, ? 1897. Der Gehoersinn. _Naturw. Wochensch._, _XII_, 139-140.

Allen, Grant. 1877. _Physiological aesthetics_. London: no publisher given.

Allen, Grant. 1878. Note deafness. _Mind, III_, 152-167.

Andrew, J. 1881. _The pendulograph: A series of writings of the twenty ratios of the musical system_. London: no publisher given. 20 pp.

Angell, Frank. 1891. Untersuchungen ueber die Schaetzung von Schallintensitaeten. _Philosophischen Studien, VII_, 414-468.

Angell, Frank, and Harwood, H. 1899. Experiments on discriminations of clangs for different intervals of time. _American Journal of Psychology, XI_, 67-69.

Note: Conflicting entries; Rand (above) enters pages as 67-69, Chandler and Barnhart enters pages as 65-69.

Anonymous. no date. Psychologie de la musique chinoise. Revue de Psychologie appliquée, XXXIII, 4.

Anonymous. no date. Sound blindness. London Journal of Education, IX, 475.

Anonymous. 1799-1800. Ueber den Wert der Musik und die Mittel ihn zu Erhoehen. Allgemeine musikalische Zeitung 1799/1800, 817, 833, 849.

Anonymous. 1827. Das Musikalische-Komische. Allgemeine musikalische Zeitung 1827, 329.

Anonymous. 1830. Wohltaetige Wirkung der Musik auf Geisteskranke. In besonderer Beziehung auf die Werke von G.A.E. Nostitz und J. Ankendorf: Beschreibung der Kgl. Saechsischen Heil- und Verpflegungsanstalt Sonnenstein. Allgemeine musikalische Zeitung 1830, 605.

Anonymous. 1840. Irren-Heilung durch Musik. Ein Besuch im Bicetre. Nach dem Franzoeschischen. Allgemeine musikalische Zeitung 1840, 886ff.

Anonymous. 1840. Ueber den Tarantismus und sein Kur vorzueglich mit Musik. Allgemeine musikalische Zeitung 1840, 753.

Anonymous. 1843. Du pouvoir social et de l'influence morale de la musique. Bibliotheque Suisse, XLVI, 226; XLVII, 107.

Anonymous. 1844. Einige Worte ueber den Einfluss der Musik. Allgemeine musikalische Zeitung 1844, 361.

Anonymous. 1871. Studien ueber die Tonkunst zur Foerderung richtiger Erkenntnis ihres hohen Zweckes und Benuetzung ihrer Macht. Wien: Mayer. 102 pp.

Anonymous. 1878. Das Urteilen ueber Musik. Helvetia, I, 401.

Anonymous. 1882. Zur Charakteristik der Tonarten. Neue Musikzeitung 1882, 10-11; 1897, 4; 1906, 24.

Apel, August. 1799-1800. Ueber Ton und Farbe. Allgemeine musikalische Zeitung, n/v, 753, 769.

Apel, M. 1895. Kants Erkenntnistheorie. Berlin: no publisher given. 147 pp.

Appunn, Anton. 1898. Schwingungszahlenbestimmungen bei sehr hohen toenen. Annalen der Physik, LXIV, 409.

Appunn, Anton. 1899. Warum koennen differenztoene nicht mit sicherheit zur Bestimmung hoher Schwingungszahlen angewendet werden? Annalen der Physik, LXVII, 222.

Appunn, G. 1868. Ueber die Helmholtz'sche Lehre von den Tonempfindungen als Grundlaege fuer die Theorie der Musik, nebst Beschreibung einiger, zum Theil ganz neuer Apparate, welche zur Erlaeuterung und zum Beweis dieser Theorie geeignet sind. Bericht der Wetterauischen gesammte Gesellschaft den Naturkunde Hanau ueber Zeitabschnitt von 14. October 1863 bis 31. December 1867, Hanau, 73-90.

Aristedes, Quintillianus. De musica libri III. Hrsg. von Albert Jahn. Berlin, 1882: no publisher given.

Note: Entered in the Mecklenburg subject index under "Symbolism."

Arnheim, F. 1887. Beitraege zur Theorie der Localisation von Schallempfindungen mittelst der Bogengaenge. No city or publisher given.

Arnold, Yourij von. 1867. Der Einfluss des Zeitgeistes auf die Entwicklung der Tonkunst. Also: Neue Allgemeine Zeitschrift fuer Theater und Musik, n/v, no pp. Leipzig: Lucius. 44 pp.

Arreat, L. 1895. Mémoire et imagination. Peintres, musiciens, poètes et orateurs. Paris: Alcan.

Atlee, E.A. 1804. An inaugural essay on the influence of music in the cure of diseases. Philadelphia: no publisher given.

Auerbach, F. See: Kries, J. von. 1877.

Axbel, ? 1890. Harmonie des vibrations. Le son et la lumière et leurs rapports communs. Paris: Robert. 10 pp.

Ayers, H. 1892. A contribution to the morphology of the vertebrate ear, with a reconsideration of its function. Journal of Morphology, VI, no pp.

B., C.D.v. 1858. Das Ethische in der Musik. Neue Berliner Musikzeitung, n/v, 353.

B. (F.L.) 1816. Musik und Malerie. Allgemeine musikalische Zeitung, n/v, 293.

B. (F.L.) 1824. Ideal und Wirklichkeit, auch in Beziehung auf Tonkunst. Allgemeine musikalische Zeitung, n/v, 249.

Bach, H.A. 1817. De musicae effectu in homine sano et aegro. Berlin: no publisher given.

Bagge, Selmar. 1860. Gedanken und Ansichten ueber Musik. Wien: no publisher given.

Bagge, Selmar. 1882. Das Musikalische-Schoene, Vortrag. Basel: no publisher given.

Baginsky, B. 1881. Die Schwindelerscheinungen nach Ohrverlitzung. Sitzbericht von der Akademie von Wissenschaft, Berlin, 42-7.

Baginsky, B. 1883. Function der Gehoerschnecke. Virchow's Archiv, XCIV, no pp.

Baginsky, B. 1883. Zur Physiologie der Gehoerschnecke. Sitzbericht von der Akademie von Wissenschaft, Berlin, 683-9.

Baginsky, B. 1891. Hoersphaere und Ohrenbewegungen. Archiv fuer Anatomie und Physiologie, 1891.

Bailly, Edmond. 1900. Das Toenende Phaenomen in der Natur. No city, no publisher given.

Bain, A. 1855. The senses and the intellect. No city, no publisher given.

Baker, F.C. 1897. On the effect of music on caged animals. *American Naturalist*, *XXXI*, 460-463.

Bamberg, ? 1851. Ueber das Tragische in der Tonkunst. *Neue Berliner Musikzeitung*, *n/v*, 295.

Banister, H.C. 1885-6. Music as a language. *Proceedings of the Musical Association*, *n/v*, 107-124.

Baratoux, J. 1888. *De l'unification de la mesure de l'ouïe*. Paris: no publisher given. 16 pp.

Baratoux, J. 1888. *L'audition colorée*. Paris: no publisher given.

Baron Kelvin. *See*: Thompson, W.

Baron Rayleigh. *See*: Strutt, J.W.

Barth, A. no date. Beitraege zur Anatomie des Ohres. *Zeitschrift fuer Ohrenheilkunde*, *XVII*, no pp.

Barth, A. 1889. Ueber die Darstellung des haeutigen Labyrinthes. *Arch. f. Anat. u. Physiol.*, *physiol. Abth.*, *n/v*, no pp.

Barth, Ernst. 1898. *Ueber den gesundheitlichen Wert des Singens*. Leipzig: no publisher given.

Bartholomaei. 1877. Anfang des Tastens, Sehens und Hoerens des Kindes. *Jahrbuch d. Vereins fuer wissenschaftlich Paedagogie*, *IV*, no pp.

Batka, Richard. 1899. Musikaesthetische Streifzuege. *Herausgegeben von Carl Stumpf*. Leipzig: Diederichs. 288 pp.

Battelli, F. 1896-7. Sul limite inferiore dei suoni percettibili. *Giorn. d. R. Accad. di Med. di Torino*, *XLIV* (1896), 478-486.

For french translation: *Arch. Ital. de Biol.*, *XXVII* (1897), 202-9.

Bauer, K.L. 1878. Die Summationstoene als Differenz- und als Stosstoene aus den Obertoenen der Primaertoene. Annelen der Physik., IV, 516.

Bauer, W.A. 1836. Ueber den Einfluss der Musik auf den Menschen in gesundem und krankem Zustand (Zustanden?). Wien: no publisher given.

Beardsley, G.L. 1882-3. The medical uses of music. New England Medical Monthly, I, 214-216.

Beaunis, Henri Etienne. 1875. Les principes de la physiologie. Paris: Berger Levrault and Co. 25 pp.

Beaunis, Henri Etienne. 1884-6. Recherches expérimentales sur les conditions de l'activité cérébrale et sur la physiologie des nerfs. Paris: J. -B. Baillier. 2 vols. in 1.

Beaunis, Henri Etienne. 1889. Les sensations internes. Paris: Alcan. iii, 256 pp.

Beaunis, Henri Etienne, and Binet, Alfred. 1892. Sur deux cas d'audition colorée. Rev. Philos., XXXIII, 448-461.

Beaunis, Henri Etienne. 1893. Travaux du laboratoire de psychologie physiologique des hautes études. Paris: Baillier. 100 pp.

"A collection of miscellaneous bio-bibliographic information on H. Beaunis can be found in the Library of Congress index: WZ 100, qB 381." --L.C. entry annotation.

Beaunis, Henri Etienne. 1898. Muscle sense in singing. American Journal of Psychology, I, 205.

Beauquier, Charles. 1865. La musique et la sensibilité physique. Revue politique et litteraire, II, 791.

Beauquier, Charles. 1865. Philosophie de la musique. Paris: Germer Baillier. New York: Baillier Brothers. viii, 204 pp.

Beauregard, H. 1893. Recherches sur l'appareil auditif chez les Mammimères. Journal de l'Anatomy et de la Physiologie, 1893.

Bechterew, W. von. 1885. Ueber die innere Abtheilung des Strickkoerpers und den achten Hirnnerven. Neurol. Centralbl., IV, 1885.

Becker, J.C. 1821. De musicae vi salutari. Berlin: no publisher given.

Beckmann, ? 1898. Zur Theorie des Hoerens. Verh. a. Deutsch. Otol. Gesell., V, (Vers. in Wuerzb.), 27-28. Mai 1898.

Behnke, Emil. 1879. On the mechanism of the human voice. Proceedings of the Musical Association, VI, 1-14.

Bell, A. Melville. 1882. Sounds and their relations. London: no publisher given.

Bell, Sir Charles. 1811. Idea of a new anatomy of the brain. Reprinted: Journal of Anatomy and Physiology, III (1869), 154-157.

Also available: Wayne Dennis (1948).

Bellaigue, Camille. 1893. Psychologie musicale. Paris: C. Delagrave. xxii, 282 pp.

Benoist, E. 1899. L'audition colorée. L'Independant Med., V, 97-100.

Benoist, E. 1899. Contribution à l'étude de l'audition colorée. Paris: no publisher given. 47 pp.

Bentley, I.M. no date. Standards of audition. Science, XIX, 951-961.

Berg, H. 1877. Die Lust an der Musik erklairt. Nebst einem Anhang: Die Lust an den Farben, den Formen und der koerperlichen Schoenheit. Berlin: no publisher given.

Note: Kreitler and Kreitler conflicts with incomplete Mecklenburg citation given above; K. and K. shows: Berlin: Behr, 1879.

Bernardini, C., and Ferrari, Guilio C. 1896. Richerche sperimental sull memoria musicale nei frenastensici. Riv. sper. Freniatria., 22, 315-323.

Bernstein, J. 1871. Untersuchengen ueber den Erregungsvorgang im Nerven- und Muskelsysteme. Carl Winter's Universitaetsbuchhandlung, Heidelberg.

"Bernstein [1871] published a monograph entirely devoted to the (over-all) responses of nerves and muscles to electric stimuli. Applying an ingenious technique, he discovered that electric stimulation initiates a negative nerve impulse with a duration of 0.6 - 0.7 msec. In view of this short duration, he suggested that the nerve is able to produce synchronous impulses up to a stimulation frequency of about 1600 pps. Although Bernstein assumed that also in the auditory nerve synchronism is preserved for frequencies up to 1600 Hz, he did not consider the possibility that pitch might be related to the rate of nerve impulses, but adopted Helmholtz's concept of the specific energies as the basis of pitch." -- Plomp, 1967: Pitch, timbre, and hearing theory ... (Bernstein was Helmholtz's assistant and successor as professor of physiology at Heidelberg). -- Ibid.

Berthoud, Samuel Henry. 1853. Une cure operée par la musique. New York: C. Lassalle. 96 pp.

Besteiro, J. 1897. La psicofisica. Madrid: no publisher given. 144 pp.

Bezold, Fr. 1884-5. Schuluntersuchungen ueber das kindliche Gehoerorgan. Zeitschrift fuer Ohrenheilkunde, XIX, no pp.

Note: entry is from Rand (1905), who cites volume as XIX, XV. Second volume number given by Rand is doubtful.

Bezold, Fr. 1896. Ueber den gegenwaertigen Stand der Hoerpruueferungen. Zeitschrift fuer Ohrenheilkunde, XXIX, 1-27. English translation: Archive of Otol., XXV (1896), 274-284.

Bezold, Fr. 1896-7. Demonstration einer kontinuierlichen Tonreihe. Zeitschrift fuer Psychologie, XIII, 161-174.

Bezold, Fr. 1896-1900. Das Hoervermoegen der Taubstummen. Wiesbaden: (1896), 156 pp. Zeitschrift fuer Psychologie, n/v (1900), 78.

Bezold, Fr. 1897. Die Stellung der Konsonanten in der Tonreihe. Zeitschrift fuer Ohrenheilkunde, XXX, 114-121.

Bezold, Fr. 1897. Ueber die funktionelle Pruefung des menschlichen Gehoerorgans. Wiesbaeden: no publisher given. 2 vols. Vol. 1: 240 pp.; Vol. 2: 175 pp.

Bie, Oskar. 1885. Der Naturalismus in der Musik. Allgemeine Musikzeitung 1885, 149.

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., n/v, 79-106. (Also, Berlin, 1896, no publisher given).

"...presents...notes on the influence of music on the organism. Most of the paper is devoted to the physiological and motor affects of rhythm." --Diserens (1923).

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., 81, 84.

Note: Diserens (1923) gives same journal, but gives volume LXXXC, which must be a typographical error, and gives pages 79-106. "...Most of the paper is devoted to the physiological and motor affects of rhythm, but several observations on tonal affects on man and animals are recorded. The author reports an experiment of his own in which a violent pain appeared in an apparently sound tooth upon hearing a soprano sing a high note (B) at a concert, a quarter tone too high. Examination of the tooth disclosed slight decay. The hyper-irritability of the nerve was thus excited by irradiation of an auditory stimulus. The observation accords with the conclusion of Urbantschitsch [1888: Ueber den Einfluss einer Sinneserregung...] that auditory stimuli lower the sensory threshold. Billroth also mentions seeing a young "great Dane" fall down as if in a faint when a village brass band struck up a (march)." --Diserens (1923)

Billroth, Th. 1894-5. Wer ist Musikalisch? Deutscher Rundschau., LXXI (1894), 79; LXXIV (1895), 385.

Also: Wer ist Musikalisch? Herausgegeben von Eduard Hanslick. Berlin: Stavanger. 2. Auflage 1896, 3. Auflage 1898, 4. Auflage 1912, 5. Auflage Berlin 1946: Paetel. 246 pp. Please note conflict: Max Schoen (1940), p. 235 says 1896, Berlin.

Binder, ? 1889. Das Morel'sche Ohr. Arch. f. Psychiatrie, XX. Also: Berlin (1889), no publisher given. 55 pp.

Bindseil, H.E. 1839. Akustik. Verlag der Horvath'schen Buchhandlung, Potsdam.

Held that the timbre of a given tone originates from its harmonics. --Plomp, 1971: Timbre as a multidimensional attribute...

Binet, Alfred. 1888. Etudes de Psychologie Expérimentale. Paris: no publisher given. 306 pp.

Binet, Alfred, and Philippe, J. 1892. Etude sur l'audition colorée. Rev. Philos., XXXIII, 461-4.

Binet, Alfred. 1892. Le problème de l'audition colorée. Rev. d. Deux Mondes, CXIII, 586-614.

Binet, Alfred. 1894. Introduction à la Psychologie expérimentale. Paris: no publisher given. 146 pp.

Binet, Alfred. 1894. L'application de la psychométrie à l'étude de l'audition colorée. Paris: no publisher given.

Binet, Alfred, and Courtier, Jules. 1895. Recherches graphiques sur la musique. L'Année Psychologie, 2, 201-223. Also: Rev. Scient., 4, 5-15.

"...devoted to the determination of the energy and rapidity of movements made by a pianist; i.e., the mechanical work of the fingers on the keys. The study bears most directly upon the influence of technical difficulties in performance..." --Diserens (1923)

Binet, Alfred, and Courtier, Jules. 1895. Circulation capillaire de la main. Année Psychologie, 2, 87-167.

"In connection with a study of the capillary circulation of the hand, carried out on four subjects by means of the Marey sphygmograph and the plethysmograph, these authors found a diminution of the amplitude of the pulse in response to the sudden sound of a gong." --Diserens (1923)

Binet, Alfred, and Courtier, Jules. 1896. L'influence de la vie èmotionelle sur le coeur, la respiration, et la circulation capillaire. Année Psychologie, 3, 65-126.

"...investigated the influence of musical stimuli on respiration and circulation. The former was studied by means of the pneumograph, the latter by the plethysmograph. The reactions of a single subject were studied ... sad melodies accelerate respiration by 216 [respirations per minute] on the average, considerably diminish the amplitude and produce irregularities in both acceleration and amplitude of respiration. Gay music e.g., military marches, produced an acceleration of 3.8 [respirations per minute] and showed less tendency to reduce amplitude... With respect to circulation, purely sensorial excitations produce a slight lessening of the amplitude of pulsation. Dissonances produce a greater effect of the same nature. Sad music has almost no influence, while gay music nearly always provokes a reduction." --Diserens (1923) Note: I think that the first respiration rate change given by Diserens is improbable; a rate change of 2.6 respirations per minute would seem more likely. --D.B.

Bishop, S.S. 1890. Imperforate auditory canals. Chicago: no publisher given. 8 pp.

Blackburn, Vernon. 1898. The fringe of an art. Appreciations in music. London: Unicorn Press. New York: Mansfield. 176 pp.

Blake, Clarence J. 1879. Audibility of high musical tones. American Journal of Otology, I, 276.

Blaserna, P. 1876. _Die Theorie des Schalls in Beziehung zur Musik_. Leipzig: no publisher given.

Blaserna, P. 1877. _Le son et la musique_. Paris: no publisher given.

Bleyer, J.M. 1897. Tone Blindness. _Journal of Eye, Ear, and Throat Disease, II_, 1f.

Bloch, E. 1893. Das Binaurale Hoeren. _Zeitschrift fuer Ohrenheilkunde, 24_, 25-85.

Boecklin, August von. 1811. _Fragmente zur hoeheren Musik und fuer aesthetische Tonliebhaber_. Freyberg/Konstanz: Herder. 84 pp.

Boehm, J.W. 1830. _Analyse de Schoenen in der Musik_. Wien: no publisher given.

Boehmer, H. 1863. _Die Sinneswahrnehmung_. Leipzig: no publisher given.

Boettcher, O. 1886. Rueckblicke auf die neueren Untersuchungen und den Bau der Schnecke, im Anschluss an eigene Beobachtungen. _Archiv fuer Ohrenheilkunde, XXXIV_, no pp.

Bolton, Thaddeus. 1894. Rhythm. _American Journal of Psychology, 6_, 145-238.

Howes (1927) _Borderland_... discusses Bolton's experiments which led to this article; see especially pages 88-100.

Bonnier, P. 1896. Les derniers théories de l'audition. _Arch. Int. de Laryngologie, IX_, 218-241.

Bonnier, P. 1898. _L'oreille: anatomie, physiologie, symptomatologie, pathologie_. Paris: no publisher given. 5 vols.

Bonnier, P. 1900. La définition du timbre. _Compte-Rendu Soc. de Biol., LII_, 300-302.

Bonnier, P. 1900. A propos de la théorie de Helmholtz. Compte-Rendu Soc. De Biol., LII, 302-304.

Bosanquet, R.H.M. 1879. On a mode of producing continuous notes from resonators. Proceedings of the Musical Association, VI, 15-21.

Bosanquet, R.H.M. 1879. On the present state of experimental acoustics, with suggestions for the arrangement of an acoustic laboratory and a sketch of research. Philosophy Magazine, 8, 290-305.

Bosanquet, R.H.M. 1879. Some experiments with a revolving stop-cock. Proceedings of the Musical Association, VI, 21-30.

Bosanquet, R.H.M. 1881. On the history of the theory of the beats of mistuned consonances. Philosophy Magazine, XII, 270-282.

Bosanquet, R.H.M. 1881. On the beats of consonances of the form h:1. Philosophy Magazine, XI (5th ser.), 420-436, 492-506.

Bourdon, B. 1898. The application of the graphic method of the study of the intensity of the voice. L'Année Psychol., 5, 369-378.

Br..., Alexander. 1836. Parallelen. Politik und Musik. Neue Zeitschrift fuer Musik, V, 83.

Branckmann, K. 1896. Die im kindlichen Alter auftretende Schwerhoerigkeit und ihre paedagogische Wuerdigung. Leipzig: no publisher given. 103 pp.

Brandt, S. 1861. Ueber Verschiedenheit des Klangs (Klangfarbe). Ann. Phys. Chem., CXII, 324-336.

Breakspeare, Eustace J. 1880. Musical aesthetics; with especial reference to Dr. Ed. Hanslick's essay, 'Vom musikalische Schoenen.' Proceedings of the Musical Association, VI, 59-79.

Brendel, Karl Franz. 1847. Ueber musikalische Recensionen. Neue Zeitschrift fuer Musik, XXVI (1847), 102, 106, 114, 153, 163; XXVII (1847), 254.

Brendel, Karl Franz. 1855. (Polemik gegen Eduard Hanslick). Rheinische Musik- und Theaterzeitung, XLII, 8-10.

Breton, A. 1897. Nouveau cas d'audition colorée. Rev. Gen. de Clin. et de Thérap., XI, 279.

Breuer, J. 1891. Ueber die Function der Otolithen-Apparate. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 48, 195-302.

Breuer, Joseph. 1874. Die Function der Bogengaenge des Ohrlabyrinthes. Medicinische Jahrbuch (Wien), 1874. no pp.

Brinkerhoff, C. 1892. Color analogy in music. The Echo, 9 (no. 2), 1.

The Echo: published in LaFayette, Indiana.

Broman, J. 1899. Die Entwicklungsgeschichte der Gehoerknoechelchen beim Menschen. Wiesbaeden: no publisher given. 164 pp.

Bronislawski, Venceslaus-Handelsman. 1900. Contribution a l'etude l'amusie et de la localisation des centres musicaux. Thesis. Bordeaux: Gounouilhou. 76 pp.

Brueckmann, ? 1811. Ueber eine merkwuerdige Nervenkrankheit, durch Musik geheit. Archiv fuer medizinische Erfahrungen, I, 8ff.

Brueckner, C. 1888. Function des Labyrinthes. Virchow's Archiv, CXIV, no pp.

Bruehl, G. 1898. Das menschliche Gehoerorgan in acht topographischen Bildern, mit erlaeuterndem Texte. Munich: no publisher given. 11 pp.

Bruhns, C. 1857. Ueber das deutlich Hoeren. Dissertation: Goettingen, 1857.

Bruneau, Alfred. 1900. La psychologie du musicien. Paris: Edition Artistique.

Brunner, M. 1897. Die methodischen Hoeruebungen in der Taubstummenschule. Wien. klin. Wochensch., X, 779-782.

Bryk, Siegfried. 1894. Medicinischer Gebrauch der Musik in altern und neuer Zeit. Neue Zeitschrift fuer Music 1894, 521.

Buch, Einar. 1899. Ueber die 'Verschmelzung' von Empfindungen, besonders bei Klangeindruecken. Philosophischen Studien, XV, 1-66, 183-278.

Note: Mecklenburg conflicts with Rand entry (above): Mecklenburg gives year as 1899, vols I, II, and 1900, vol. XV, 1.

Buchner, L. 1880. Mind in animals. English translation: A. Besant. London: Freethought.

"Occasional references to animals effected [sic] by music: '...spiders living in a room are attracted out by the playing of a piano, guitar, or violin especially when the music is tender and not too loud.' (320)" --Shaffer (1971): The psychology of music: a bibliography.

Buecher, Karl. 1847. Arbeit und Rhythmus. Leipzig: no publisher given. 412 pp. 6th edition, 1924.

Note: Fortescu cites 1899 edition.

Buescher, Carl. See: Buecher, Karl.

Burq, V. 1874. De la gymnastique pulmonaire contre la phthisie. Chronique musicale, 5, 97-104+.

Cabanes, L.A. 1899. Les phthisiques célèbres. La maladie de Chopin d'après des documents inédits. La chronique médicale, n/v, 673.

Caluci, E. 1894. Sulla Genesi del Senso musicale. Venice: Ferrari.

Cappuccio, Guiseppe. 1895. L'Arte della Musica e la Sociologia. Siracuse: Tamburo.

Casamorata, L.F., and Maglioni, G. 1871-2. Memoria intorno alla soluzione del XVIII queseto accademico. Reglio instituto musicale, (Florence), anno 9, 82-91; anno 10, 45-57.

Cassel, Paulus. 1882. Die Musik und ihr Einfluss auf die Menschen. Berlin: no publisher given.

Note: dissertation?

Castillon (fils). 1804. Recherches sur le principe du beau et sur son application à la musique. Abhandlungen der Preussischen Akademie der Wissenschaften, n/v, 3.

Cattell, James McKeen, and Fullerton, G.S. 1892. On the perception of small differences. No city or publisher given.

Chalupecky, H. 1904. Farbenhoeren. Wien. klin. Rundschau, XVIII (1904), 273-6, 395-7, 412-4, 431-2.

Charpentier, A. 1890. L'Intensité comparative des sons d'après leur tonalité. Arch. de Physiol. Nor. et Pathol., II(5e ser.), no pp.

See also: Couty, L. 1874.

Chladni, Ernst Florens Friedrich. 1787. Entdeckungen ueber die Theorie des Klangs. Leipzig: Bey Weidmanns erbur und Reich. i, 77 pp.

Chladni, Ernst Florens Friedrich. 1800-1801. Ueber die wahre Ursache des Consonirens und Dissonirens. Allgemeine musikalische Zeitung 1800/1801, 337, 353.

Chladni, Ernst Florens Friedrich. 1802. Die Akustik, I. Leipzig: B. and H. xxxii, 304 pp.

"Chladni was the great acoustician who discovered how to make sound pictures in dust on vibrating plates; Napolean paid to have the above treatise translated into French." --Boring, 1942: 348.

Chladni, Ernst Florens Friederich. 1809. *Traite d'acoustique*. Paris: Chez Courcier. xxvii, 375 pp.

Translated from *Die Akustik* by the author.

Chladni, Ernst Florens Friedrich. 1821. *E.F.F. Chladni's Beitraege zur praktischen Akustik und zur Lehre von Instrument-bau, enhaltend die Theorie und Anleitung zum Bau des Clavicylinders und damit verwandter Instrumente*. Leipzig: B. and H.

Chladni, Ernst Florens Friederich. 1824. Ueber die Hervorbringung der menschlichen Sprachlaute. *Ann. Phys.*, *76*, 187-216.

Chladni, Ernst Florens Friedrich. 1830. *Neue, unveraenderte Ausgabe* [of *Die Akustik*, *I*]. Leipzig: B. and H. xxxvi, 242 pp.

Chomet, H. 1875. *The influence of music on health and life*. New York: Putnam.

Claparede, E. 1900. Sur l'audition colorée. *Rev. Philos.*, *XLIX*, 515-7.

Clavier, J. 1899. L'audition colorée. *Annales des sciences psychologiques*, *IX*, 237-251.

Clavier, J. 1899-1900. L'audition colorée. *L'Anne Psychol.*, *V*, 161. Also: *Rev. d. Sciences*, *XI* (1900), 975-985.

Cobb, Gerard. 1884. On certain principles of musical exposition considered educationally and with special reference to current systems of musical theory. Part 1 and 2. *Proceedings of the Musical Association*. 10th Session, 1883-4. Part 1, 125-151. Part 2, 153-184.

Cole, W.F. 1898. A discovery in the physiology of the ear. *Laryngology*, *IV*, 291-9; *V*, 162-3.

Colman, W.B. 1894. On so-called 'colour-hearing.' *Lancet*, no. *3683*, 795, 849.

Colman, W.B. 1898. Further remarks on 'colour-hearing.' *Lancet*, *I*, 22-24.

Combarieu, Jules. 1893. L'expression objective en musique d'après le langage instinctif. Revue philosophique, XXXV (1), 124.

Combarieu, Jules. 1894. Les rapports de la musique et de la poésie, considerées au point de vue de l'expression. Thesis: Paris. Paris, 1894: Alcan.

Cook, H.O. 1899. Fluctuation of attention to musical tones. American Journal of Psychology, XI, 119-123.

Cornelius, H. 1892-3. Ueber Verschmelzung und Analyse. Vierteljahrschrift fuer wissenschaftliche Philosophie, 16, 404-446; 17 (1893), 3-75.

Corning, James Leonard, M.D. 1899. The use of musical vibrations, before and during sleep; supplementary employment of chromatoscopic figures; a contribution to the therapeutics of the emotions. Medical Record, 55 (Jan. 21, 1899), 79-86. Also: New York: Publisher's Printing Co., 24 pp. (Reprint from the Medical Record article).

Note: Schoen (1940) confirms the N.Y. Pub. Library entry (above); but Fortescu conflicts: enters author as Corning, T.L.

Cornu, August, and F. Mercadier. 1869. Sur les intervalles musicaux. Comptes Rendus de l'Académie Royale des Sciences, n/v, 301-8, 424-7.

Corti, A. 1851. Recherches sur l'organe de l'ouïe des mammifères. Zeitschrift fuer wissenschaftlich Zoologie, 3, 109-169.

Courtier, Jules. See Also: Binet, Alfred, 1895.

Courtier, Jules. 1897. Communication sur la mémoire musicale. 3er Internationale Kongress fuer Psychologie, 238-341.

Couty, L., and Charpentier, A. 1874. Effets cardio-vasculaires des excitations des sons. Arch. de Physiol., 4, 525-583.

"The earliest well controlled experiments on response to auditory stimuli...the auditory stimuli employed were in part mere noises, but since whistling was also used, the results have some bearing on response to musical elements. The experiments were carried out on dogs... sudden stimuli...generally produced increased cardiac tension and acceleration of pulse ranging from ten to one hundred per cent... kymographic records were taken of the cardiovascular effects..." --Diserens (1923)

Cozauet, A (Jean d'Udine). 1897. <u>De la corrélation des sons et des coleurs en art</u>. Paris: Fischbacher.

Cross, Charles R., and Goodwin, Harry M. 1893. Some considerations regarding Helmholtz's theory of consonance. <u>Proceedings of the American Academy of Arts and Sciences</u> (New Series), <u>19</u>, 1-12.

Note: Mecklenburg (entry 580) conflicts, gives: 1891. Some considerations regarding Helmholtz theory of consonance. <u>Proc. of the Amer. Acad. of Arts and Sci. of Boston</u>, <u>XXVII</u>, 130-132.

Csillage, Carl. 1854. <u>Aesthetik der Tonkunst in Verbindung mit einer ausfuehrlichen Grammatik und Poetik der Musiksprache</u>. Pressburg: no publisher given.

Cutter, Ephraim. 1891. <u>The relation of medicine and music</u>. No publication data given.

Held by the New York Public Library.

Czermak, Joh. 1873. <u>Ueber das Ohr und das Hoeren</u>. Berlin: no publisher given.

Daae, H. 1894. Ueber Doppelhoeren. <u>Zeitschrift fuer Ohrenheilkunde</u>, <u>XXV</u>, 251-268. English translation by A.B. Kibbe: <u>Arch. of Otol.</u>, <u>XXIII</u> (1894), 283-290.

Dall'Olio, Cesare. 1898. <u>La musica e la civiltà</u>. Bologna: Cenerelli. 24 pp.

Darlington, L. <u>See</u>: Talbot, E.B.

Daubresse, M. 1900. L'audition colorée. <u>Rev. Philos.</u>, <u>XLIX</u>, 300-305. Cf. <u>Ibid.</u>, 515-7.

Dauriac, Lionel. 1886. L'acoustique psychologique. Rev. Philos., XXI, 217-246.

Dauriac, Lionel. 1892. De l'oreille musicale, essai sur la psychologie du musicien. Orleans: Girardot.

Dauriac, Lionel. 1893. Essai sur la psychologie de musicien. Rev. Philos., 35, 449-470, 595-617.

Note: O.S.U. Center for Experimental Research in the Arts hedge file entry also shows: 39 (1895), 31-56. Mecklenburg (entry 622) shows: Psychologie du musicien. Revue Philosophique, XXXV (XVIII?) 1893/1, 449-470, 595-617.

Dauriac, Lionel. 1895. De l'intellegence musicale et de ses conditions objectives et subjectives. Revue Philosophique, XXXIX, 31, 238.

Dauriac, Lionel. 1895. La mémoire musicale. Revue Philosophique, XXXIX, 400.

Dauriac, Lionel. 1895. La Psychologie de musicien. Paris: Alcan. Also: Revue Philosophique, XLI (1895), no pp.

Dauriac, Lionel. 1896. Etudes sur la psychologie du musicien. VI: Le plaisir et l'émotion musicale. In: Revue Philosophique, XLII (2), 1-154.

Dauriac, Lionel. 1897. Psychologie dans l'Opéra français. Paris: "(Auber-Rossini-Meyerbeer); cours libre professé à la Sorbonne par Lionel Dauriac." xxiii, 164 pp.

Dauriac, Lionel. 1900. L'hypnotisme et la psychologie musicale. Revue Philosophique, 50, 390-395.

"De Rochas [See Rochas d'Aiglun, 1900] later presented an amplified version of his experiments and conclusions in a book reviewed favorably by L. Dauriac...the latter regards De Rochas' work as a distinct forward step in the study of musical reactions, but advises caution in the use of the hypnotic method, and in the acceptance of data derived from this source..." --Diserens (1923)

Davidson, T. 1882. Perception. Mind, VII, 496-513.

Davison, J.T.R. 1899. Music in medicine. The Lancet, n/v, 1160.

"...summarizes and confirms Dogiel's [1880] and Tarchanoff's [1894; both of these works may be found in this bibliography.] experiments on the physiological effects of music. On the basis of such experiments the theory is advanced 'that music exercises its influence over the body, without the influence of the highest nervous centers,' and that the human organism participates in the tendency to vibrate synchronously with music which sometimes obtains in the animal world, a theory which in a modified and improved form has been restated recently (1918) by Dr. Beaunis." --Diserens (1923)

Day, H. 1889. The philosophy of perception. Biblioth. sacra, XLVI, 671-700.

Decher, Adolph. 1875. Chromographische Darstellung der Tondichtungen. Munich: T. Ackermann. 6 pp. (5 diagrams).

Delage, Yves. 1886. Sur la fonction des canaux semi-circulaires de l'oreille interne. Comptes Rendus de l'Académie Royale des Sciences, CIII (1886), no pp.

Delezenne, C.E.J. 1827. Sur les valeurs numérique des notes de la gamme. Recueil des travaux de la Société des Sciences, de l'Agriculture et des Arts de Lille, 1-56.

"This work (esp. 4-6) is the conventional starting point for the history of pitch discrimination." --Boring (1942), 349.

Dennert, H. 1887. Akustich-physiologische Untersuchungen. Archiv fuer Ohrenheilkunde, 24, 171-184.

"Although the main stream of experiments since Helmholtz were carried out with simple tones, there have been a few investigations on pitch perception in which complex tones were involved (Koenig, 1876; Dennert, 1887; Hermann, 1890, 1912; Zwaardemaker, 1900). These investigators considered their experimental results as to be at variance with the concept that pitch is determined by the frequency of the fundamental and concluded that the pitch of complex tones is correlated with the periodicity of the stimulus. Owing to the poor control of experimental conditions at that time, others (Pipping, 1895; Everett, 1896; Schaeffer, 1899...) succeeded in their attempt to argue away this conclusion and the frequency-pitch concept maintained its position." --Plomp (1967) Pitch, timbre ... Please note entry conflict: Small (1971) shows title as akustische-physiologische Untersuchungen mit Demonstration.

Dennert, H. 1896. Zur Wahrnehmung der Geraeusche. Archiv fuer Ohrenheilkunde, XLI, 109.

Desessartz, Jean Charles. 1802. Réflexions sur la musique considerée comme moyen curatif, lues à la séance publique de l'Institute national des sciences et arts, le 20 vendemiaire an XI. Paris: Baudouin, imprimeur. i, 20 pp.

Destouches, L. 1899. La musique et quelques uns de ses effets sensoriels. These. Paris (1899). 2me edition Paris 1900: Editions scientifiques. 82 pp.

Dixon, H. 1899. Music and medicine considered from a physiological, pathological and therapeutic standpoint (abstract of paper). The Lancet, n/v, 1815.

"Dixon reported the repetition of experiments similar to those of Dogiel [1880] with similar results, i.e., increased blood pressure and cardiac action, and variations in respiration. He does not state his method or the number and nature of his subjects, but mentions several physiological effects of music which are not reported by other experimenters. Among such effects are 'perspiration, desire to micturate, lachrymation, and rarely, laughter.'" --Diserens (1923)

Dogiel, J. 1880. Ueber den Einfluss der Musik auf den Blutkreislauf. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, n/v, 416-428.

Note conflicting sourse from Mecklenburg: Archiv fuer Anatomie und physiologie, Physiologische Abteilung

1880, p416. "To Dogiel ... belongs the credit of having carried out the first systematic experiments on the influence of music proper on the organism ... executed two series of experiments on the influence of music on the circulation of the blood: the first on human circulation, the second on that of animals, chiefly dogs and rabbits. The experiments on human beings were made by means of the plethysmograph; on animals by taking the cardiac pulse on the cartoid artery. The sources of auditory stimuli were Koenig's diapason with resonance boxes, the violin, clarinet, flute, and a metal whistle ... the general conclusions of Dogiel's study are as follows: (1) music exhibits an influence on the circulation of the blood in man as in animals (2) blood pressure sometimes rises and sometimes falls ... (3) the action of the musical sounds and of the whistles on animals and man expresses itself for the most part by the acceleration of the cardiac contractions. The automatic centers of the heart work more energetically (4) the variations of the circulation as a result of musical influence agree with the respiratory changes, although they can be observed independently of the latter (5) the variations of the circulation depend on the pitch, intensity, and timbre of the sound (6) in the variations of the blood pressure, the idiosyncracies of the individual, whether man or animal, are plainly apparent and even the nationality in case of man has some effect." --Diserens (1923)

Donders, F.C. 1864. Zur Klangfarbe der Vocale. Ann. Phys. Chem., 123, 527-528.

"The finding that the differences between vowels are based on specific peaks in the amplitude pattern raised the interesting question of whether, for the same vowel, the frequencies of these peaks do or do not shift in accordance with the frequency of the fundamental. Most investigators (... Donders, 1864) promoted the view that the formant frequencies are approximately constant." --Plomp (1971) Timbre ...

Donovan, J. 1889. Music and action: Affinity between rhythm and pitch. London: no publisher given. 138 pp.

Dove, H.W. 1839. Repertorium der Physik. Berlin: Verlag Veit und Comp.

Volume 3: "The use of dichotic experiments to differentiate between peripheral and central effects is not new ... Dove [1839] used dichotically presented partials to prove that Tartini tones (combination tones arising from monaural distortion) are not subjective but objective. He failed to hear a difference tone when two successive partials were presented to different ears through rubber tubes. Similar experiments were performed later by Thompson [1877, 1878, 1881]. Although both investigators noticed the absence of a distortion tone in the dichotic case, they did not notice, or at least did not report, any musical pitch sensation corresponding to the missing fundamental." --Houtsma/Goldstein (1971)

Downey, June E. 1897. A musical experiment. American Journal of Psychology, 9, 63-69.

Note: Kreitler and Kreitler (1972) give "June A. Downey."

Draeseke, Felix. 1884. Die Charakteristik der Tonarten. Neue Zeitschrift fuer Musik, LI, 357.

Dreher, Eugen. 1889. Die Physiologie der Tonkunst. Halle: Salle.

Dreher, Eugen. 1894. Grundzuege der Aesthetik der musikalischen Harmonie auf psycho-physiologischer Grundlage. Bielefeld: Helmich. 26 pp. Also: Sammlung paedagogischer Vortraege, VII, 1.

Drobisch, M.W. 1852. Ueber musikalische Tonbestimmung und Temperatur. Abhandlung der Mathematisch-Physikalischen Klasse der Kg. Saechsischen Gesellschaft der Wissenschaften, II (1852-55), 1.

Drobisch, M.W. 1855. Nachtraege zur Theorie der musikalischen Verhaeltnisse. Abhandlung der Mathematisch-Physikalischen Klasse der Kg. Saechsischen Gesellschaft der Wissenschaften 1855.

Drobisch, M.W. 1877. Ueber reine Stimmung und Temperatur der Toene. Abhandlung der Mathematisch-Physikalischen Klasse der Kgl. Saechsischen Gesellschaft der Wissenschafted 1877.

Droenewolf, O. 1867. Ueber das Verhaeltnis der Musik zu den anderen Kuensten. Neue Zeitschrift fuer Musik, LXIII, 17, 29, 39.

Dunan, Ch. 1895. A propos de l'espace sonore. Rev. de Met. et de Mor., III, 704-707.

Duncan, P. Martin, and William Millard. 1866. A manual for the classification, training, and education of the feeble-minded, imbecile, and idiotic. London: Longmans, Green.

See especially page 191 in the Kraft (1963) J.R.M.E. article for a discussion of the use of music in mental and moral instruction.

Dutczynski, A.L. 1894. Beurteilung und Begriffsbildung der Zeit-Intervalle in Sprache, Vers und Musik. Psychophilosophische Studie. Leipzig: no publisher given.

Dutto, Uberto. 1896. Influenzo della musica sulla Termogenesi animale. Rendiconte della R. Acedemia dei Lincei, 5, no pp.

"Following the work of Tarchanoff [1894], Dr. Dutto ... of the laboratory of physiology of Rome, executed a series of tests to determine the influence of musical stimuli on thermogenesis of animals. For the purpose of extending the investigations of Dogiel [1880] and Tarchanoff, various animals were subjected to the influence of music by letting them hear an organ during an hour or an hour and one-half. Under these conditions he found that thermogenesis increased in birds generally; hares, guinea pigs, and chickens, however, showed a diminution...Dutto thinks that music determines a state of special psychic tension during which the afflux of blood to the peripheral circulatory system is diminished with a consequent decrease in the radiated heat...If music, as Dutto contends, acts as a stimulus to organic metabolism, we have an explanation of the result of Tarchanoff who found that dogs and guinea pigs consume more oxygen and eliminate more carbon dioxide when subjected to the influence of music." --Diserens (1923)

Ebhart, K. 1898. Zwei Beitraege zur Psychologie des Rhythmus und des Tempo. Zeitschrift fuer Psychologie, 18, 99-154.

Eccarius-Sieber, Artur. 1898 (1899?). Die musikalische Gehoerbildung. Berlin: 2. Auflage Berlin 1902: Simrock.

Edser, E. See: Rucker, A.W.

Ehrenfels, C. von. 1890. Ueber Gestaltqualitaeten. Vierteljahrschrift fuer wissenschaftlich Philosophie, 14, 249-292.

"...points out that the existence of melodic transposition means that a melody exists independently of the tones which constitute it ... precursor of gestalt psychology of music." --Boring (1942): 16.

Eichbaum, Dr. ?. 1888. Ueber subjective Gehoerswahrnehmungen und deren Behandlung. Berlin and Neuwied: no publisher given. 32 pp.

Ellis, Albert. 1896. Phrenology and musical talent. Blackpool: Human Nature Office. 24 pp.

Ellis, Alexander J. 1876. On the sensitiveness of the ear to pitch and change of pitch in music. Proceedings of the Musical Association, III, 1-32.

Elsas, A. 1886. Ueber die Psychophysik. Marburg: no publisher given. 76 pp.

Engel, Carl. 1876. Music and medicine. Musical myths and facts, II, 84-113. London: no publisher given. 2 volumes.

Engel, Gustav. 1867. Die wissenschaftliche Begruendung der musikalischen Intervalle. Der Gedanke, VII, no pp.

Engel, Gustav. 1884. Aesthetik der Tonkunst. Berlin: no publisher given. 421 pp.

Engel, Gustav. 1886. Ueber den Begriff der Klangfarbe. Halle: a.S.C.E.M. Pfeffer.

(Philosophische Gesellschaft zu Berlin. Philosophische Vortraege. N.F. Heft 12, pp. 313-355). [Plomp, 1971: "Neue Folge, ii. Ser., Heft 12, 311-355"]. [Mecklenburg entry 780: "Philosophische Vortraege, herausgegeben von der Philosophischen Gesellschaft zu Berlin. Halle (1887): Steffer, 48 pp."]. "Including simple tones in his classification of the timbres of tones ..., von Helmholtz recognized implicitly that also tones without harmonics are characterized by a typical frequency-dependent timbre. The fact that low tones sound dull and high tones bright is nowadays completely neglected as an indication that, in addition to pitch and loudness, timbre is also an attribute of simple tones. Von Helmholtz did not emphasize this point, but it was advocated explicitly by Engel (1886) and Stumpf (1890) [Tonpsychologie] as a necessary implication of the fact that timbre is an attribute of complex tones. --Plomp (1970): Timbre ...

Engel, Gustav. 1889. Ueber den Stimmumfang sechsjaehriger Kinder. Hamburg: no publisher given.

Engel, Gustav. 1891. Ueber Vergleichungen von Tondistanzen. Zeitschrift fuer Psychologie, 2, 361-378.

Engel, Gustav. 1892. Die Bedeutung der Zahlenverhaltnisse fuer die Tonempfindung. Dresden: no publisher given. 59 pp.

Erdmann, ?. 1809. Ueber den Einfluss der Musik auf Kranke. Archiv fuer medizinische Erfahrungen, II, 121.

Mecklenburg entry gives: 1899/2.

Eschweiler, ?. 1899. Zur Vergleichenden Anatomie der Muskeln und der Topographie des Mittelohres verschiedener Saeugetier. Arch. f. mikr. Anat., LIII, 558-622.

Everett, J.D. 1896. On resultant tones. Phil. Mag., 41, 199-207.

See annotation: Dennert, H. 1887.

Ewald, J.R. 1894-9. Zur Physiologie des Labrynths. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LIX (1894), 258-275; LXIII (1896), 521-541; LXXVI (1899), 147-188; XCIII (1903).

VI. Mittheilung: Eine neue Hoertheorie. LXXVI, 147-188. (In: Tonndorf (1971), Cochlear mechanics ...; also cited by von Bekesy (1971), Cochlear model ... "Ewald (1899) ... employed a simple mechanical model of the cochlea. When properly stimulated, this model produces a wave pattern along its elastic basilar membrane. This pattern is characteristic for each frequency, but there is no systematic relation between frequency and place in this 'sound pattern theory.'" --Tonndorf (1971), 206-7.

Exner, S. 1875. Experimentelle Untersuchungen der einfachsten psycheschen Processe. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, XI, 403-432.

Exner, S. 1876. Zur Lehre von den Gehoersempfindungen. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, XIII, no pp.

Faist, A. 1897. Versuche ueber Tonverschmelzung. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XV, 102, 289.

Schoen (1940), Kreitler and Kreitler (1972), and Chandler/ Barnhart conflict with Mecklenburg on pageanation; all give: 189-205.

Favre, Louis. 1900. La musique des couleurs [et les musiques de l'avenir]. Paris: Schleicher. xv, 114 pp.

Fechner, Gustav Theodor. 1860. Elemente der Psychophysik. Leipzig: B. and H. 2 vols. in 1.

Note: a comprehensive bibliography of Fechner's works may be found in the third edition (Leipzig, 1907: B. and H., 2 vols.), and in the second edition (Leipzig, 1889: B. and H.).

Fechner, Gustav Theodor. 1873. Einige Ideen zur Schoepfungs- und Entwicklungsgeschichte der Organismen. Leipzig: B. and H.

Fechner, Gustav Theodor. 1876. Vorschule der Aesthetik. Leipzig: B. and H., 1876. 2nd. ed., 1897-8.

Kreitler and Kreitler (see notes to Chapter 5, p. 382) mention Fechner's 1876 treatise in reference to "preferences for the Golden Section" and "other proportions of form."

Fechner, Gustav Theodor. 1877. In Sachen der Psychophysik. Leipzig: B. and H. viii, 219 pp.

Fechner, Gustav Theodor. 1882. Revision der Hauptpunkte der Psychophysik. Leipzig: B. and H. xii, 426 pp.

Fechner, Gustav Theodor. 1884. Ueber die Frage des Weber'schen Gesetzes und Periodicitaetsgesetzes im Gebiete des Zeitsinnes. Leipzig: S. Hirzel. iii, 108 pp.

Fere, C., and Londe, ?. 1887. Sensation et mouvement. Paris: no publisher given.

Pp. 36-41: "[In 1885] Fere and Londe investigated the effects of tones produced by vibrating tuning forks on the dynamometric records of a single subject. In the first series of experiments a large number of forks ranging from 50 to 100 [Hz] were employed and large differences in dynamometric pressure, varying with the pitches of the tones, were noted. In another series of experiments, ... the muscular force increased with the intensity of the stimuli. ... the general conclusion is that sounds are dynamogenic, i.e., muscular energy increases with the intensity and pitch of auditory stimuli, a result that is to be expected in the light of the previous experiments." --Diserens (1923).

Fere, C. 1900. Travail et Plaisir. Paris: no publisher given.

See especially chapter 11.

Ferrand, ?. 1895. Essais physiologiques sur la musique. Bulletin de l'Académie de Médecine de Paris, XXXIV (IIIe Serie), 226, 276.

Ferrari, Guilio C. See also: Bernardini, C. 1896.

Ferrari, Guilio C. 1889. Primi esperimenti sull immagionazione musicale. Rivista musicale Ital., 6, 159-175.

Ferrari, Guilio C. 1894. L'Idea nel Bello musicale. Rivista Italiana di Filosofie, n/v, no pp.

Ferrari, Guilio C. 1895. La Liberte e la Regolarita nella Arti belle e nella Musica. Rivista Italiana di Filosofia, n/v, no pp.

Ferrari, Guilio C. 1897. Richerche sperimentali sulla natura dell'emozione musicale. Rivista musicale Ital., 4, 328-329.

"...repeated the experiments of Patrizi [1896] on normal, feebleminded, and idiotic individuals. ... concludes that there are vasomotor activities after a musical emotion only when the individual is in a state of psychological inferiority; when the superior psychic functions have vanished; and when mental coordination ceases to inhibit emotion. In short, the effect appears when an organic disorder exists." --Diserens (1923) Trivial problem: there is some disagreement as to Ferrari's middle initial. Mecklenburg says "M", Diserens says "E", and all other sources agree on "C".

Ferrario, Guiseppe. 1825. Influenza del Suono, del Canto e della Declamazione sull'Uono in Istato di Salute e di Malattia. Milano: Visag. 2nd ed., Milano, 1841: Visag.

Fétis, François Joseph. 1830. Curiosities historiques de la musique, complement nécessaire de la musique misé à la portée de tout le monde. Paris: Janet et Cotelle. vii, 454 pp.

Fiebach, Otto. 1891. Die Physiologie der Tonkunst. Leipzig: Merseberger.

Fink, Gottfried Willhelm. 1836. Ueber den Reiz des Haesslichen auch in der Musik. Allgemeine musikalische Zeitung, 1836, 3.

Fink, Gottfried Wilhelm. 1845. Geschichtliche Andeutungen ueber den Einfluss der kirchlichen Musik auf das Gemuet. Zeitschrift fuer historische Theologie, XV (1), 127.

Fisher, H. no date. Psychology for music teachers. Laws of thought applied to sounds and their symbols, with other relevant matter. London: Curwen. 188 pp.

Flourens, P.M.J. 1864. Psychologie comparée. 2nd ed. No city or publisher given.

Flournoy, Th. 1892. Enquête sur l'audition colorée. Arch. d. Sci. Physiol. et Nat., XXVIII, 505-8.

Flournoy, Th. 1893. Les phénomènes de la synopsie. Audition colorée. Paris: Geneve.

Cf.: Psychology Review, I, 318-22.

Foehlisch, D.J.F. 1823. Ueber Menschenbildung durch das Schoene, mit besonderer Ruecksicht auf Ton- und Zeichenkunst, hauptaechlich in den Mittelschulen. Wertheim: no publisher given.

Fortlage, C. 1855. System der Psychologie als empirischer Wissenschaft aus der Beobachtung des innern Sinnes. 2 vols. No city or publisher given.

Fourier, J.B.J. 1822. Théorie analytique de la chaleur. Eng. trans., 1878. No city or publisher given.

Note: Chapter three of this work contains Fourier's mathematical system for generation of sine-wave components.

Fournier, ?. 1819. Essai sur la musique considerée sous le rapport de son influence sur l'homme en santé et sur l'homme malade. Bibliotheque Universelle Suisse, XI, 289.

Fowler, J.A. 1896. Music or the language of tone. Phrenological Magazine, September/October.

Franck, Friederick Albert. 1835. De musices effectibus in hominem sanum et aegrotum. Berolini: Typis Nietackianis. 44 pp. [Dissertation, Berlin: 1835]

Contains bibliographical footnotes.

Frankl, L. von. 1891. Ueber den Verlust des musikalischen Ausdrucksvermoegens. Deutsche Zeitschrift fuer Nervenheilkunde, I, 283.

Franz, K.W. 1801-2. Ueber Gemuetsstimmung in musikalischer Hinsicht, ein psychologisch-aesthetischer Versuch. Allgemeine musikalische Zeitung, n/v, 657.

Free, H. 1896. Die experimentelle Psychologie. Leipzig: Jos. Meyer. iii, 31 pp.

Freund, C.S. 1895. Labyrinthtaubheit und Sprachtaubheit. Wiesbaeden: no publisher given. 115 pp.

Friedmann, H. 1901. Ueber kuenstliche Reizung des Ohrlabyrinths. Dissertation: Strassborg. 58 pp.

Fullerton, G.S. See: Cattell, James McKeen. 1892.

Gall, F.J., and Spurzheim, G. 1809. Recherches sur le système nerveux. No city or publisher given.

Galli, Amintore. 1881. Storia teoretica ed estetica della Musica: Programmi e sunti di Lizioni. No city or publisher given.

Galli, Amintore. 1897. Estetica della Musica, Ossia del Bello nella Musica sacra, teatrale e da Concerto. Torino, 1897; 2. Edizione, Torino, 1900: Bocca. 1046 pp.

Galton, Francis, and Grueber, Ed. 1893. L'audition colorée et les phénomènes similaires. Paris: no publisher given.

Gamucci, B. 1875. Considerazioni sul Bello musicale. Akten des Kgl. Musikalischen Instituts zu Florens 1875.

Gardiner, William. no date. Die Musik der Natur. [German translation: "weitere Angaben nicht zu ermitteln"]. No city or publisher given.

Gardiner, William. 1832. The music of nature, or an attempt to prove that what is passionate and pleasing in the art of singing, speaking and performing upon musical instruments, is derived from the sounds of the animated world. London: Longman. Reprint, Boston (1840 or 1841): Ditson.

Gardiner, William. 1847. Melodies from the music of nature. London: Novello.

Gaskell, J. 1854. Sense and sound. Philadelphia: no publisher given.

Gates, A.I. 1898. Musical interests of children. Journal of Ped., 2, no pp.

Gelle, M.E. 1886. Rôle de la sensibilité du tympan dans l'orientation au bruit. C.R. Soc. Biol., 3 (ser. 7), 448f.

Gelle, M.E. 1898. L'audition et ses organes. Paris: no publisher given. 326 pp.

Genzmer, A. 1873. Die Sinneswahrnehmungen der neugeborenen Menschen. Halle: no publisher given.

Gerber, P.H. 1898. Mozarts Ohr. Deutsche medizinische Wochenschrift, XXIV, 351.

Gerstenkorn, Franz. 1857. [Polemik gegen Eduard Hanslick]. Neue Zeitschrift fuer Musik, n/v, no pp.

Geyer, F. 1848. Die Musik als soziale Kunst. Neue Berliner Musikzeitung 1848, 225, 233.

Geyer, F. 1858. Ueber das Natuerliche in der Kunst. Neue Berliner Musikzeitung 1858, 177, 185, 193.

Gilbert, J. Allen. 1893. Experiments on the musical sensitiveness of school children. New Haven: Stud. Yale Psych. Lab., I, 80-87.

Mecklenburg conflicts with Chandler and Barnhart;

gives: vol. 2 (1894), 105.

Gilman, Benjamin Ives. 1892-3. Report on an experimental test of musical expressiveness. American Journal of Psychology, 4, 42-73; 5 (1893), 558-576.

Conflict: Mecklenburg says 1891-2 (vol. 4), 558; 1892 (vol. 5), 42. Chandler and Barnhart is confirmed by Schoen, Kreitler and Kreitler.

Goblot, Edmond. 1898. De musicae apud veteres cum philosophia conjunctione. Thesis. Paris: Alcan. 66 pp.

Goddard, Joseph. 1894. Colour compared with music and painting. Musical Opinion, 18, 777-778. [London].

Goldschmidt, Hugo. 1895. Objektivitaet des kuenstlerischen Urteils und der musikalische Interpret. Allgemeine Musikzeitung 1895, 653, 667.

Goldschmidt, V. 1901. Ueber Harmonie und Complication. Berlin: no publisher given. 136 pp.

Goltz, Fr. 1870. Die physiologische Bedeutung der Bogengaenge des Ohrlabyrinthes. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, III (1870), no pp.

Goodrich, A.H. 1881. Music as a language. New York: no publisher given.

Goodwin, H.M. See: Cross, Charles R. 1893.

Gordon y de Acosta, Antonio Maria. 1898. Indicaciones terapeuticas de la musica. Habana: Establecimiento tipographico. 63 pp.

Held by N.Y. Public Library.

Gowers, W.R. 1896. The Bradshaw lecture on subjective sensations of sound. British Medical Journal, II, 1429-36. Also: Lancet, II, 1357-63.

Gowers, W.R. 1897. Ueber subjective Gehoersempfindungen. Wien. med. Bl., XX, 161, 177, 193, 211, 232.

Grafe, A. 1897. Note sur un nouveau cas d'audition colorée. Rev. de Med., XVII, 192-6.

Grafe, A. 1898. Sur un cas à rattacher à ceux d'audition colorée. Rev. de Med., XVIII, 225-8.

Gray, A.A. 1900. A modification of the Helmholtz theory of hearing. Journal of Anatomy and Physiology, XXIV, 324-351.

"The assumption by Helmholtz that a particular pitch corresponds to each nerve fibre, was accepted widely although it remained difficult to understand that only one or two nerve fibres are stimulated by a simple tone. For that reason, Gray (1900) proposed that many nerve fibres may be involved, but that pitch is determined by the place of maximal amplitude of vibration. This modification was widely adopted by other investigators in the field of audition." --Plomp (1967) Pitch, timbre ...

Grassman, H. 1877. Ueber die physikalische Natur der Sprachlaute. Ann. Phys. Chem., I, 606-629.

"The finding that the differences between vowels are based on specific peaks in the amplitude pattern raised the interesting question of whether, for the same vowel, the frequencies of these peaks do or do not shift in accordance with the frequency of the fundamental. Most investigators (...Grassman, 1877 ...) promoted the view that the formant frequencies are approximately constant." --Plomp (1971), Timbre ...

Gretrey, A.E.M. no date. Essais sur la musique. In: Chomet, H. 1875. The influence of music on health and life. New York: Putnam.

"Earliest observations on the physiological effects of music, which partake of the nature of experiment in the generally accepted sense ... mentions the effect of music on the heart and the circulation of the blood ..." --Diserens (1923): Reactions to musical stimuli. The Psychological Bulletin, 20 (no. 4), 173-199.

Griveau, Maurice. 1896. L'interprétation artistique de l'orage. Rivista Musicale Italiana 1896, 684.

Grueber, Eduard. See also: Galton, Francis. 1893.

Grueber, Eduard. 1893. Psychologischer Fragebogen ueber Gehoerfarben, Gehoerfiguren, und Gehoerhelligkeiten. Leipzig: no publisher given.

Grueber, Eduard. 1893. Questionnaire sur l'audition colorée. Rev. Philos., XXXV, 499-502.

Guenon, A. 1898. Influence de la musique sur les animaux et en particulier sur le cheval. Chalons-sur-Marne: Librairie civile et militaire. 136 pp.

Note: Rand entry (above) conflicts with Fortescu entry on author's name; Fortescu shows Guenon, L.A. Mecklenburg entry 1118 shows: "Guenon, Ad. ... Chalons-sur-Marne: Union. 136p."

Guerney, E. See: Gurney, Edmund.

Guiband, M. 1898. Contribution à l'étude expérimentale de l'influence de la musique sur la circulation et la respiration. Année Psych., 5, 645-649.

"...Guiband followed up Binet and Courtier's study [1895] of the effect on respiration and circulation by very methodical investigations along the same lines at the University of Bordeaux. His method and apparatus were similar to Binet's, but were not confined to the study of a single individual. His conclusions quoted 'in extenso' in a review by Binet, including the following: All individuals do not react in the same way to similar musical stimuli, whether simple or complex. Moreover, some subjects react to every kind of musical stimulus, while others react only to certain ones ... when musical selections are used as stimuli, vascular and respiratory reactions become ... more varied. Inconstant in direction, they follow the evolution of the melody in a given individual ... Respiration is regular when the melody is calm, and becomes irregular, sometimes deep, sometimes shallow, when rhythm or intensity is modified. The rhythm of respiration tends to adapt itself to the rhythm of the

music especially when the latter grows slower."
--Diserens (1923)

Gurney, Edmund. 1880. The power of sound. London: Smith, Elder, and Co. Introductory essay by Edward T. Cone.

Schoen (1940) cites: "Power, E. Elements of the beautiful in music. In: Op.cit., 319.

Guthmann, Friedrich. 1805-6. Vermischte Gedanken psychologischen Inhalts fuer praktische Musiker. Allgemeine musikalische Zeitung, n/v, 81.

Guyot, E. 1897. La boussole de l'harmonie universelle. Esthétique applicable aux arts des sons, de la couleur et de la forme. Paris: Fischbacher.

H.S.K. 1847. Die Musik als Heilmittel. Wien 1847. Neue Ausg. Wien 1867: Capellen. 32 pp.

Haase, Rudolf. 1882. Die Bedeutung der Musik als Bildungsmittel und ihre Beziehungen zur Poesie. Koethen: no publisher given.

Hadden, J. Cuthbert. 1896. Music as a medicine. Music, 9, 359-368. Also: Chicago: no publisher given.

Haecker, Valentin. 1900. Der Gesang der Voegel, sein anatomischen und biologischen Grundlagen. Jena: G. Fischer. 102 pp.

Haellstroem, Gustav Gabriel. 1832. Von den Combinationstoenen. Annelen der Physik., XXIV, 438ff.

Haller, Albrecht von. 1747 et seq. Prima linae physiologiae. Eng. trans., 1766 et seq. No publisher given.

Haller, Albrecht von. 1752. De partibus corporis humani sensibilibus et irritabilibus. Comment. Soc. reg. Sci. Gottingensis (Gesellschaft fuer Wissenschaft, Goettingen), II, 114-158.

Haller, Albrecht von. 1757-66. Elemente physiologiae corporis humani. 8 vols. No city or publisher given.

Hand, Perdinand G. 1837. Aesthetik der Tonkunst. 2 Baende. Leipzig 1837-41; 2. Auflage, Leipzig 1846: Hockhausen. [2nd edition] iv, 630 pp.

Hannover (Koenig), George von. 1841. Ideas and reflections on the properties of music. London: Colburn.

Hannover (Koenig), George von. 1858. Ideen und Betrachtungen ueber die Eigenschaften der Musik. Hannover: 2. Auflage 1858: Helwing. 50 pp.

Hannover (Koenig), George von. 1879. Ueber Musik und Gesang. Wien: no publisher given.

Hansen, J.N. 1833. De musicae in corpus humanum vi. Berlin: no publisher given. [Dissertation].

Hanslick, Eduard. 1854. Vom musikalische-Schoenen. Leipzig: B. and H. 196 pp. Eng. trans., 1891: no publisher given. 174 pp.

From Mecklenburg entry 1188: Vom Musikalisch-Schoenen. Ein Beitrag zur Revision der Aesthetik der Tonkunst. Leipzig 1854, 2. Auflage 1858, 6. Auflage, 1881, 7. Auflage 1885, 8. Auflage ca. 1891-95, 9. Auflage 1896, 10. Auflage 1902, 11. Auflage 1910, 12. Auflage 1918, 13. -15. Auflage Leipzig 1922: B. and H. (viii, 176 pp.) (Spanish, 1879, Italian, 1884, Norwegian 1885, English 1891, Russian 1895, Japanese 1924). Schoen cites the 1891 English translation.

Hanslick, Eduard. 1894. De beau dans la musique. Edité par Charles Bannelier. 2e edition Paris: Macquet.

Hartmann, E. von. 1886. Zur Aesthetik der Tonkunst. Deutsche Rundschau, XLVI, 72.

Hartmann, Ludwig. 1898. Critique musicale: Réalisme ou Idéalisme. Lettres. Rom: Tipogr. Cooperativa. 8 pp.

Hausegger, Friederich von. 1884. Zur Frage der Erziehung fuer und durch die Musik. Allgemeine deutsche Musikerziehung, n/v, 339-349.

Hausegger, Friederich von. 1885. Die Musik als Ausdruck. Wien, 1885; 2. Auflage Wien 1887: Konegen. 238 pp.

Mecklenburg entry also cites: Bayerische Blaetter 1884, 1888, 198ff. Incomplete citation given by Schoen.

Hausegger, Friederich von. 1893. Das Jenseits des Kuenstlers. Wien: Konegen. 312 pp.

Hausegger, Friederich von. 1897. Die kuenstlerische Persoenlichkeit. Wien: Konegen. 312 pp.

Hausen, Hans Niels. 1833. De musicae in corpus humanum vi. Dissertatio inauguralis psychologico-medica quam ... die XX. m. Augusti a. MDCCCXXXIII ... publice defendet, scriptor Joannes Nicolaus Hansen. Berolini [Dissertation, Berlin]: Typis Nietackianis. 37pp.

Compare with entry from Mecklenburg: Hansen, J.N. 1833.

Hauser, ?. 1834. Versuch ueber das Schoene in der Musik. Erfurt: no publisher given.

Haweis, Hugh Reginald. 1888. Music and morals. London 1888, 1896, 1912, 1934: Longmans. 556 pp.

Heffernan, James. 1877-8. On musical beats and their relation to consonance and dissonance. Proceedings of the Musical Association, XIV, no pp.

Heim, Albert. 1874 (1873?). Die Toene der Wasserfaelle. Verhandlungen der Schweizerischen Naturforschenden Gesellschaft Schaffhausen, LVI, 209.

Heinse, Wilhelm. 1805. Musikalische Dialoge, oder philosophische Unterredungen beruehmter Gelehrter, Dichter und Tonkunstler ueber den Kunstgeschmack in der Musik. Leipzig: Graeff. 238 pp.

Held, H. 1897. Zur Kenntnis der peripheren Gehoerleitung. Archiv fuer Anatomie und Entwicklungsgeschichte, n/v, 350-360.

Helmholtz, H.L.F. von. 1842. De Fabrica Systematis nervosi Evertebratorum. Inaugural-Dissertation: Berlin.

Reprinted in: Wissenschaftliche Abhandlungen von Hermann Helmholtz, vol. 2. Leipzig: J.A. Barth, 1883, 663-679.

Helmholtz, H.L.F. von. 1852. Ueber die Natur der menschlichen Sinnesempfindungen, Habilitation. [Professorial Inaugural] Lecture, Koenigsberger naturwissenschaftlichen Unterhaltungen, vol. 3, 1-20.

Reprinted in: Wissenschaftliche Abhandlungen von Hermann Helmholtz, vol. 2. Leipzig: J.A. Barth, 1883, 591-609.

Helmholtz, H.L.F. von. 1856. Ueber die Combinationstoene. Monatsberichte der Preussischen Akademie der Wissenschaften, n/v, 279.

Additional entry from Mecklenburg: "1856. Ueber Combinationstoen oder Tartinischen Toene. Niederrheinische Sitzungsberichte, Mai 1856." Additional entry from Plomp (1971): "1856. Ueber Combinationstoene. Ann. Phys. Chem., 99 [Annelen der Physik, XCIX], 497-540.

Helmholtz, H.L.F. von. 1859. Ueber die Klangfarge [Klangfarbe?] der Vocale. Ann. Phys. Chem., 18, 280-290.

Helmholtz, H.L.F. von. 1860. On the motion of the strings of a violin. Proceedings of the Glasgow Philosophical Society, Dec., 1860. Also: Philosophy Magazine, XXI (ser. 4), 393-396.

Helmholtz, H.L.F. von. 1862. Ueber die arabisch-persich Tonleiter. Verhandlungen des natur-historisch-medicinische Vereins zur Heidelberg, II, 216-217.

Reprinted in: Wissenschaftliche Abhandlungen von Hermann Helmholtz, vol. I. Leipzig: J.A. Barth, 1882, 424-426.

Helmholtz, H.L.F. von. 1863. On the sensations of tone as a physiological basis for the theory of music. Translated and revised by Alexander T. Ellis. London, 1895: Longmans, Green. 2nd english edition: New York: Dover, 1954.

The original German publication: 1863. Die Lehre von den Tonempfindungen als physiologische Grundlage fuer die Theorie der Musik. Braunschweig, Germany: Friederick Vieweg und Sohn.

Helmholtz, H.L.F. von. 1868. Mechanik der Gehoerknoechelchen und des Trommelfells. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, I, no pp.

Helmholtz, H.L.F. von. 1868. Ueber den Muskelton. Verhandl. Naturhist. -Medicin. Vereins Heidelberg, 4, 88-90.

"In 1866, Helmholtz announced in a lecture that stimulating muscles via their nerves with periodic electric pulses gives rise to synchronous mechanical vibrations of the muscle (Helmholtz, 1868). Up to about 240 pps, these vibrations manifested themselves by a clear tone ..." --Plomp (1967): Pitch, timbre and hearing theory.

Helmholtz, H.L.F. von. 1868-74. Théorie physiologique de la musique. Trad. franc. par A. Gueroult. Paris: Masson. 2 vols.

Helmholtz, H.L.F. von. [1878]. Das Denken in der Medicin. 2 Aufl. No city or publisher given.

Helmholtz, H.L.F. von. 1879. Handbuch der Physiologie. Bd. III, Thl. I, Leipzig: no publisher given.

Hennig, Richard. 1897. Die Charakteristik der Tonarten; historische-kritische, und statistische Untersucht vom psycho-physiologischen und musikalischen standpunkt aus. Berlin: F. Duemmler. vi, 131 pp.

Contrast the following entry from Mecklenburg: "Hennig, Karl. 1897. Die Charakteristik der Tonarten. Historisch, kritisch, und statistisch untersucht vom psychologisch-physiologischen und musikalischen Standpunkt aus. Berlin: Duemmler. vi, 132pp.

Henri, Victor. 1894. Review of W. Wundt Experiences acoustiques sur un Pigeon sans labyrinthe (Phil. Stud., IX). Année Psychol., I, 337-339.

Henri, Victor. 1896. Sensations auditives. Année Psychol., 3, 390-401.

"...critical summary of the method and results of [the experiments of P. Mentz (1895)]..." --Diserens (1923)

Herault, A. 1882. La mémoire de l'intonation. Rev. Philos., XIV, 310-312.

Herbart, Johann Friederich. 1811. Psychologische Bemerkungen zur Tonlehre. Goettingen: no publisher given. Also: Gesamtausgabe. 12 volumes. Leipzig, 1850-52.

Herbart, Johann Friederich. 1816. Lehrbuch zur Psychologie. No city or publisher given.

Herbart, Johann Friederich. 1825. Psychologie als Wissenschaft. No city or publisher given.

Herbart, Johann Friederich. no date. Ueber die Tonlehre. Werke, VII, 224ff.

Herder, Johann Gottfried von. 1801. Wirkt die Musik auf Denkungsart und Sitten? Adrastea, n/v, no pp.

Herder, Johann Gottfried von. 1888. Ob Malerei oder Tonkunst eine groessere Wirkung gewaehre? Ein Goettergespraech. Saemtliche Werke, XV, Berlin 1888.

Hering, M.E. 1875. Ueber Fechner's psychophysisches Gesetz. Vienna: no publisher given. 22 pp.

Hermann, ?. 1873. Richard Wagner. Streiflichter aus Dr. Puschmanns psychiatrischer Studie. Munich: no publisher given.

Hermann, L. 1890. Phonophotographische Untersuchungen, III. Archiv fuer der gesammte Physiologie der Menschen und der Theire, 47, 347-391.

Cf. annotation to Dennert (1887) entry.

Hermann, L. 1891. Zur Theorie der Combinationstoene. Pfluegers Arch. Physiol., 49, 499-518.

[Bonn: Archiv fuer der gesammte physiologie der Menschen und der Thiere].

Hermann, L. 1894. Beitraege zur Lehre von der Klangwahrnehmung. Arch. fuer d. ges. Physiol., LVI, 467-499.

[Bonn: Archiv fuer der gesammte Physiologie der Menschen und der Thiere].

Hermann, L. 1896. Zur Frage betreffend den Einfluss der Phasen auf die Klangfarbe. Ann. Phys. Chem., 58, 391-401.

Hiller, Ferdinand von. 1864. Die Musik und das Publicum. Koeln: no publisher given.

Hiller, Ferdinand von. 1880. Wie hoeren wir Musik? Deutsche Rundschau, XXIV, 432ff.

Hirschfeld, Robert. 1883. Staatswissenschaft und Musik. Neue Berliner Musikzeitung, n/v, 265-273.

Hirschfeld, Robert. 1885. Das kritische Verfahren Eduard Hanslick's. Wien 1885, 3. Aufl. 1895: Loewit.

Hoffman, Johann Leonhard. 1786. Versuch einer Geschichte der mahlerischen Harmonie ueberhaupt und der Farbenharmonie insbesondere, mit Elaeuterungen aus der Tonkunst und vielen praktischen Anmerkungen. Halle: J.C. Handel. xviii, 157 pp.

Hoffmann, E.T.A. 1812. Johannes Kreislers, des Kapellmeisters Gedanken (Disseriuncula) ueber den hohen Wert der Musik. Allgemeine Musikzeitung 1812, no pp.

Hoffmann, E.T.A. 1813. Der Dichter und der Komponist. Allgemeine Musikzeitung 1813, no pp.

Hoffmann, E.T.A. [1814]. Phantasiestuecke in Callots Manier. Leipzig, 1924: no publisher given.

Hoffmann, E.T.A. 1814. Ueber einen Ausspruch Sacchinis und ueber den sogenannten Effekt in der Musik. Allgemeine Musikzeitung 1814, no pp.

Hoffmann, E.T.A. 1816. Ahnungen aus dem Reich der Toene. Morgenblatt 1816, no pp.

Hoffgartner, Friedrick Karl. 1847. Die Musik in ihrer Beziehung zur Aesthetik und zur Heilkunst. Dissertation: Wien.

Hoorn, P.G. van. 1817. Waarneming einer genezing van eene bijzondere zenuwziekte door de muzijk. Natuurkundige Vrhandelingen van de Hollandsche Maatschappij der Wetenschappen te Harlem, VIII, 217ff.

Horstig, C.G. 1824. Ueber den Einfluss der Tonkunst auf Menschenveredelung. Caecilia 1824, 59.

Hospital, Pierre. 1897. Histoire medicale de la musique et de la danse. Conférences faites à la Société contre l'ignorance (Cercle clermontois de le Ligue de l'enseignment). Clermont-Ferrand: G. Mont-Louis. 62 pp.

Hostinsky, Ottokar. 1877. Das Musikalisch-Schoene und das Gesammtkunstwerk vom Standpunkt der formalen Aesthetik. Leipzig: B. and H.

Hostinsky, Ottokar. 1879. Die Lehre von den musikalischen Klaengen. Prague: Dominicus.

Mecklenburg entry gives: "1878 (1879). Die Lehre vondem musikalischen Klaengen. Ein Beitrag zur aesthetischen Bgruendung der Harmonielehre."

Hueffer, Franz. 1875. Die Poesie in der Musik. Aus dem Englischen uebersetzt. Leipzig: no publisher given.

Hughlings-Jackson, J. 1879. Auditory vertigo. Brain, II, 29-38.

Hullett, J.W.H. 1894. Mechanical music composer. (Parts 1, 1a, 2). Adelaide; folio.

Hurst, C.H. 1895. A new theory of hearing. Transcript of the Liverpool Biological Society, 9, 321-353.

Ireland, William W. 1894. On affections of the musical faculty in cerebral disease. Journal of Medical Science, XL, 354-367.

Jadassohn, Salomon. 1899. Das absolute Tonbewusstsein; die Lehre vom musikalischen Hoeren. Leipzig: B. and H.

Jadassohn, Salomon. 1899. A practical course in ear training or a guide for acquiring relative and absolute pitch. Translated by Le Roy B. Campbell. Leipzig (1899), 2nd ed., Leipzig (1905): B. and H. 80 pp.

Jaell, Marie. 1896. La musique et la psychophysiologie. Paris: Alcan. 171 pp.

Note: Mecklenburg entry conflicts: "1895-6. ... Presses Universitaire de France." Translations: La musica y la psicofisiologia. (Aus dem Franzoesischen ins Spanische uebersetzt von Josefa Lloret de Ballenilla). Madrid (1901): Administracion Die Musik und die Psycho-Physiologie. Aus dem Franzoesichen uebersetzt von Franziska Kromayer. Strassburg, 1905: Verlagsanstalt. viii, 144 pp.

James, William. 1890. Principles of psychology. No city or publisher given.

Volume 1 (533-549) contains James' evaluation of Fechner and of psychophysics. --Boring (1942). Howes (1927): "A systematic psychology of the emotions; the earliest specimen, followed by Ribot, McDougall." -pp 50, 51.

Jan, Carl von. 1867. Die Tonarten bei Platon. Neues Jahrbuch fuer Philosophie und Paedagogik 1867, (oder) Biographisches Jahrbuch fuer Altertumskunde 1867.

Jan, Carl von. 1893. Die Harmonie der Sphaeren. Philologus, LII, 13ff.

Jastrow, J. 1896. An apparatus for the study of sound intensities. Science, III, 544-6.

Kalischer, Alfred Chr. S.L. 1888. Musik und Moral. Hamburg: Richter.

Kamm, M. 1899. Giebt es ein Hoeren ohne Labyrinth? Klin. Vortr. a. d. Geb. d. Otol. u. Phar. -Rhinol., III, 91-108.

Kastner, Johann Georg. 1856. La harpe d'école et la musique cosmique. Paris: no publisher given.

Katterfeldt, Julius. 1845. Die Musik als Foerderungsmittl der religioesen Erbauung. Kiel: Universitaets-Buchhandlung.

Kausch, Johann Joseph. 1782. Psychologische abhandlung ueber den einfluss der Ton und ins besondere der Musik auf die Seele; nebst einem Anhange ueber den unmittelbaren zwek der schoenen Kunste. Breslau: Bei J.F. Korn, dem aelteren. xvi, 200 pp.

Kayser, R. 1897. Ueber subjective Gehoersempfindungen. Halle: no publisher given. 46 pp.

Luft, Eduard. 1888. Ueber die Unterscheidungsempfindlichkeit fuer Tonhoehen. Philosophischen Studien, IV, 511-540. Also, Dissertation: Leipzig, 1888.

Lussy, Mathis. 1863. Traité de l'expression musicale. Nancy (1863), 2e edition 1874, 8e edition Nancy 1904: Berger-Levrault. Deutsch: Leipzig 1886 (uebersetzt von F. Vogt); English: London 1885 (translated by E. von Glehn).

Maclean, Charles. 1895. On some causes of the changes of tone-colour proceeding in the most modern orchestra. Proceedings of the Musical Association, XXI, 77-102.

Maclean, Charles. 1897-8. On modern sensationalism. Proceedings of the Musical Association, XXIV, no pp.

MacDougall, E. 1902. The relation of auditory rhythm to nervous discharge. Psychological Review, IX, 460-536.

MacDougall, E. 1902. Rhythm time and number. American Journal of Psychology, XIII, 88-97.

MacDougall, Robert. 1898. Musical imagery: a confession of experience. _Psychological Review_, _V_, 463-476.

Conflict: Schoen (1940) says "McDougall."

Mach, Ernst. 1863. Zur Theorie des Gehoerorgans. _Sitzber. Akad. Wiss. Wien. math. -naturw. Cl._, _XLVIII_ (2), 283-300.

Mecklenburg (entry 1928) gives: "...Prag/Jena, 1872."

Mach, Ernst. 1865. Ueber den Zeitsinn des Ohres. _Sitzber. Akad. Wiss. Wien, math. -naturw. Cl._, _LI_ (2), 133-150.

Mach, Ernst. 1866. _Einleitung in die helmholtz'sche Musiktheorie_. Graz: no publisher given.

Mach, Ernst. 1885. Zur Analyse der Tonempfindungen. _Sitzungsbericht der Akademie von Wissenschaft Wiener_, _92_, 1283-1289.

Mach, Ernst. 1886. _Analyse der Empfindungen_. Jena: no publisher given. 121 pp.

Cf. Mach 1897 entry, this section.

Mach, Ernst. 1886. _Contributions to the analysis of the sensations_. Jena: no publisher given [Fischer?]. English translation: Chicago, 1895: no publisher given.

"A fuller treatment of the problems of this lecture will be found in my _Contributions to the analysis of the sensations_ (Jena, 1886), English translation, Chicago, 1895. J.P. Soret, _Sur la perception du beau_ (Geneva, 1892) also regards repetition as a principle of aesthetics. His discussions of the _aesthetical_ side of the subject are much more detailed than mine. But with respect to the psychological and physiological foundation of the principle, I am convinced that the _Contribution to the analysis of the sensations_ go deeper. --Mach (1894)" --Ernst Mach, introductory footnote to lecture "On symmetry" from: _Popular scientific lectures_ (1898), 89f.

Mach, Ernst. 1897. Analysis of the sensations. [The analysis of the sensations and the relation of the physical to the psychical]. Eng. trans. of: Die Analyse der Empfindungen und das verhaeltniss des physischen zum psychischen. Eng. trans. Chicago and New York: Open Court Publishing Co., 1902. 120 pp.

Mach, Ernst. 1898. Popular scientific lectures. Eng. trans. by Thomas J. McCormack. "Third edition, revised and enlarged." 59 cuts, diagrams. Chicago: Open Court Publishing Co. [Copyrights: pp. 1-258, 338-374: 1894; pp. 259-281: 1896; 282-308: 1897; 309-337: 1898]. viii, 385 pp.

Pages 32-47 ('On the causes of harmony'): "Now that we have made ourselves acquainted with overtones and beats, we may proceed to the answer of our main question, Why do certain relations of pitch produce pleasant sounds, consonances, others unpleasant sounds, dissonances? It will readily be seen that all the unpleasant effects of simultaneous sound-combinations are the result of beats produced by those combinations (42) ... Only such sounds are consonant as possess in common some portion of their partial tones ... Consonance is the coalescence of sounds without appreciable beats!" (44) Pages 89-106 ('On symmetry'): 99-104 deal explicitly with musical symmetry and its perception. ["Delivered before the German Casino of Prague, in the winter of 1871"]. Appendix I ('A contribution to the history of acoustics'): "This article, which appeared in the Proceedings of the German Mathematical Society of Prague for the year 1892, is printed as a supplement to the article of 'The causes of harmony,' at page 32." Ibid., 375.

Mader, L. 1900. Mikrophonische Studien am schallleitenden Apparate des menschlichen Gehoerorganes. Sitzber. Akad. Wiss. Wien, math. -naturw. Cl., CIX, 37-78.

Maglioni, G. See: Casamorata, L.F.

Mahling, Friedrich. 1926. Das Problem der "Audition colorée;" eine historische-kritische Untersuchung. Leipzig: Akademische Verlagsgesellschaft m.b.H. 136 pp.

Bibliography: 102-136.

Maillard, C. 1880. L'audiometre et ses applications. Nancy: no publisher given.

Mantovani, G. 1896. Psicologia fisiologica. Milan: no publisher given. 165 pp.

Mantovani, Tancredi. 1892. Il Studio della Estetica musicale. Trieste: no publisher given.

Marques, Joaquim Jose. 1884. A musica e a medicina. Amphion, I (6no. 10), 4-5.

Marshall, H.R. 1894. Pain, pleasure, and aesthetics. New York: MacMillan.

Matte, F. 1894. Experimenteller Beitrag zur Physiologie des Ohrlabyrinths. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LVII, 437-474.

Maubel, Henry. 1895. Psychologie de la musique. Société nouvelle, (Année) XI, tome 2, 37-49.

Note: Fortescu entry conflicts with the Chandler and Barnhart entry (above); shows: "Maybel, H. 1895. Psychologie de la musique ... Brussells: Société Nouvelle. 49 pp.

Maudsley, H. 1867. The physiology and pathology of mind. No city or publisher given.

Maudsley, H. 1876. Physiology of mind. No city or publisher given.

Mayer, A.M. 1874. The determination of the law connecting the pitch of a sound with the duration of its residual sensation. American Journal of the Sciences and the Arts, 8, 241-255.

Mayer, A.M. 1894. Researches in acoustics. American Journal of Science, XLVII, 1-28, 283-5. Also: Lond. Edinb. Dubl. Phil. Mag., 37 (ser. 5), 259-288.

"...Mayer (1894) found that a tone could be rendered inaudible by another tone of lower frequency, but not readily by one of higher frequency."

--Jeffress (1971): Masking ... (In: Foundations of modern auditory theory).

McDougall, R. See: MacDougall, R.

McNaught, William G. 1899. The psychology of sight-singing. Proceedings of the Musical Association, XXVI, 35-55.

Meinong. A. 1891. Zur Psychologie der Komplexionen und Relationem. Zeitschrift fuer Psychologie, 2, 245-265.

Meinong, A., and Witasek, St. 1897. Zur experimentellen Bestimmung der Tonverschmelzungsgrade. Zeitschrift fuer Psychologie, XV, 189-205.

Melati, G. 1901. Ueber binaurales Hoeren. Philosophischen Studien, XVII, 431-461.

Cf. Psychology Review, IX, 85-88.

Melde, F. 1895. Ueber 'resultirende' Toene, sowie einige hierbei gemachte Erfahrungen. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LX, 623-641.

Mendoza, F. Suarez de. See: Suarez de Mendoza, F.

Mentz, P. 1895. Die Wirkung akustischer Sinnesreize auf Puls und Athmung. Wundt Philosophischen Studien [Leipzig], XI, 61-124, 371-392, 563-602.

Note: Chandler and Barnhart conflicts with Diserens (above), shows volume as X. "Mentz conducted experiments on the influence of auditory stimuli on the movements of circulation and respiration under the varying conditions of attention. The apparatus used consisted of the Marey sphygmograph and pneumograph. He found that auditory stimuli, noises as well as simple sounds, produce a retardation of the pulse, and a retardation or acceleration of the respiration, correlated with the duration of the stimulus and the presence or absence of voluntary attention ... if [a listener] does not pay particular attention or does not attempt to analyze the selection a retardation of the pulse ensues; if he analyzes the music acceleration appears. In an examination of the pulse during the musical selection, Mentz found that a marked variation in intensity produced retardation. Disagreeable dissonances are accompanied by acceleration; agreeable consonance by retardation." --Diserens (1923)

Mercadier, F. See: Cornu, August. 1869.

Merkel, Julius. 1887. Das psychophysische Grundgesetz in Bezug auf Schallstaerken. Philosophischen Studien, IV, 117-160, 251-291.

Mettenleiter, Dom. 1868. Musica. Archiv fuer Wissenschaft, Geschichte, Aesthetik und Literatur der heiligen und profanen Tonkunst, in zwanglosen Heften herausgegeben. Brixen: Theologische Verlags-Anstalt (2. Heft: pp. 93-243).

Metz, Karl. 1898. Das deutsche Kunstlied. Musikaesthetische Betrachtungen, nebst einem Anhang: Farbe und Ton. Leipzig (1898, 1901): Merseberger. viii, 116 pp. (Saengerhalle 30/53).

Meumann, E. 1894. Untersuchungen zur Psychologie und Aesthetik des Rhythmus. Philosophischen Studien, X, 249-332, 393-430. Also: Leipzig: Englemann, 1894.

Meyer, Max F. 1896. Ueber Combinationstoene und einige hierzu in Beziehung stehende akustische Erscheinungen. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XI, 177-229. Dissertation, 1896: Berlin. Hamburg/Leipzig (1896): Voss.

Meyer, Max F. 1896-7. Ueber die Rauhigkeit tiefer Toene. Zeitschrift fuer Psychologie, 13, 75-80.

Note: Rand entry (above) conflicts with Chandler and Barnhart entry: "1897. Ueber die Rauhigkeit tiefster Toene."

Meyer, Max F., and Stumpf, Carl. 1897. Schwingungszahlbestimmungen bei sehr hohen Toenen. Ann. d. Physik, 61, 760-779.

Meyer, Max F. 1898. Nachtrag zu dieser Abhandlung. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVIII, 274-293.

"Thirty years ago I pointed out in three publications that 'consonance' (also called 'fusion' by Stumpf) is not a term corresponding to a single psychological concept, that it is not capable of being defined unambiguously: "Ueber Tonverschmelzung und die Theorie der Konsonanz", "Nachtrag zu dieser Abhandlung", "Ueber Beurteilung zusammengesetzter Klaenge." Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVII, pp. 401-421, 1898/XVIII, pp. 274-293, 1898/XX, pp. 13-33, 1899. It took thirty years before any other psychologist joined me in assuming an attitude as critical as mine toward the term 'consonance' and similar terms in simultaneous and successive tones ..." --Max F. Meyer (1929). The musician's arithmetic. The University of Missouri Studies, IV (no. 1), 99f.

Meyer, Max F. 1898. [The record of Carl Stumpf]. Zeitschrift fuer Psychologie, 16, no pp.

Meyer, Max F. 1898. Ueber die Intensitaet der Einzeltoene zusammengesetzter Klaenge. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVII, 1-14.

Meyer, Max F. 1898. Ueber Tonverschmelzung und die Theorie der Consonanz. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVII (1898), 401-421; XVII (1898), 274-293.

Cf. C. Stumpf, "Erwiderung," Ibid., 294-302. See: annotation to Meyer (1898) "Nachtrag ..." entry. Note: Schoen (1940) cites only vol. 17 data.

Meyer, Max F. 1898. Ueber Unterschiedsempfindlichkeit fuer Tonhoehen nebst ueber einige Bemerkungen ueber die Methode der Minimalveraenderungen. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, 16, 352-372.

Note: Mecklenburg entry conflicts: "Ueber die Unterscheidsempfindlichkeit fuer Tonhoehen. Beitraege zur Akustik und Musikwissenschaft, herausgegeben von Carl Stumpf, II, 66ff."

Meyer, Max F. 1898. Zur Theorie der Differenztoene und der Gehoersempfindungen ueberhaupt. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVI, 1-34, XVII, 8-14.

New York Public Library Music Index entry for this work shows publication date as 1897. Ward (1971) also shows: "[1898] ... Beitr. Akust. Musikwiss., 2, 25-65."

Meyer, Max F. 1899. Die Tonpsychologie, ihre bisherige Entwicklung und ihre Bedeutung fuer die musikalische Paedagogik. Zeitschrift fuer paedagogische Psychologie, I, 74-85, 180-189, 245-254.

Mecklenburg (entry 2055) conflicts; shows date as 1895/1899, shows volumes as I, II-IV.

Meyer, Max F. 1899. Is the memory of absolute pitch capable of development through training? Psychology Review, 6, 514-516.

Meyer, Max F. 1899. Ueber Beurtheilung zusammengesetzter Klaenge. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XX, 13-33.

See: annotation to Meyer (1898) "Nachtrag ..." entry.

Meyer, Max F. 1899. Ueber die Funktion das Gehoerorgans. Verhandlungen d. Physikal. Ges. zu. Berlin, 17 (5), 49-55.

Meyer, Max F. 1899. Zur Theorie des Hoerens. Pflueger's Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 78, 346-362.

Meyer, Max F. 1900. E. ter Kuile's Theorie des Hoerens. Pflueger's Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 81, 61-75.

Meyer, Max F. 1900. Elements of a psychological theory of melody. Psychology Review, 7, 241-273.

On pages 400-405 of this volume can be found a review of this Meyer article by C.K. Wead.

Meyer, Max F. 1900. Neue Erklaerung der subjectiven Combinationstoene. _Pflueger's Archive fuer der gesammte Physiologie der Menschen und der Thiere, LXXXI_, 49-60.

Meyer, Max F. 1900. Zu Schaefers Neuer Erklaerung der Combinationstoene. _Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LXXXI_, 49ff.

Michaelis, Christian Friedrich. 1806-7. Ueber das Humoristische in der Musik. _Allgemeine musikalische Zeitung 1806/7_, 725.

Michaelis, Christian Friedrich. 1807-8. Ueber das Idealische der Tonkunst. _Allgemeine musikalische Zeitung 1807/8_, 449.

Michaelis, Christian Friedrich. 1879. _Zur Lehre von den Klaengen der Konsonanzen_. Berlin: no publisher given.

Michalis, Alfred. 1895. _Vermischte Aufsaetze ueber Musik belehrenden, unterhaltenden und biographischen inhalts, nebst Grundlagen zu einer musikalischen Physiologie_. Leipzig: R. Kuehn. iii, 142 pp.

Mecklenburg says "Michaelis", shows publisher as "Verlags-Institut. (142 pp)."

Michalski, L. 1876. _Bedeutung der halbzirkelfoermigen Kaenals des Ohrlabyrinths_. Greifsw.: no publisher given.

Milet, J. 1892. _Pamphlet sur l'audition colorée_. Thesis: Montpellier. Paris: no publisher given.

Mill, James. 1829. _Analysis of the phenomena of the human mind_. Edited with additional notes by John Stuart Mill. London: Longmans, Green, Reader and Dyer, 1869.

Millard, William. _See_: Duncan, P. Martin.

Miller, J. 1870. _Metaphysics or the science of perception_. New York: no publisher given.

Moch, G. 1898. Le calcul et la réalisation des conditions colorées. _Rev. Scient._, _X_ (ser. 4), 225-230.

Mojon, [Benedetto]. 1803. _Mémoire sur l'utilité de la musique, tant dans l'état de santé, que dans celui de maladie; traduit de la seconde édition italienne, avec notes, par C.D. Muggetti_. Paris: Fournier. 48 pp.

Molldur (Kieninger), Karl. 1880. _Die Kunst und Wissenschaft der Musik_. _I_: Die Musik in ihrem Verhaeltnis zur Religion. Lorch (1880), 2. Aufl. Lorch 1903: Rohm. _II_: Musik als Medium zur Krankenheilung. Lorch 1903: Rohm. _II_: Musik als Farben-Komposition zur Unterstuetzung der Tonmusik bei der seelischen Heilung (Heilung aller Seelen?). Lorch 1903: Rohm. _IV_: Musik als Geisterdemonstration Entsprechungswissenschaft - nebst geistigem "Darwinismus" als verklaerten Sphaeren. Lorch 1903: Rohm (insgesamt 296 pp).

Moore, Aubertine Woodwort. 1900. _For my musical friends: a series of practical essays on music and music culture_. New York: Dodge. vi, 266 pp.

Moos, ?. 1867. Ueber das subjektive Hoeren wirklicher musikalischer Toene. _Archiv fuer pathologische Anatomie_, _XXXIX_, 289ff.

Moos, ?. 1871. Pathologische Beobachtungen ueber die physiologische Bedeutung der Hoerheren musikalischen Toene. _Archiv fuer Ohren- und Augenheilkunde_, _II_ (1871-2), 139ff.

Moos, ?. 1874. Ueber das combinierte Vorkommen mangelhafter Perception gewisser Konsonanten sowie hoher musikalischer Toene und deren physiologische Bedeutung. _Archiv fuer Ohren- und Augenheilkunde_, _IV_, 165ff.

Morgan, A. de. [1864]. On the beats of imperfect consonances. _Cambridge Philosophical Society_, _X_, 129-141.

Plomp (1971) gives journal as "_Trans_. _Cambr_. _Phil_." "...proved that Ohm's formula agrees with the rate of waveform variations of the superimposed sinusoids, suggesting that the beats may be due to phase sensitivity of the ear. The latter opinion was defended by Koenig (1876) but rejected by most investigators. Recent experiments (Plomp 1967) have put forward new evidence ... that these beats ... have

indeed their origin in the ear's phase sensitivity."
--Plomp (1971): Timbre...

Morse, H.L. See: Randall, B.H., 1887.

Mosche, E. 1898. Zur Methode der richtegen und falschen Faelle im Gebiete der Schallempfindungen. Philosophischen Studien, XIV, 491-549.

See also: Lorenz, G., 1885.

Mueller, F.A. 1882. Das Axiom der Psychophysik und die Bedeutung der Weber'schen Versuche. Marburg: no publisher given. 158 pp.

Mueller, Georg Elias. 1873. Zur Theorie der sinnlichen Aufmerksamleit. Leipzig: Druck von A. Edelmann. 136 pp.

Mueller, Georg Elias. 1878. Zur Grundlegung der Psychophysik. Berlin: T. Grieben. xvi, 424 pp.

Mueller, Georg Elias. 1882. Revision der Hauptpunkte der Psychophysik. No city or publisher given.

Mueller, J. 1892. Die Untersuchungen der akustischen Funktionen des Ohres. Int. Centralbl. f. Ohrenheilkunde, II, 1-26.

Contains bibliographic material.

Mueller, Johannes. 1826. Zur vergleichenden Physiologie des Gesichtssinnes. No city or publisher given.

Mueller, Johannes. 1838. Handbuch der Physiologie des Menschen. Eng. trans.: Textbook of physiology, 1842.

Plomp (1967) gives: "Verlag J. Hoelscher, Coblenz, Vol. 2, 1840." "[The hypothesis that a specific pitch corresponds to each of the numerous nerve fibres in such a way that pitch increases gradually from the basal to the apical end of the organ of Corti] ... can be considered as an extension of Mueller's (1840) doctrine of 'specific energies' of the different senses, which states that stimulating a fibre of the optical nerve always results in a visual sensation, stimulating a fibre of the acoustical nerve in an auditory sensation, etc." --Plomp (1967).

Muensterberg, Hugo. 1889. [Auditory localization as a function of the semi-circular canals]. Beitraege zur experimentellen Psychologie, 2, 182-234.

Bracketed title by this compiler.

Muensterberg, Hugo, and Pierce, A.H. 1894. The localisation of sound. Psychology Review, I, 461-476.

Munk, Hermann. 1868. Untersuchungen ueber das Wesen der Nerven-Erregung. No city or publisher given.

Munk, Hermann. 1889. Ueber die centralen Organe fuer das Sehen und das Hoeren bei den Wirbelthieren. Sitzbericht d. k. preuss. Akad. d. Wiss. zu Berlin, XXXI (20 Juni, 1889), 615-634.

Mygind, H. 1894. Taubstummheit. Berlin and Leipzig: no publisher given. 285 pp.

Natanson, ?. 1844. [Expansion of Johannes Mueller's principle of specific nerve energies]. Arch. physiol. Heilk., 3, 515-535.

Bracketed title by this compiler; see Boring (1942, pp. 403-4).

Naumann, Emil. 1869-70. Die Tonkunst in der Culturgeschichte. 2 Baende. Berlin: no publisher given. 772 pp.

Newton, Sir Isaac. 1704. Optiks. 2nd ed., 1717; with additions and corrections, 1718; 3rd ed., 1721; 4th ed., (posthumous), 1730; reprint 1931.

Contains Newton's erroneous hypothesis that there are seven colors in the color spectrum due to the fact that there are seven notes in the diatonic scale.

Noel, Roden. 1872. The philosophy of perception. Contemporary Review, XX, 72-103.

Nohl, Ludwig. 1878. Zum Komischen in der Musik. Allgemeine deutsche Musikzeitung 1878, 25.

Oersted, H. Chr. 1808. Ueber die Gruende des Vergnuegens, welches die Toene herverbringen. Leipzig (1951): Gesammelte Schriften III.

Oersted, H. Chr. 1851. Die Naturwirkung des geordneten Lautausdrucks. Leipzig (1951): Gesammte Schriften III.

Oesch, Alb. 1898. Was koennen wir ohne Schnecke hoeren? Basel: no publisher given. 66 pp.

Oesterley, Hermann. 1885. Beobachtungen ueber die Wirkungsweise der Musik. Deutsche Revue, IV, 66.

Ohm, G.S. 1839. Bemerkungen ueber Combinationstoene und Stoesse. Ann. Phys. Chem., 47, 463-466.

"Ohm (1839) published a general formula for the rate of ... beats: two tones of M and N Hz, respectively, with M:N only slightly different from m:n (m and n both small integers), give rise to [mN - nM] beats per sec. The most promoted explanations of these beats were in terms of combination tones ... De Morgan (1864) proved that Ohm's formula agrees with the rate of waveform variations of the superimposed sinusoids, suggesting that the beats may be due to phase sensitivity of the ear." --Plomp (1971): Timbre...

Ohm, G.S. 1843. Ueber die Definition des Tones, nebst daran geknuepfter Theorie der Sirene und aenlicher tonbildener Vorrichtungen. Ann. Phys. Chem., 135, 497-565.

See Seebeck (1841) entry, this section, for relevant annotation. Conflicting entries: Plomp (1970, 1971) gives volume and pages as "59, 513-565." Tonndorf (1971) and Houtsma/Goldstein (1971) concur with Plomp.

Ohm, G.S. 1844. Noch ein Paar Worte ueber die Definition des Tones. Ann. Phys. Chem., 62, 1-18.

Oppel, J. 1871. Ueber Vogelstimmen, insbesondere Kuckucksruf und Amselschlag. Der Zoologische Garten, XII/2, no pp.

Ovio, G. 1898. Sugli occhiali colorati. Ann. di Ottal., XXVII, 317-374.

Parr, W. Alfred. 1900. The power and influence of music considered from a psycho-physiological point of view. Florence: Claudian Press. 18 pp.

Pastor, Willy. 1889. Harmonik und Psychologie. Musikalisches Wochenblatt 1889, 36-39.

Pastor, Willy. 1889, 1890, 1893. Aufsaetze zur Aesthetik und Psychologie der Musik. Musikalisches Wochenblatt, n/v, no pp.

Patrici, M.L. 1896-7. Music and the cerebral circulation of man; adapted from the Italian of prof. M.L. Patrici. Music, XI, 232-242.

"Patrici" is probably a printing error or an anglicization; see "Patrizi, M.L." entry (Italian), this section.

Patrizi, M.L. 1896. Primi esperimenti intorno all'influenza della musica sulla circulazione del Sangue nel cervello umano. Riv. Musicale Ital., 3, no pp. Also: Arch. di Psichiat., 17 (1896), 390-406.

Mecklenburg also shows: "Patrizi, Mariano L. 1896. Primi esperimenti intorno al'influenza della musica sulla circulazione del Sangue nel Cervello del'Uomo. Torino: Bocca." "Emanuel Favre, a boy of thirteen years of age, was severely wounded in the head by an axe. The wound was 13 cm. in length, cleaving the bones of the skull for the entire distance. Restored to health the boy presented a soft cicatrice, through which the pulsations of the brain were plainly visible, and changes of the cerebral circulation could be accurately determined ... Plethysmographs were used to determine changes in circulation; for registering the pulse of the brain a cup of gutta percha was made with an electric connection capable of showing the slightest modification in volume or pulsation. The results were recorded on a kymograph. In general it was found that pulsations took a higher range after a musical note, or a very near repetition of the same note. High notes produced greater changes than tones of lower pitch ... Patrizi is undecided whether the variations in cerebral volume are autonomic neuromuscular functions, or passive reflections of general vasomotor phenomena. He points out, however, that his results diverge from those of Fere [1887] and Tarchanoff [1894], since the substitution of lively for melancholy music did not produce an increase of volume as these investigators assumed. In a book published several years later [1902. La nuova fisiologia della emozione musicale. Modena: no publisher given], Patrizi enlarges on the observations reported above in the effort to establish a musical esthetics founded on physiological principles." --Diserens (1923). Bracketed material supplied by this compiler.

Pease-Cheney, Simeon. 1887-9. Bird music. The Century Magazine, XIII (1887), 845; XIV (1888), 709, 908; XV (1888), 97; XVI (1889), 234.

Pedrono, ?. 1882. De l'audition colorée. Annales d'oculistique, LXXXVIII, no pp.

Perrod, Giovanni. 1896. La Sensibilita meteorica in R. Wagner. Rivista Musicale Italiana, n/v, 562-576.

Peterson, J. 1898. Ueber Erziehung durch Musik und ueber Talent. Berlin: Schlesinger. 44 pp.

Pfaundler, L. 1878. Ueber die geringste absolute Anzahl von Schallimpulsen, welche zur Hervorbringung eines Tones noetig ist. Sitzbericht Akad. Wiss. Wien, math.-naturw. Cl., LXXVI, 561-572.

Phillipe, J. See also: Binet, Alfred.

Phillipe, J. 1894. L'audition colorée des aveugles. Rev. Scient., I, 806-9.

Cf.: Psychology Review, I, 433.

Pierce, A.H. See: Muensterberg, Hugo.

Piper, Ferdinand. 1850. Von der Harmonie der Sphaeren. Berlin: no publisher given.

Pipping, H. 1895. Zur Lehre von den Vocalklaengen. Z. Biol., 13, 524-583.

See annotation to the Dennert (1887) entry, this section.

Pohl, R. 1888. Die Hoehenzuege der musikalische Entwicklung. Leipzig: no publisher given. 373 pp.

Poiree, Elie. 1898. Etude sur le discours musical. Revue internationale de musique, n/v, 129-141.

Poiree, Elie. 1899. Etude sur le discours musical. Essais de technique et d'esthétique musicales 1899/2, no pp.

Mecklenburg entry (above) unclear; could mean 1899, vol. II, or 1899-1902, no volume given.

Polak, A.J. 1900. Ueber Zeiteinheit in Bezug auf Konsonanz, Harmonie und Tonalitaet. Leipzig: no publisher given.

Pole, W. 1877. On the philosophy of harmony. Proceedings of the Musical Association, IV, 74-83.

Pole examines Helmholtz's Tonempfindungen (1863), mentions later developments such as Appun's set of tonometers.

Politzer, A. 1876. Studien ueber die Paracussis loci. Archiv fuer Ohrenheilkunde, XI, 231-236.

Pontecoulant, Adolph le Doulcet, Comte de. 1868. Les phénomènes de la musique; ou, Influence du son sur les êtres animes, par le marquis de Pontecoulant. Paris: Libraire Internationale. 159 pp.

Power, E. See: Gurney, Edmond.

Poynting, J.H., and Thompson, J.J. 1900. Text-book of physics: sound. New edition, London: no publisher given. 176 pp.

Preyer, Wilhelm. 1876. Ueber die grenzen der Tonwahrnehmung. Jena: H. Dufft. vi, 72 pp.

Note: In the Library of Congress index, Preyer is entered as "Preyer, William," and is cross-referenced from "Preyer, Thierry William." See especially: "Die Empfindlichkeit des Intervallensinnes," page 24, and "Die Empfindlichkeit fuer Tonhoehen,", p. 24.

Preyer, Wilhelm. 1878. Die Theorie der musikalischen Konsonanz. _Sitzbericht der Jenaischen Gesellschaft fuer Medizin und Naturwissenschaft, n/v_, no pp.

Preyer, Wilhelm. 1879. _Akustische untersuchen_. Jena: G. Fischer. 66 pp. "mit 2 Tafeln."

Preyer, Wilhelm. 1879. _Zur Theorie der Konsonanz. In: Akustische Untersuchungen_. Jena: G. Fischer. 66 pp.

Preyer, Wilhelm. 1887. Die Wahrnehmung der Schallrichtung mittelst der Bogengaenge. _Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 40_, 588-616.

Preyer, Wilhelm. 1889. Ueber Combinationstoene. _Annalen der Physik, XXXVIII_, 131ff.

Preyer, Wilhelm. 1891. Ueber den Ursprung des Zahlbegriffes aus dem Tonsinn und ueber das Wesen der Primzahlen. _Beitraege zur Psychologie und Physiologie des Sinnesorgane, n/v_, 1ff.

Pringscheim, C. 1873. _Richard Wagner und der "Spezialist der Psychiatrie." Eine Beleuchtung der Puschmannschen Studie_. Berlin: Schneider.

Probst, Moriz. 1899-1900. Ueber die Lokalisation des Tonvermoegens. _Archiv fuer Psychiatrie und Nervenkrankheiten, XXXII_ (1899), 387; 1900/2 [_XXXIII?_], no pp.

Pudor, Heinrich. 1891. _Das Heroentum in der deutschen Musik_. 2. Auflage, Dresden: Damm. 30 pp.

Pudor, Heinrich. 1891. _Krieg und Frieden in der Musik_. Leipzig: Muench. 48 pp.

Pudor, Heinrich. 1891. _Sittlichkeit und Gesundheit in der Musik_. Vortrag. 2. Auflage, Leipzig: Muench. 32 pp.

Puschmann, Th. 1873. Richard Wagner. Eine psychiatrische Studie. 3. Auflage, Berlin: Behr.

Quinet, E. 1885-6. Ce que dit la musique. La nouvel Revue, XXXIII (1885), 328; XLI (1886), 568.

Rambosson, J. 1876. Spécification des diverses influences de la musique dans ses applications à l'hygiène et à la médecine. Bulletin de l'Académie de Médecine de Paris, V (Serie 2), 1041.

Rambosson, J. 1877. Spécification des diverses influences de la musique sur la physique et sur le moral, par M.J. Rambosson. Paris: A. Picard. 39 pp.

"Extrait du Recueil des séances et travaux de l'Académie des Sciences morales et politiques." Compare Mecklenburg's entry: "Les diverses influences de la musique sur le physique et sur le moral. Séances et Travaux de l'Académie des Sciences morales et politiques de l'Institut de France, CIX (1878, Ser. 1), 115ff."

Ramsay, D.C. 1893. Scientific basis and build of music. London: no publisher given. 121 pp.

Randall, B.H., and Morse, H.L. 1887. Photographic illustrations of the anatomy of the human ear. Philadelphia: no publisher given.

Ranke, Otto. no date given. Die Gleichrichter-Resonanztheorie. Ein Erweiterung der Helmholtz'chen Resonanztheorie des Gehoers durch physikalische Untersuchung der Fluessigkeitsschwingungen in der Cochlea. Munich o.J.: Lehmann. 90 pp.

Rau, A. 1896. Empfinden und Denken: Ein physiologische Untersuchung. Giessen: no publisher given. 385 pp.

Raudnitz, Leipold. 1840. Die Musik als Heilmittel, oder: Der Einfluss der Musik auf Geist und Koerper des Menschen, und deren Anwendung in verscheidenen Krankheiten. Nebstanhang: Diatetik fuer Saenger und solche Musiker, welche Blasinstrumente behandeln... Prague: G. Haase Soehne. iv, 136 pp.

Rayleigh, Lord (or Baron). <u>See</u>: Strutt, J.W.

Reichert, C.B. 1871. Gehoerschnecke beim Menschen und den Saeugetieren. <u>Archiv fuer Anatomie und Physiologie</u>, <u>n/v</u>, no pp.

Reid, Thomas. 1785. <u>Essays on the intellectual powers of man: Essay II</u>, Chapter 5. No city or publisher given.

"An excellent discussion of the older theories of perception ante 1785." --Boring (1942, p. 47).

Riemann, Heinrich. 1890. Physiologie und Musikaesthetik. <u>Allgemeine Musikzeitung 1890</u>, 165, 181, 191, 203, 215, 225.

Reissmann, A. 1875. Dichtung und Musik. <u>Neue Berliner Musikzeitung 1875</u>, 289, 297, 305, 321, 329.

Reissmann, A. 1884. <u>Die social Lage der Musiker</u>. Part I. Breslau: no publisher given.

Reissmann, A. 1895. <u>Dichtkunst und Musik in ihrem Verhaeltnis zueinander</u>. Koeln: Ende. 94 pp.

Reuleaux, H. 1880. <u>Das singende Tal bei Thronecken</u>. Koblenz: no publisher given.

Riemann, Hugo. 1873 (1874?). <u>Vom musikalischen Hoeren</u>. Dissertation: Goettingen.

Riemann, Hugo. 1875. Die objective Existenz der Untertoene in der Schallwelle. <u>Allgemeine deutsche Musikzeitung 1875</u>, 25-26.

Riemann, Hugo. 1882 oder 1883. Der Ausdruck in der Musik. <u>Sammlung musikalischer Vortraege</u> 1883/<u>50</u> oder <u>V</u>/1882, no pp.

Riemann, Hugo. 1886. Wurzelt der musikalische Rhythmus in Sprachrhythmus? <u>Vierteljahrschrift fuer Musikwissenschaft</u>, <u>n/v</u>, 495ff.

Riemann, Hugo. 1888 oder 1890. Katechismus der Musik-Aesthetik. Wie hoeren wir Musik? Grundlinien der Musikaesthetik. Leipzig 1888 oder 1890, 2. Auflage 1903, 3. Auflage 1911, 4. Auflage 1919, 5. Auflage 1921, 6. Auflage Leipzig 1923: Hesse (Max Hesses illustrierte Katechismen XVII). viii, 100 pp.

Riemann, Hugo. 1895. Catechism of Aesthetics. London: Augener. "(Engl. Uebersetzung vor. No)."

Riemann, Hugo. [1895]. Programmusik, Tonmalerei und musikalischer Kolorismus. Praeludien und Studien, I, 54.

[Praeludien und Studien. Gesammelte Aufsaetze zur Aesthetik, Theorie und Geschichte der Musik. 3 Baende. Leipzig 1895-1901: Seemann (II: vi, 234 pp; III: 228 pp.)]. --Mecklenburg entry 2542; [ ] Mecklenburg 1540.

Riemann, Hugo. [1895-1901]. Zur Theorie der Konsonanz und Dissonanz. Praeludien und Studien, III, no pp.

[Praeludien und Studien. Gesammelte Aufsaetze zur Aesthetik, Theorie und Geschichte der Musik. 3 Baende. Leipzig 1895-1901: Seemann (II: vi, 234 pp.; III: 228 pp.)]. --Mecklenburg entry 2542; [ ] Mecklenburg 1540.

Riemann, Ludwig. 1896. Populaere Darstellung der Akustik in Bezeihung zur Musik. Braunschw.: no publisher given. 157 pp.

Rischbeiter, W. 1888. Die Gesetzmaessigkeit in der Harmonik. Regensberg: no publisher given. 169 pp.

Ritter, H. 1886. Die Aesthetik der Tonkunst in ihren wichteasten Grundzuegen. Wuerzburg: Stahel.

Ritter, H. 1892. Studien und Skizzen aus Musik- und Kulturgeschichte, sowie Musikaesthetik. 2. Auflage, Dresden: Hertz. 186 pp.

Rochas, Alfred de: See: Rochas D'Aiglun, E.A.A.

Rochas D'Aiglun, E.A.A. 1900. Les sentiments, la musique, et le geste. Grenoble: H. Falque et F. Perrin. iii, 279 pp. Also: Nouvelle Rev., 114, 384-389, 587-602.

"[Rochas D'Aiglun conducted an] investigation ...

on the influence of music on behavior during hypnosis. According to De Rochas, isolated tones provoke a trembling extending to all parts of the body, the character of the reaction varying with the pitch and intensity of the notes. Very high tones evoked the expression of pain, very low tones that of anguish or terror. Chords excite the same reaction as simple tones, and dissonances at any part of the scale produce an expression of suffering ... the author concludes that the phenomena observed are pure reflexes, set off by auditory stimuli, without the intervention of the will..." --Diserens (1923)

Roeber, A. 1834. Untersuchungen des Hrn. Scheibler in Crefeld ueber die sogenannten Schlaege, Schwegungen oder Stoesse. Ann. Phys. Chem., 32, 333-362, 492-520.

"...so-called 'beats of mis-tuned consonances were investigated for the first time by Scheibler (Roeber, 1834) ... discovered that three simultaneous simple tones of (n-1)p, np, and (n+1)p Hz(n=integer), with one tone slightly mistuned, give rise to a beat sensation." --Plomp (1971)

Roentgen, E. 1893. Einiges ueber Theorie und Praxis im musikalischen Dingen. Vierteljahrschrift fuer Musikwissenschaft, 9, no pp.

Roger, Joseph Louis. 1803. Traité des effets de la musique sur le corps humain, par Joseph Louis Roger ... traduit du latin, et augmenté de notes, par Etienne Sainte-Marie. Paris: Chez Brunot. xxxviii, 352 pp.

"[The] original appeared in 1758 under the title: Tentamen, de vi soni et musices in corpore humano. Cf.: Eitner." --N.Y. Public Library Music Index catalogue card annotation.

Rolland, ?. 1853. Influence de la musique sur la guérison des maladies. Soc. archeologique de Sens, III, 117-144.

Rostosky, P. 1899. Ueber functionelle Beziehungen beider Gehoerorgane. Leipzig: Dissertation. 167 pp.

Rucker, A.W., and Edser, E. 1895. On the objective reality of combination tones. Philosophy Magazine, 39 (series 5), 341.

Rudinger, N. 1888. Zur Anatomie und Entwickelung des inneren Ohres. Monatssch. f. Ohrenheilkunde, XXII, no pp.

Rush, Samuel. A discourse on the moral influence of sounds, delivered before the Chester County cabinet of natural science, January 18, 1839. Philadelphia: Chester County Cabinet of Natural Science. 32 pp.

Rutherford, W. 1886. A new theory of hearing. Journal of Anatomy and Physiology, 21, 166-168.

"The most well-known supporter of the periodicity-pitch principle was Rutherford in a lecture presented in 1886. He compared the organ of hearing with a telephone, neglecting frequency analysis. Apparently independent of Wundt, he also pointed to the 'muscle-tone,' investigated by himself, as a phenomenon in favour of the periodicity hypothesis. He published some years later a more extensive exposition of his theory, in which he no longer excluded the possibility of frequency analysis in the cochlea (Rutherford, 1898)." --Plomp (1967)

Rutherford, W. 1898. Tone sensation with reference to the function of the cochlea. Lancet, 76 (2), 389-394.

See annotation to previous Rutherford entry, this section.

Ruths, Christoph. 1897. Experimental-Untersuchungen ueber Musikphantome und ein daraus erschlossenes Grundgesetz der Entstehung der Wiedergabe, und der Aufnahme von Tonwerken. (I: Induktive Untersuchungen ueber die Fundamentalgesetze der psychischen Phaenomene usw.). Darmstadt 1897 (oder 1898): Schlapp. xx, 456 pp.

Rand (1905) gives: "1898. Induktive Untersuchungen ueber die Fundamentalgesetze der psychischen Phaenomene. Darmstadt: H.L. Schlapp. 455 pp."

Sachs, E.M. 1887. Das Verhaeltnis der Sprache zur Musik. Allgemeine Musikzeitung, n/v, 479, 491, 501.

Sala, L. [1894]. Ueber den Ursprung des Nervus acusticus. Arch. f. mikr. Anat., XLIII, no pp.

Note: Rand (1905) gives incomplete entry. Date given above was added through comparison with the Eschweiler entry (this section).

Salmon, Thomas. 1705. The theory of music reduced to arithmetical and geometric proportions. Philosophical Transactions, 5, 243-246.

Sapper, ?. 1890. Ueber Tonfolgen und Verwendung von Dur und Moll beim Vogelgesang. Neue Musikzeitung 1890, no pp.

Sauders, Cecil G. 1879. The construction of buildings considered with reference to sound. Proceedings of the Musical Association, V, 100-117.

Sauveur, J. 1700. Sur la détermination d'un son fixé. Mémoires de l'Académie Royal des Sciences. Republished: Paris, 1719. 144 pp.

Sauveur, J. 1701. Des intervales des sons, et son application à tous les systèmes et tous les instrumens de musique. Hist. Acad. Sci. Paris, n/v, 299-366.

Savart, F. 1825. [Title unknown]. Ann. chim. phys., 30, 64.

Savart, F. 1831. Note sur la perception des sons graves. Ann. chim. phys., 47, 69.

Savart, F. 1840. Analyses de cours scientifiques; Cours de Physique expérimentale, professé au Collège de France pendant l'année scolaire 1838-1839, par M.F. Savart, professeur. L'Institut, Paris, France, 8, 69-71.

Savart, F. 1840. Notes sur les causes qui déterminent le degrée d'élévation des sons. Ann. chim. phys., 75, 705.

Schaaffhausen, ?. 1885. Einige Reliquien beruehmter Maenner. Robert Schumanns Gehirn und Hoerorgane. Korrespondenzblatt der Deutschen Gesellschaft fuer Anthropologie, Ethnologie und Urgeschichte, XV (10), 147-149.

Schaefer, Karl L. See also: Abraham, Otto.

Schaefer, Karl L. 1890. Ueber die Wahrnehmung und Lokalisation von Schwebungen und Differenztoenen. Zeitschrift fuer Psychologie, I, 81-98.

Schaefer, Karl L. 1891. Ein Versuch ueber die intrakranielle Leitung leisester Toene von Ohr zu Ohr. Zeitschrift fuer Psychologie, II, 111-142.

Schaefer, Karl L. 1892-3. Ist eine cerebrale Entstehung von Schwebungen moeglich? Philosophischen Studien, IV (1892), 348-350; V (1893), 397-411.

Schaefer, Karl L. 1895. Beweise gegen Wundt's Theorie von der Interferenz akustischer Erregugen im Centralorgan. [Concerning Wundt's theory of acoustically-stimulated interference in the inner ear]. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LXI, 544-550.

Schaefer, Karl L. 1899. Die Bestimmung der unteren Hoergrenze. Zeitschrift fuer Psychologie, XXI, 161-173.

Schaefer, Karl L. 1899. Eine neue Eklaerung der subjectiven Combinationstoene auf Grund der Helmholtz'schen Resonanzhypothese. Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 78, 505-526.

See annotation to Dennert, H. (1887) entry, this section. New York Public Library Music Index entry for this article gives journal and volume as: "Arch. f. d. ges. Physiol., LXXXI, 505-525. Cf. Ibid., LXXXI, 49-60." Mecklenburg confirms the Chandler and Barnhart entry (above).

Schaik, W.C.L. von. 1895. Sur la limite inférieure des sons perceptibles. Arch. Neerl. d. Sci. Exactes et Nat., XXIX, 87.

Schasler, Max. 1881. Die Ironie in der Musik. _Neue Zeitschrift fuer Musik 1881_, 385, 397, 405.

Schasler, Max. 1882. Die Musik und Malerei in ihrer Stellung zueinander im System der Kunst. _Neue Zeitschrift fuer Musik 1882_, 1, 13, 25, 37.

Schaul, Johann Baptist. 1809. _Briefe ueber den Geschmack in der Musik_. Karlsruhe: no publisher given.

Schiff, M. 1891. Les rameaux non auditifs du nerf acoustique. _Arch. d. Sci. Phys. et Nat._, _n/v_, no pp.

Schilling, Gustav. 1838. _Versuch einer Philosophie des Schoenen in der Musik, oder Aesthetik der Tonkunst_. Mainz: no publisher given.

Mecklenburg gives: "('Warnung' vor dem 'Versuch einer Philosophie des Schoenen in der Musik oder Aesthetik der Tonkunst'). _Allgemeine musikalische Zeitung 1838_, _n/v_, 807."

Schischmanow, I. 1889. Untersuchungen ueber die Empfindlichkeit des Intervallsinnes. _Philosophischen Studien_, _V_, 558-600.

Mecklenburg gives: "Schichmanow, Iwan."

Schleiden, ?. 1857. _Die Natur der Toene und die Toene der Natur_. No city or publisher given.

Schmitt, Hans. 1895. _The natural laws of musical expression_. Eng. trans.: Frances A. van Santford. Chicago: Summy.

Schneider, Paul. 1892. _Ueber das Darstellungsvermoegen der Musik. Eine Untersuchung an der Hand von Professor Eduard Hanslicks Buch "Vom Musikalisch-Schoenen."_ Opeln./Leipzig: Marke. 126 pp.

Schneider, Peter Joseph. 1835. _System einer medizinischen Musik_ ... Bonn: C. Georgi. 2 vols.

Mecklenburg also gives: "Die Musik und Poesie. Nach ihren Wirkungen historisch-kritisch dargestellt. (System einer medizinischen Musik). 2 Teile, Bonn."

Schubring, Gustav. 1867. Die philosophische und die physikalische Theorie der Musik. Zeitschrift fuer die gesammte Naturwissenschaft, XXX, 185.

Schucht, J. 1857. Die Sentimentalitaet in den Tondichtungen der Neuzeit. Neue Berliner Musikzeitung 1857, 249, 257, 265.

Schucht, J. 1881. Die ethische Wirkung der Musik und das Moralprinzip in der Kunst. Neue Zeitschrift fuer Musik 1881, 357, 365, 373.

Schucht, J. 1891. Der Realismus in Poesie und Musik. Neue Zeitschrift fuer Musik 1891, 243.

Schuetze, Stephan. 1830. Ueber Gefuehl und Ausdruck in der Musik. Caecilia, XII, 237.

Schuetze, Stephan. 1834. Ueber das Verhaeltnis der Komik zur Musik. Caecilia, XVI, 197. Erwiderung durch Kaeferstein, p. 245.

Schultz, Ferdinand. 1883. Die Tonkunst nach Ursprung und Umfang ihrer Wirkung. Berlin: no publisher given.

Schultz, Ferdinand. 1898. Das Wesen der Musik. Jahrbuch der Koeneglichen Akademie gemeinnuetziger Wissenschaften Erfurt 1898, no pp.

Schulze, R. 1898. Ueber Klanganalyse. Philosophischen Studien, XIV, 471-489.

Schumann, F. 1890. Ueber das Gedaechtniss fuer Komplexe gleicher Schalleindruecke. Zeitschrift fuer Psychologie, I, 75-80.

Schwalbe, G. 1887. Lehrbuch der Anatomie der Sinnesorgane. Erl., 1887. No city or publisher given.

Scripture, Edward W. 1892. Einige Beobachtungen ueber Schwebungen und Differenztoene. Philosophischen Studien, VII, 630-2.

Scripture, Edward W. 1893. Ist eine cerebrale Entstehung von Schwebungen moeglich? Philosophischen Studien, VIII, 638-640.

Scripture, Edward W., and Smith, Howard P. 1894. Experiments on the highest audible tone. Studies of the Yale Psychological Laboratory, II, 105-113.

Seashore, Carl E. 1899. Hearing-ability and discriminative sensibility for pitch. University of Iowa Studies in Psychology, II, 55.

Seebeck, A. 1841. Beobachtungen ueber einige Bedingungen der Entstehung von Toenen. Ann. Phys. Chem., 53, 417-436.

"G.S. Ohm postulated in 1843 that the ear performs a Fourier analysis upon the incoming signal -- a logical assumption since a listener is able to discern the various partials of a complex tone. Helmholtz in 1863, endorsed Ohm's 'acoustic law' and at the same time suggested a mode by which the cochlea might execute the required analysis ... There was, of course, some criticism of [Ohm's] hypothesis. Seebeck (1841), a contemporary of Ohm's, studied the perception of complex tones produced by a siren. He felt that some of his results were incompatible with the assumption of a Fourier analysis, but rather indicated a waveform or time analysis. It is a curious fact that Ohm (1843), who apparently did not conduct acoustic experiments of his own, cited Seebeck's findings in support of his own thesis. Seebeck (1843), in turn wrote a rebuttal, but it found little attention in his own time. Apparently, the Fourier principle with its clear-cut mathematical formulation was too powerful to be put aside. In recent times, [several investigators] have taken up Seebeck's experiments again, confirmed his results, and expanded upon his concepts." --Tonndorf (1971).

Seebeck, A. 1843. Ueber die Sirene. Ann. Phys. Chem., 60 (ser. 2), 449-481.

See annotation to Seebeck (1841) entry, this section.

Seebeck, A. 1844. Ueber die Definition des Tones. Ann. Phys. Chem., 63, 353-368.

Seebeck, A. 1844. Ueber die Erzeuqunq von Toene durch getrennte Eindrucke, mit Beziehung auf die Definition des Tones. Ann. Phys. Chem., 63, 368-380.

Seebeck, A. 1849. Akustik. In: Repertorium der Physik, 8 (Berlin: Verlag von Veit und Comp.).

Corroborates Willis' (1830) premise that timbre originates from the harmonics of a complex tone. --Plomp (1971).

Seebeck, J.T. 1846. Beitraeqe zur Physiologie des Gehoer- und Gesichtesinnes. Poggendorf's Annelen., 68, no pp.

Seguin, Edouard. 1846. Traitement moral, hygiène, et éducation des idiots et des autres enfants arriérés ou retardés dans leur développement, agités de mouvements involontaires, débiles, muets non-sourds, bègues, etc. Paris: J.B. Bailliere.

Pages 385-392: "Seguin devoted many rhapsodic passages to music and even to noise, 'wrongly said to be without worth, since it has no place in an orchestra.' He provided a fairly elaborate description of the various conditions of listening and hearing, the classes of sounds, and the physiological aspects of audition. ...[Seguin] pointed out, above all, that education in music for the idiot has as its primary object bringing the child to the threshold of speech in those cases where speech is very defective." --Kraft (1963).

Seguin, Edouard. 1866. Idiocy and its treatment by the physiological method. New York: William Wood.

Page 149: "Seguin stressed the functional nature of listening, the anomalies of hearing in the mentally defective: 'the wild boy educated by Itard did not hear the report of a pistol discharged behind his head, but heard the fall of a nut upon the floor.'" --Kraft (1966)

Seidl, Arthur. 1898. (Besprechung von Ch. Ruths "Experimental- Untersuchungen ueber Musik-Phantome.") Darmstadt: no publisher given. (Musikalisches Wochenblatt 1898), n/v, no pp.

Parentheses from Mecklenburg.

Sergi, G. 1882. Teoria fisiologica della percezione. Milano: no publisher given. Cf.: Rev. Philos., XIV, 566-574; and in: Riv. di Filos. Scient., I, 325-9.

Some conflict among sources concerning Sergi's first initial; Chandler and Barnhart gives "H.", Diserens gives "G."

Sergi, G. 1893. Dolore e Piacere. Milano: no publisher given.

"...gives a critical resume of the experiments of Dogiel on reactions to music. Sergi interprets these results in terms of the James-Lange theory of emotion and concludes that musical emotions entirely lack intellectual character." --Diserens (1923).

Sernagiotto, C. 1897. L'Arte dei Suoni de'suoi Rapporti colla Vita sociale. Conferenza Venezia: "Aurora" (L. Merlo). 56 pp.

Sharpe, B.F. 1899. A double instrument and a double method for the measurement of sound. Science, IX, 808-810.

Shuttleworth, H.C. 1899. The place of music in public worship. New York: Scribner. 80 pp.

Simmel, Georg. 1882. Psychologische und ethnologische Studien ueber Musik. Zeitschrift fuer Voelker-Psychologie und Sprachwissenschaft, XIII, 261-

Smith, E.A. 1895. The influence of music upon life and health. Music, VIII, 361-365.

Smith, Howard F. See: Scripture, E.W. 1894.

Smith, W. MacDonald. 1888. The physiology of pianoforte playing, with a practical application of a new theory. Proceedings of the Musical Association, XIV, 43-66.

Smith, W. MacDonald. 1894. From brain to keyboard; new and complete practical solution of all technical difficulties. Proceedings of the Musical Association, XXI, 17-33.

Sokolow, B.P. 1897. [Facts and theory of color-hearing]. Voprosy Filos., VIII, no pp.

Sommer, Hans. 1898. Die Wertschaetzung der Musik. Muenchen: Kastner und Lossen. Also: Abdruck aus 'Kunstwart', XI, 13-15.

Sonneck, O.G. 1897. Ein kritisch-polemisches Referat ueber die "Musik-aesthetische Streitfragen usw." von F. Roesch als Protest gegen den Symbolismus in der Musik. Frankfurt (M): Knauer. 96 pp.

Soret, J.P. 1892. Sur la perception du beau. Geneva: no publisher given.

"...J.P. Soret, Sur la perception du beau (Geneva, 1892), also regards repetition as a principle of aesthetics. His discussions of the aesthetical side of the subject are much more detailed than mine. But with respect to the psychological and physiological foundation of the principle, I am convinced that the Contributions to the analysis of the sensations [see Mach (1896), this section] go deeper." --Mach (1894); Ernst Mach, Popular scientific lectures (1898), 89f.

Sorge, G.A. 1745. Vorgemach der musicalischen composition. Lobenstein: Verlag des Autoris.

Soula, H. 1883. Essai sur l'influence de la musique en médecin. Paris: no publisher given. 68 pp.

Sourian, P. 1883. Les sensations et les perceptions. Rev. Philos., XVI, 58-82, 135-161.

Soury, J. 1891. Histoire des doctrines de Psychologie physiologique. Paris: no publisher given. 464 pp.

Spanuth, A. 1878. Das Komische in der Musik. Allgemeine deutsche Musikzeitung 1878, 1.

Sparmann, H.M. 1891. Attempt at an analysis of music. Cincinnati: no publisher given. 61 pp.

Spencer, H. 1855. Principles of psychology. London: no publisher given.

Spencer, H. 1857. On the origin and function of music. Essays. London: no publisher given.

Spencer, H. 1862. First principles. No city or publisher given.

Spottiswoode, William. 1879. On beats and combination tones. Proceedings of the Musical Association, V, 118-130.

Spurzheim, G. See: Gall, F.J.

Squire, C.R. 1901. A genetic study of rhythm. American Journal of Psychology, XII, 492-589.

Stade, Fritz. 1870. Vom Musikalisch-Schoenen. Mit Bezug auf Dr. E. Hanslicks gleichnamigen Schrift. Leipzig, 1870; 2. Auflage Leipzig, 1904: Kahnt. 48 pp.

Stainer, Sir John. 1892. Music in its relation to the intellect and the emotions. London: Novello, Ewer, and Co. 64 pp.

Note: "The substance of this essay was delivered as a professional lecture in the Sheldonian theatre, Oxford, on June 8, 1892." --O.S.U. Music Library catalogue card abstract.

Starke, Paul. 1886. Die Messung von Schallstaerken. Philosophischen Studien, III, 264-304.

Starke, Paul. 1889. Zum Mass der Schallstaerke. Philosophischen Studien, V, 157-169.

Stearns, R.E.D. 1890. Instances of the effects of musical sounds on animals. American Naturalist, 24, 236-7, 125-7, 238, 26-9.

"[Stearns] notes a pet bird who becomes excited [by] 'Rule Britannica' on flute..." --Shaffer (1971).

Steed, Orlando. 1880. On the beauty of touch and tone: an inquiry into the physiological and mechanical principles involved in their cultivation. Proceedings of the Musical Association, VI, 31-58.

Author is given as "Steed, A. Orlando" by some sources.

Stein, K. 1833-4 Versuch ueber das Komische in der Musik. Caecilia, XV, 221. (Vgl. von Schuetze ebenda, XVI (1834), 197, und Nachschrift von Stein ebenda, p. 245: "Ueber Komische Musik." In Erwiderung der Abhandlung von K. Stein im 60. Heft der Caecilia: "Versuch ueber das Komische in der musik." (Allgemeine musikalische Zeitung 1834, 249, 269).

Steinitzer, Max. 1885. Psychologische Wirkungen der musikalischen Formen. Munich: Reidel. ix, 130 pp.

Mecklenburg gives: Ueber die psychologische Wirkungen..."

Stern, L. William. 1896-1900. Die Wahrnehmung von Tonveraenderungen. Zietschrift fuer Psychologie, XI (1896), 1-30; XXI (1899), 360-387; XXII (1899-1900), 1-12.

Sterne, Carus. 1890. Musikalischer Sand. Promethius, I, 257.

Stone, W.H. 1881. The causes of the rise in orchestral pitch. Proceedings of the Musical Association, 7, 99-116.

Stone attributes the rising tendency of orchestral pitch since the time of Handel to aural discrimination problems such as masking and beat tones, along with a lack of standardization pitch generators.

Stratton, Stephen S. 1882-3. Women in relation to musical art. Proceedings of the Musical Association, IX, no pp.

Strutt, J.W. [Lord Rayleigh]. 1876. On our perception of the direction of a source of sound. Proceedings of the Musical Association, 2, 75-84.

Strutt, J.W. [Lord Rayleigh]. 1877. Acoustical observations. Philosophy Magazine, 3 (ser. 5), 456-464.

Strutt, J.W. [Lord Rayleigh]. 1878. On the determination of absolute pitch by common harmonium. Proceedings of the Musical Association, V, 1-26.

Strutt, J.W. [Lord Rayleigh]. 1878. The mutual influence of two sounds nearly in unison. Proceedings of the Musical Association, V, 27-33.

Strutt, J.W. [Lord Rayleigh]. 1894. The theory of sound. New York (1896): Dover Publications, Inc. 2nd edition (revised and enlarged, New York (1945): Dover Publications, Inc. 2 vols.

Stumpf, Carl. 1873. Ueber den psychologischen Ursprung der Raumvorstellung. Leipzig: S. Hirzel. viii, 324 pp.

Stumpf, Carl. 1883-90. Tonpsychologie. Leipzig: Verlag von S. Hirzel. 2 vols. in one. Vol. I: viii, 427 pp; Vol. II: viii, 582 pp. [Druck von Poeschel und Trepte in Leipzig].

Stumpf, Carl. 1885-6. Musikpsychologie in England. Vierteljahrschrift fuer Musikwissenschaft [Leipzig], Jahrg. 1, 261-349.

Conflicting entries: New York Public Library Music Index entry (above) shows date as 1885 only, and as Jahrgang 1; Chandler and Barnhart entry shows date as 1885-6, Jahrgang 2. Chandler and Barnhart also cites publication of this work as a book: "Leipzig; 89 pp." Mecklenburg (entry 3070) confirms N.Y. Public Library entry; also gives (entry 3069): "Musikpsychologie in England. Betrachtungen ueber die Hereleitung der Musik aus der Sprache und aus dem tierischen Entwicklungsprozess, Ueber Empirismus und Nativismus in der Musiktheorie. Viert. f. Mus., I, 1885."

Stumpf, Carl. 1886. Ueber der Vorstellung von Melodien. Zeitschrift fuer Philosophie, 89, 45-57.

Stumpf, Carl, ed. 1890. Ueber Vergleichungen von Tondistanzen. Zeitschrift fuer Psychologie, I, 419-462.

Stumpf, Carl. 1896. Ueber die Ermittlung von Obertoenen. Wiedemann's Ann., LVII, 600. Also: Leipzig: no publisher given.

Stumpf, Carl. 1897. _Die pseudo-aristotelischen Probleme ueber Musik_. Berlin: Koenigl. Akademie der Wissenschaft, in commission bei G. Reimer. 85 pp.

"Aus den Abhandlungen der Koenigl. Pruess. Akademie der Wissenschaft zu Berlin von jahr 1896." See Mecklenburg for conflicts: "von jahr 1896/3, p. 1." Shows book length as 86 pages.

Stumpf, Carl. 1897. Neueres ueber Tonverschmelzung. _Zeitschrift fuer Psychologie_, _XV_, 280-303, 354.

Stumpf, Carl, ed. 1898. _Beitraege zur Akustik und Musikwissenschaft_. Leipzig: no publisher given.

Stumpf, Carl. 1898. Die Unmusikalisch und die Tonverschmelzung. _Zeitschrift fuer Psychologie_, _17_, 422-435.

Stumpf, Carl, and Meyer, Max. 1898. Massbestimmungen ueber die Reinheit consonanter Intervalle. _Zeitschrift fuer Psychologie_, _XVIII_, 321-404. Also: _Beitr. Akust. Musikwiss._, _II_, 84-167.

Stumpf, Carl. 1898. Ueber die dualistische Konsonanz Definition und die Lehre von der Klangvertretung. _Beitraege zur Akustik und Musikwissenschaft_, _I_ (Heft), 84-108.

Stumpf, Carl. 1898. Konsonanz und Dissonanz. _Beitraege zur Akustik und Musikwissenschaft_, _I_, 1-108. Also: Leipzig: Verlag von Johann Ambrosius Barth, 1898. vi, 108 pp.

Kreitler and Kreitler (1972) conflict on pageanation: " 91-107." Schoen (1940) confirms the Rand entry (above).

Stumpf, Carl. 1898. Zum Einfluss der Klangfarbe auf die Analyse von Zusammenklaengen. _Beitraege zur Akustik und Musikwissenschaft_, _II_, 168.

Stumpf, Carl. 1898-1901. Geschichte des Konsonanzbegriffs. _Abhandlung der bayerischen Akademie der Wissenschaft; 1898-1901 philos. -philol. classe._, _21_ (Abt. 1), 1-78. Also: Munich: Pranz. x, 261 pp..

Stumpf, Carl. 1899. Beobachtungen ueber subjective Toene und ueber Doppelthoeren. _Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane_, _XXI_, 100-121.

Stumpf, Carl. 1901. Ueber das Erkennen von Intervallen und Accorden bei sehr kurzer Dauer. _Zietschrift fuer Psychologie_, _XXVII_, 148-186.

Suarez de Mendoza, F. 1890. _L'audition colorée_. Paris (2nd ed., 1899): no publisher given. 164 pp.

Sully, James. 1879. Animal music. _The Cornhill Magazine_, _XL_, 605ff.

Tafani, A. 1885. _L'organo dell'udito_. Firenze: no publisher given.

Talbot, E.B., and Darlington, L. 1897-8. Distraction by musical sounds; the effect of pitch upon attention. _American Journal of Psychology_, _9_, 332-343.

"...experimented on the influence of music on the discrimination of lifted weights ... the authors conclude that music facilitates attention, the middle octaves having the greatest influence... in opposition to Fere's results [1887], they find that there is no essential relation between pitch and dynamogenic effect." --Diserens (1923); [ ] mine.

Tanzi, E. 1891. Cenni ed esperimenti sulla psicologia dell-udito. _Riv. di Filos. Scient._, _n/v_, no pp.

"...published an account of experiments on the reaction time for major and minor chords. The keys of a pianoforte, the reagent's key and a chronoscope were connected in a single circuit ... The conclusion is that minor chords produce more rapid reaction than do the major chords, a fact that may have some relation to the prevalence of minor chords in primitive music." --Diserens (1923).

Tappert, Wilhelm. no date. Notenmalerei und Notenscherze. (Weitere Angaben nicht zu ermitteln).

Tappert, Wilhelm. 1868. Zooplastik in Toenen. Musikalische Studien 1868, no pp.

Tarchanow, J. 1878. Das Telephon als Anzeiger der Nerven- und Musclestroeme beim Menschen und den Thieren. St. Petersburger med. Wochenschrift, 3, 353ff.

Tarchanow, J. 1894. L'influence de la musique sur l'homme et les animaux. Archives Italiens de la Biologie, XXI, 313-317.

Author's name shown by some sources as "Tarchanoff." "As early as 1888 Tarchanoff noted variations in the electric conductivity of subjects subjected to the stimulus of an electric bell ... In an interesting communication to the International Congress of Rome in 1895, Professor Tarchanoff presented results obtained by means of the Mosso ergograph, which resemble those of Fere's [1887] experiments. He notes that music exercises a powerful influence on the muscular activity of man, increasing or diminishing it according to the nature of the melodic stimuli. When a subject is completely fatigued by working on the ergograph and can no longer raise the weight, gay music of rapid movement causes the fatigue to vanish for a variable time, and the subjects are able to raise the weight once more; i.e., do additional work. Sad, slow music in the minor key [sic] produces the opposite effect... A third series of experiments on human beings showed that the electric currents determined by the skin of the hand and registered by Wiedemann's galvanometer are modified by the influence of music. Since these cutaneous currents were then regarded as due to increase of secretory activity, Tarchanoff concluded that music influences the activity of the cutaneous glands... [Tarchanoff] reported that decapitated animals respond to sound stimuli by violent struggling, although Professor Henri [V. Henri (1894)] was unable to confirm these results, in a similar experiment of his own ... a second series of experiments was made on dogs and guinea pigs in order to determine the quantity of oxygen consumed and the quantity of carbon dioxide gas eliminated in 24 hours under varying conditions of rest and auditory stimulation by means of an electric bell sounding every five seconds. During these 24 hours of persistent stimulation the consumption of oxygen increased 12.01 per cent for dogs and 10.94 per cent for guinea pigs. During the same period the elimination of carbonic acid gas increased 11.64 per cent and 11.11 per cent for the respective animals." --Diserens (1923)

Taylor, Sedley. 1875. Sound and music. London: no publisher given. 223 pp. 3rd ed., 1896.

Thimus, Albert (Freiherr) von. 1868-76. Die harmonikale Symbolik des Alterthums. Koeln: M. Du Mont-Schauberg. 2 volumes.

Volume I: "Die esoterische zahlen lehre und harmonik der Pythagoreer in ihren bezeihungen zu aelteren griecheschen und morgenlaendischen quellen, insbesondere zur altsemitisch-hebraeisch ueberlieferung." Volume II: "Der technisch-harmonikale und theosophisch-kosmographische inhalt der Kabbalistischen buchstaben-symbole des althebraeischen buechlein's Jezirah. Die Pythagorisch-platonische lehre vom werden des hebraeischen wie chamitisch-altaegyptischen weisheitslehre und zur heiligen ueberlieferung die urzeit." --New York Public Library Music Index catalogue card annotation; confirmed by Mecklenburg.

Thomas, C.H. 1880. Researches on hearing through the teeth and cranial bones. Philadelphia: no publisher given. 4 pp.

Thomson, J.J. See: Poynting, J.H. 1900.

Thomson, W. 1878. On beats of imperfect harmonies. Proceedings of the Royal Society (Edinburgh), 9, 602-612.

"...[Thomson] called attention to the fact that ... beats already occur at very low [sound pressure levels], so that it is very improbable that the phenomenon is due to non-linear distortion in the ear, as was assumed by von Helmholtz (1863) and most other investigators..." --Plomp (1971) Note:

Houtsma/Goldstein (1971) shows Thomson only by title: Baron Kelvin.

Thompson, Sylvanus P. 1877-81. On binaural audition. Philosophy Magazine, IV (ser. 5: July-December), 274-276; VI (ser. 5: July-Dec.), 389-391; XII (ser. 5: July-Dec.), 351-355.

Thompson, Sylvanus P. 1890. Physical foundation of music. London: no publisher given. 31 pp.

Thompson, Sylvanus P. 1892. On the function of two ears in the perception of space. Philosophy Magazine, XIII (January-June), 406-416.

Thorp, G.E. 1894. Colour audition and its relation to the voice. Edin. Medical Journal, XL, 21-5.

Tigretier, ?. 1833. Eine abyssinische Krankheit, welche mit Musik Kuriert wird, ihre Aehnlichkeit mit dem Tarantismus. Vom Mailaender Correspondenten. Nebst Zusatz der Redaktion. Allgemeine Musikalische Zeitung 1833, 137.

Tischer, Ernst. 1883. Bemerkungen ueber die messung von Schallstaerken. Philosophischen Studien, I, 543-555.

Titchener, Edward Bradford. 1892. The Leipzig school of experimental psychology. Mind, XVII, 206-234.

Toulouse, E., and Vaschide, N. 1900. Nouvelle méthode pour la mesure de l'acuité auditive des sons. Comptes Rendus de l'Académie Royale des Sciences, CXXX, 529-530.

Truetler, W.J. 1899. Music in relation to man and animals. Proceedings of the Musical Association, XXV, 71-91.

Turpin, James. 1883. Some practical bearings of the study of acoustics upon music as an art. Proceedings of the Musical Association, 9, 71-93.

[March 5, 1883]. Turpin states that Helmholtz's work may be the basis of a scientific (experimental) esthetics.

Tyndall, J. 1867. Sound. London: no publisher given. 464 pp. 2nd ed., 1893. German translation by A. von Helmholtz and Cl. Wiedemann; Braunschw.: 548 pp.

Ulrici, Hermann. 1863. Physiologische Erklaerung und psychologische Bedeutung der Gehoersempfindungen. Zeitschrift fuer Philos. und phil. Kr., XLIII, 78.

Urbantschitsch, V. 1876. Intermittent perception of very weak sounds. Mind, I, 296ff.

Urbantschitsch, V. 1881. Ueber das An- und Abklingen akustischer Empfindungen. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 25, 323.

Urbantschitsch, V. 1881. Zur Lehre von der Schallempfindung. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 24, 574-595.

Note: Some sources give pageanation as "574-7." Contains bibliographic material.

Urbantschitsch, V. 1888. Ueber den Einfluss einer Sinneserregung auf die uebrigen Sinnesempfindungen. Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 42, 3-4.

"...[Urbantschitsch] investigated the influence of auditory stimuli on the sense impressions, particularly on normally minimal visual stimuli. He found that patches of color observed at a distance at which the color could scarcely be recognized were brought clearly into the sensory field, by sounding a tuning fork. In short, the threshold of color perception is lowered by tonal stimuli. Tuning forks of high pitch, applied to both ears, were most effective. The influence [of sound upon threshold perceptibility of] the different colors is variable. Barely legible print was often read when a tone accompanied the effort. Tastes, odors, and touch are similarly affected by sound, and pain is increased by jarring noises. Finally Urbantschitsch claims to have produced photisms, or phenomena of colored audition, by having the subject observe a grey disk on white paper, or an undulating white surface, and describe the colors perceived while different tuning forks were sounded. The experiments,

if valid, indicate that the subjects of audition colorée are merely striking examples of the normal psychological influence of one sense upon the other."
--Diserens (1923)

Urbantschitsch, V. 1895. Ueber Hoeruebungen bei Taubstummheit und bei Ertaubung im spaeteren Lebensalter. Wien: no publisher given. 135 pp.

Urbantschitsch, V. 1899. Ueber den Einfluss von Schallenempfindungen auf die Schrift. Pfluegers Arch., 74, 43-46.

Van Cleve, J.S. 1897-8. Concerning musical memory. Music, XII (1897), 636-644; XIII (1898), 158-166.

Vaschide, N. See: Toulouse, E. 1900.

Vescovi, P. de. 1897. Visione cromatizzata delle parole (audizione colorata). Arch. Ital. di Otol., V, 273-341.

Vierordt, K. von. 1885. Die Schall- und Tonstaerke und das Schalleitungsvermoegen der Koerper. Tuebingen: no publisher given. 274 pp.

Vigna, C. 1882. Intorno alle diverse influenze della musica sul fisico e sul morale. Milano: no publisher given. 99 pp.

Vallanis, Luigi Alberto. 1896. Come si sente e come si dovrebbe sentire la musica. Torino: Lattes.

Villoteau, Guillaume Andre. 1807. Mémoire sur la possibilité et l'utilité d'une théorie exacte des principes naturels de la musique. Paris: Imp. Imperiale. 88 pp.

Villoteau, Guillaume Andre. 1807. Recherches sur l'analogie de la musique avec les arts qui ont pour l'imitation du langage, pour servir d'introduction à l'étude des principes naturels de cet art... Paris: Imp. Imperiale. 3 uols.

Vivier, A.J. 1893. Mémoire sur la désaccord qui existe entre les mathématiciens et les musiciens sur les vrais rapports des sons musicaux. Paris: no publisher given. 23 pp.

Voigt, W. 1890. Ueber den Zusammenklang zweier einfacher Toene. Nachrichten von der Gesellschaft der Wissenschaften zur Goettingen (1890), 159.

Wagener, G. 1876. Bemerkungen ueber die Theorie der chinesischen Musik und ihrem Zusammenhang mit der Philosophie. Zeitschrift der ostasiatischen Gesellschaft, 1876; Mitteilungen der Deutschen Gesellschaft fuer Natur- und Voelkerkunde Ostasiens, II (1877), 42ff.

Wagner, ?. 1891-2. Musikalisch-dramatische Parallelen. Beitrage zur Erkenntnis von der Musik als Ausdruck. Gesammelt von mehreren Wagnerianer, erlaeutert durch Einen. Sonderabdruck aus den Bayreuther Blaettern, 1891/1892. Bayreuth, 1903: Bayreuther Blaetter.

Wagner, E.D. 1878. Versuch einer Darstellung des Symbolischen in der Musik. Neue Berliner Musikzeitung 1878, 257, 265, 273, 281, 289, 299.

Wake, C. Staniland. 1896-7. Musical tone and color. Music, XI, 171-183.

Wallaschek, Richard. 1891. Ueber die Bedeutung der Aphasie fuer den musikalischen Ausdruck. Vierteljahrschrift fuer Musikwissenschaft, [jahrg.] 7, 53-73.

Wallaschek, Richard. 1892. Das musikalische Gedaechtniss und seine Leistungen bei Katalepsie, im Traum und in der Hypnose. Vierteljahrschrift fuer Musikwissenschaft, 7, 204-251.

Wallaschek, Richard. 1893. Primitive music. London: Longmans, Green, and Co. xi, 326 pp.

Chapter 5: Physical and psychical influence of music. Chapter 6: Heredity and development.

Wallaschek, Richard. 1894. Die Bedeutung der Aphasie fuer die Musikvorstellung. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, VI, 8.

Wallaschek, Richard. 1895. On the difference of time and rhythm in music. Mind, 4, 28-35.

Wallis, John. 1677. On the trembling of consonant strings. Philosophical Transactions, II, 380-382.

Walther, Eduard. 1882. Geschichte des Taubssonant strings. Phns. Leipzig: no publisher given.

Walther, Eduard. 1895. Handbuch der Taubstummenbildung. Berlin: no publisher given. 748 pp.

Warthin, A.S. 1894. Some physiological effects of music on hypnotized subjects. The Medical News, 65, 89-94.

"Warthin ... attempted to determine experimentally the influence of music on a group of hypnotized subjects. There were seven subjects ... pulse tracings were taken by means of appropriate apparatus, and the suggestion was given to pay attention to nothing but the music and to retain the memory of the effect on awakening... When Wagner's 'Ride of the Valkyries' was played on the piano, the pulse of the [first] subject was accelerated, while the amplitude and the pressure increased. As the music continued, the pulse rose from a normal of 60 to 120 per minute, the entire body being bathed in perspiration ... the same experiments were repeated with the other subjects with similar results ... music was also found to facilitate the hypnotic process as Braid and Moll assert in their manuels." --Diserens (1923); [ ] mine. Diserens gives pages as 89-92.

Wavruch, ?. 1842. Aerztlicher Rueckblick auf Ludwig van Beethovens letzte Lebensepoche. Wiener Zeitschrift, 30.4.1842.

Wead, C.K. 1900. Modern problems in acoustics. Science, XI, 732-5.

See also: Meyer, Max (1900) entry for review by C.K. Wead.

Weber, E.H. 1834. De Tactu. No city or publisher given.

Weber, E.H. 1846. Der Tastsinn und das Gemeingefuehl. No city or publisher given.

Weber, E.H. 1848. Ueber die Umstaende durch welche man geleitet wird manche Empfindungen auf auessere Objecte zu beziehen. Ber. saech. Ges. Wiss., 2, 226-237.

Weber, F.A. 1800-1801. Ueber komische Charakteristik und Karikatur in praktischen Musikwerken. Allgemeine Musikalische Zeitung 1800/1801, 137, 157.

Weber, F.A. 1801-1802. Von dem Einfluss der Musik auf den menschlichen Koerper und ihrer medizinischen Anwendung. Allgemeine Musikalische Zeitung 1801/1802, 561, 577, 593, 609.

Weber, Johann. 1899. Les Illusions musicales et la verité sur l'expression. 2e édition, Paris: Fischbacher. 250 pp.

Weissmann, Adolf. 1889. Gedanken ueber Musik bei Tieren und beim Menschen. Deutsche Rundschau, LXI, 50.

Wendt, A. 1808-1809. Einfluss der Musik auf den Charakter. Allgemeine musikalische Zeitung 1808/1809, 81, 97.

Wendt, A. 1826. Ausdruck in der Musik. Caecilia, IV, 173.

Wentscher, M. 1896. Ueber physiche und psychische Kausalitaet. Leipzig: no publisher given.

Whipple, G.M. [1900?]. Studies in pitch discrimination. American Journal of Psychology, XIV, 289-309, 553-573.

Whomes, Edmund. 1887. Key color. Proceedings of the Musical Association, XIII, 83-98.

Whomes attempted to discount the objective existence of chromasthesia through a tone perception experiment; the subjects were the assembled members of the Royal Musical Association. The results of the experiment were somewhat confused, mainly due to an amount of resistance, among certain members of the audience, to Whomes' opinion that color-hearing is a myth.

Widmann, P. 1874. Gehoer- und Stimmbildung. Leipzig: no publisher given.

Wilford, ?. 1876. Evolution of sound. London: no publisher given.

Rand (1905) enters this work in "Helmholtz; related articles" classification of the subject index.

Willis, R. 1830. On the vowel sounds, and on reed organ-pipes. Cambridge Philosophical Society, 3, 231-268.

"[Willis] advanced the opinion that timbre originates from the harmonics ... [He] combined a vibrating reed with an organ pipe provided with a piston and demonstrated that the vowels [i], [e], [a], [o], and [u] could be simulated in this order by increasing the distance between the reed and the piston. This was the first indication that the timbre differences between vowels are correlated with peaks in the amplitude pattern, for which since Hermann the term formants has been accepted." --Plomp (1971)

Wimmer, J. 1843. Ueber die Stimmung der Blechinstrumente. Allgemeine Wiener Musikzeitung, 3, 75.

Wimmer, S.J. 1889. The influence of music and its therapeutic value. New York Medical Journal, L, 258-260.

Witmer, L. 1893. Zur experimentellen Aesthetik einfacher raeumlicher Formverhaeltnisse. Philosophische Studien, 9, 96-114; 209-263.

Kreitler and Kreitler (1972) cite this paper, pages 382-3, in reference to "preferences for the Golden Sction and other proportions of form."

Witse, Sara E. 1888. Hearing. American Journal of Psychology, I, 702-5.

Woelfflin, Eduard von. 1897-8. Zur Geschichte der Tonmalerei. Sitzungberichte der Bayerischen Akademie der Wissenschaft, II, 2.

Wolf, Oskar. 1871. Sprache und Ohr. Braunschw.: no publisher given.

Wolf, Oskar. 1899. Die Hoerpruefung mittelst der Sprache. _Zeitschrift fuer Ohrenheilkunde_, _XXXIV_, 289-311.

Wolfe, H.K. 1886. Untersuchungen ueber das Tongedaechtniss. _Philosophischen Studien_, _III_, 534-571. Dissertation: Leipzig, 1886.

Wolf, William. 1894. Ueber Tonmalerei. _Gesammelte musikaesthetische Aufsaetze 1894_, no pp.

Wood, R.W. 1900. The photography of sound waves. _Popular Science Monthly_, _LXVII_, 354-364.

Wundt, Wilhelm. 1858. _Beitraege zur Theorie der Sinneswahrnehmung_. No city or publisher given.

Wundt, Wilhelm. 1863. _Vorlesungen ueber die Menschen- und Thierseele_. Leipzig: no publisher given.

Wundt, Wilhelm. 1873. _Grundzuege der physiologischen Psychologie_. 2 vols. Leipzig: no publisher given. 2nd ed., 1880: Verlag W. Engelmann, Leipzig; 2 vols.

"In the second edition of his work "Grundzuege..." (1880), [Wundt] criticized Helmholtz's assumption that place is correlated with pitch. Accepting that the different locations along the basilar membrane are tuned to different frequencies..., Wundt proposed an alternative...: Tones give rise to synchronous nerve impulses whose rate determines pitch." --Plomp (1967)

Wundt, Wilhelm. 1886. _Elements de Psychologie Physiologique_. Paris: no publisher given. 2 vols.

Wundt, Wilhelm. 1891. Vergleichungen von Tondistanzen. _Philosophischen Studien_, _VI_, 605-640.

Wundt, Wilhelm. 1893. Ist der Hoernerv direct durch Tonschwigungen erregbar? _Philosophischen Studien_, _VIII_, 641-652.

Wundt, Wilhelm. 1894. Akustische Versuch an einer labyrinthlosen Taube. _Philosophischen Studien_, _IX_, 496-509.

Wundt, Wilhelm. 1895. Zur Frage der Hoerfaehigkeit labyrinthloser Tauben. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 61, 339-341.

"As arguments in favour of his conception [that tones give rise to synchronous nerve impulses whose rate determines pitch], Wundt considered the phenomenon of binaural beats and the (incorrect) view that the auditory nerve can be stimulated directly by sound (Wundt, 1893, 1895)." --Plomp (1967)

Wundt, Wilhelm. 1896. Grundriss der Psychologie. No city or publisher given.

Wundt, Wilhelm. 1902. Grundzuege der physiologischen Psychologie. 5. Aufl.: Leipzig, 1902.

Volume II, pages 63-138, 370-8 concern music, sound perception.

Young, T. 1800. Outlines of experiments and inquiries respecting sound and light. Philosophical Transactions of the Royal Society, I (part 1), 106-150.

"Young (1800) and Koenig (1876), expanding a suggestion made by Smith (1749), proposed that the same envelope changes, when sufficiently slow, are heard as beats will, when sufficiently rapid, be perceived as difference tones... These authors regarded any periodic change in the stimulus as a basis for the perception of a tone. However, the precise nature and the location of the central mechanism responsible for the interpretation of waveform periodicity were never specified..." --Small (1971); the "Smith (1749)" entry cited is: "Smith, R. 1749. Harmonics, or the philosophy of musical sounds. Printed by J. Bentham, and sold by W. Thurlbourn, Cambridge."

Zahn, J.A. 1892. Sound and music. Chicago: no publisher given. 452 pp.

Ziehen, T. 1891. Leitfaden der physiologischen Psychologie. Jena: no publisher given. 176 pp.

Ziller, Fritz. 1876. _Die Musik und das Komische_. Dissertation, Goettingen. Halle: Schmidt. 50 pp.

Zimmermann, G. 1900. _Die Mechanik des Hoerens und ihre Stoerungen_. Wiesbaeden: no publisher given. 100 pp.

Zimmermann, Robert. 1885. Referat ueber Eduard Hanslicks "Vom Musikalisch-Schoenen." _Vierteljahresschrift fuer Musikwissenschaft_, _I_, 251-252.

Zwaardemaker, H. 1894. Der Umfang des Gehoers in den verschiedenen Lebensjahren. _Zeitschrift fuer Psychologie_, _VII_, 12-28.

Zwaardemaker, H. 1894. Sprachgehoer und generelles Tongehoer. _Zeitschrift fuer Ohrenheilkunde_, _XXV_, 232-248. Eng. trans. by A.B. Kibbe: _Arch. of Otol._, _XXIII_ (1894), 291-303.

Zwaardemeker, H. 1900. Ueber Intermittenztoene. _Arch. Anat. Physiol._, _Physiol. Abt._, (Suppl. Band), 60-67.

See annotation to the Dennert (1887) entry, this section.

PSYCHOPHYSICS
DUTCH

No documents found.

PSYCHOPHYSICS
ENGLISH

Andrew, J. 1881. The pendulograph: A series of writings of the twenty ratios of the musical system. London: no publisher given. 20 pp.

Angell, Frank, and Harwood, H. 1899. Experiments on discriminations of clangs for different intervals of time. American Journal of Psychology, XI, 67-69.

Note: Conflicting entries; Rand (above) enters pages as 67-69, Chandler and Barnhart enters pages as 65-69.

Anonymous. no date. Sound blindness. London Journal of Education, IX, 475.

Ayers, H. 1892. A contribution to the morphology of the vertebrate ear, with a reconsideration of its function. Journal of Morphology, VI, no pp.

Bell, Sir Charles. 1811. Idea of a new anatomy of the brain. Reprinted: Journal of Anatomy and Physiology, III (1869), 154-157.

Also available: Wayne Dennis (1948).

Bentley, I.M. no date. Standards of audition. Science, XIX, 951-961.

Bishop, S.S. 1890. Imperforate auditory canals. Chicago: no publisher given. 8 pp.

Blake, Clarence J. 1879. Audibility of high musical tones. American Journal of Otology, I, 276.

Bleyer, J.M. 1897. Tone Blindness. Journal of Eye, Ear, and Throat Disease, II, 1f.

Bosanquet, R.H.M. 1879. On a mode of producing continuous notes from resonators. Proceedings of the Musical Association, VI, 15-21.

Bosanquet, R.H.M. 1879. On the present state of experimental acoustics, with suggestions for the arrangement of an acoustic laboratory and a sketch of research. Philosophy Magazine, 8, 290-305.

Bosanquet, R.H.M. 1879. Some experiments with a revolving stop-cock. Proceedings of the Musical Association, VI, 21-30.

Bourdon, B. 1898. The application of the graphic method of the study of the intensity of the voice. L'Annee Psychol., 5, 369-378.

Cattell, James McKeen, and Fullerton, G.S. 1892. On the perception of small differences. No city or publisher given.

Cole, W.F. 1898. A discovery in the physiology of the ear. Laryngology, IV, 291-9; V, 162-3.

Ellis, Alexander J. 1876. On the sensitiveness of the ear to pitch and change of pitch in music. Proceedings of the Musical Association, III, 1-32.

Gowers, W.R. 1896. The Bradshaw lecture on subjective sensations of sound. British Medical Journal, II, 1429-36. Also: Lancet, II, 1357-63.

Gray, A.A. 1900. A modification of the Helmholtz theory of hearing. Journal of Anatomy and Physiology, XXIV, 324-351.

"The assumption by Helmholtz that a particular pitch corresponds to each nerve fibre, was accepted widely although it remained difficult to understand that only one or two nerve fibres are stimulated by a simple tone. For that reason, Gray (1900) proposed that many nerve fibres may be involved, but that pitch is determined by the place of maximal amplitude of vibration. This modification was widely adopted by other investigators in the field of audition." --Plomp (1967) Pitch, timbre ...

Helmholtz, H.L.F. von. 1860. On the motion of the strings of a violin. Proceedings of the Glasgow Philosophical Society, Dec., 1860. Also: Philosophy Magazine, XXI (ser. 4), 393-396.

Helmholtz, H.L.F. von. 1863. On the sensations of tone as a physiological basis for the theory of music. Translated and revised by Alexander T. Ellis. London, 1895: Longmans, Green. 2nd english edition: New York: Dover, 1954.

The original German publication: 1863. Die Lehre von den Tonempfindungen als physiologische Grundlage fuer die Theorie der Musik. Braunschweig, Germany: Friederick Vieweg und Sohn.

Hughlings-Jackson, J. 1879. Auditory vertigo. Brain, II, 29-38.

Hurst, C.H. 1895. A new theory of hearing. Transcript of the Liverpool Biological Society, 9, 321-353.

James, William. 1890. Principles of psychology. No city or publisher given.

Volume 1 (533-549) contains James' evaluation of Fechner and of psychophysics. --Boring (1942). Howes (1927): "A systematic psychology of the emotions; the earliest specimen, followed by Ribot, McDougall." -pp 50, 51.

Jastrow, J. 1896. An apparatus for the study of sound intensities. Science, III, 544-6.

Maclean, Charles. 1895. On some causes of the changes of tone-colour proceeding in the most modern orchestra. Proceedings of the Musical Association, XXI, 77-102.

MacDougall, E. 1902. The relation of auditory rhythm to nervous discharge. Psychological Review, IX, 460-536.

MacDougall, E. 1902. Rhythm time and number. American Journal of Psychology, XIII, 88-97.

Mach, Ernst. 1897. Analysis of the sensations. [The analysis of the sensations and the relation of the physical to the psychical]. Eng. trans. of: Die Analyse der Empfindungen und das verhaeltniss des physischen zum psychischen. Eng. trans. Chicago and New York: Open Court Publishing Co., 1902. 120 pp.

Mayer, A.M. 1874. The determination of the law connecting the pitch of a sound with the duration of its residual sensation. American Journal of the Sciences and the Arts, 8, 241-255.

Mayer, A.M. 1894. Researches in acoustics. American Journal of Science, XLVII, 1-28, 283-5. Also: Lond. Edinb. Dubl. Phil. Mag., 37 (ser. 5), 259-288.

"...Mayer (1894) found that a tone could be rendered inaudible by another tone of lower frequency, but not readily by one of higher frequency."
--Jeffress (1971): Masking ... (In: Foundations of modern auditory theory).

Muensterberg, Hugo, and Pierce, A.H. 1894. The localisation of sound. Psychology Review, I, 461-476.

Parr, W. Alfred. 1900. The power and influence of music considered from a psycho-physiological point of view. Florence: Claudian Press. 18 pp.

Pole, W. 1877. On the philosophy of harmony. Proceedings of the Musical Association, IV, 74-83.

Pole examines Helmholtz's Tonempfindungen (1863), mentions later developments such as Appun's set of tonometers.

Poynting, J.H., and Thompson, J.J. 1900. Text-book of physics: sound. New edition, London: no publisher given. 176 pp.

Ramsay, D.C. 1893. Scientific basis and build of music. London: no publisher given. 121 pp.

Randall, B.H., and Morse, H.L. 1887. Photographic illustrations of the anatomy of the human ear. Philadelphia: no publisher given.

Reid, Thomas. 1785. _Essays on the intellectual powers of man; Essay II_, Chapter 5. No city or publisher given.

"An excellent discussion of the older theories of perception ante 1785." --Boring (1942, p. 47).

Rutherford, W. 1886. A new theory of hearing. _Journal of Anatomy and Physiology_, _21_, 166-168.

"The most well-known supporter of the periodicity-pitch principle was Rutherford in a lecture presented in 1886. He compared the organ of hearing with a telephone, neglecting frequency analysis. Apparently independent of Wundt, he also pointed to the 'muscle-tone,' investigated by himself, as a phenomenon in favour of the periodicity hypothesis. He published some years later a more extensive exposition of his theory, in which he no longer excluded the possibility of frequency analysis in the cochlea (Rutherford, 1898)." --Plomp (1967)

Rutherford, W. 1898. Tone sensation with reference to the function of the cochlea. _Lancet_, _76_ (2), 389-394.

See annotation to previous Rutherford entry, this section.

Salmon, Thomas. 1705. The theory of music reduced to arithmetical and geometric proportions. _Philosophical Transactions_, _5_, 243-246.

Sauders, Cecil G. 1879. The construction of buildings considered with reference to sound. _Proceedings of the Musical Association_, _V_, 100-117.

Scripture, Edward W., and Smith, Howard F. 1894. Experiments on the highest audible tone. _Studies of the Yale Psychological Laboratory_, _II_, 105-113.

Seashore, Carl E. 1899. Hearing-ability and discriminative sensibility for pitch. _University of Iowa Studies in Psychology_, _II_, 55.

Sharpe, B.F. 1899. A double instrument and a double method for the measurement of sound. Science, IX, 808-810.

Strutt, J.W. [Lord Rayleigh]. 1876. On our perception of the direction of a source of sound. Proceedings of the Musical Association, 2, 75-84.

Strutt, J.W. [Lord Rayleigh]. 1877. Acoustical observations. Philosophy Magazine, 3 (ser. 5), 456-464.

Strutt, J.W. [Lord Rayleigh]. 1878. On the determination of absolute pitch by common harmonium. Proceedings of the Musical Association, V, 1-26.

Strutt, J.W. [Lord Rayleigh]. 1878. The mutual influence of two sounds nearly in unison. Proceedings of the Musical Association, V, 27-33.

Strutt, J.W. [Lord Rayleigh]. 1894. The theory of sound. New York (1896): Dover Publications, Inc. 2nd edition (revised and enlarged, New York (1945): Dover Publications, Inc. 2 vols.

Talbot, E.B., and Darlington, L. 1897-8. Distraction by musical sounds; the effect of pitch upon attention. American Journal of Psychology, 9, 332-343.

"...experimented on the influence of music on the discrimination of lifted weights ... the authors conclude that music facilitates attention, the middle octaves having the greatest influence... in opposition to Fere's results [1887], they find that there is no essential relation between pitch and dynamogenic effect." --Diserens (1923); [ ] mine.

Thomas, C.H. 1880. Researches on hearing through the teeth and cranial bones. Philadelphia: no publisher given. 4 pp.

Thomson, W. 1878. On beats of imperfect harmonies. Proceedings of the Royal Society (Edinburgh), 9, 602-612.

"...[Thomson] called attention to the fact that ... beats already occur at very low [sound pressure levels], so that it is very improbable that the phenomenon is due to non-linear distortion in the ear, as was assumed by von Helmholtz (1863) and most other investigators..." --Plomp (1971) Note: Houtsma/Goldstein (1971) shows Thomson only by title: Baron Kelvin.

Thompson, Sylvanus P. 1877-81. On binaural audition. Philosophy Magazine, IV (ser. 5: July-December), 274-276; VI (ser. 5: July-Dec.), 389-391; XII (ser. 5: July-Dec.), 351-355.

Thompson, Sylvanus P. 1890. Physical foundation of music. London: no publisher given. 31 pp.

Thompson, Sylvanus P. 1892. On the function of two ears in the perception of space. Philosophy Magazine, XIII (January-June), 406-416.

Turpin, James. 1883. Some practical bearings of the study of acoustics upon music as an art. Proceedings of the Musical Association, 9, 71-93.

[March 5, 1883]. Turpin states that Helmholtz's work may be the basis of a scientific (experimental) esthetics.

Tyndall, J. 1867. Sound. London: no publisher given. 464 pp. 2nd ed., 1893. German translation by A. von Helmholtz and Cl. Wiedemann; Braunschw.: 548 pp.

Urbantschitsch, V. 1876. Intermittent perception of very weak sounds. Mind, I, 296ff.

Wake, C. Staniland. 1896-7. Musical tone and color. Music, XI, 171-183.

Wallaschek, Richard. 1895. On the difference of time and rhythm in music. Mind, 4, 28-35.

Wead, C.K. 1900. Modern problems in acoustics. Science, XI, 732-5.

See also: Meyer, Max (1900) entry for review by C.K. Wead.

Whipple, G.M. [1900?]. Studies in pitch discrimination. American Journal of Psychology, XIV, 289-309, 553-573.

Willis, R. 1830. On the vowel sounds, and on reed organ-pipes. Cambridge Philosophical Society, 3, 231-268.

"[Willis] advanced the opinion that timbre originates from the harmonics ... [He] combined a vibrating reed with an organ pipe provided with a piston and demonstrated that the vowels [i], [e], [a], [o], and [u] could be simulated in this order by increasing the distance between the reed and the piston. This was the first indication that the timbre differences between vowels are correlated with peaks in the amplitude pattern, for which since Hermann the term formants has been accepted." --Plomp (1971)

Witse, Sara E. 1888. Hearing. American Journal of Psychology, I, 702-5.

Wood, R.W. 1900. The photography of sound waves. Popular Science Monthly, LXVII, 354-364.

Young, T. 1800. Outlines of experiments and inquiries respecting sound and light. Philosophical Transactions of the Royal Society, I (part 1), 106-150.

"Young (1800) and Koenig (1876), expanding a suggestion made by Smith (1749), proposed that the same envelope changes, when sufficiently slow, are heard as beats will, when sufficiently rapid, be perceived as difference tones... These authors regarded any periodic change in the stimulus as a basis for the perception of a tone. However, the precise nature and the location of the central mechanism responsible for the interpretation of waveform periodicity were never specified..." --Small (1971); the "Smith (1749)" entry cited is: "Smith, R. 1749. Harmonics, or the philosophy of musical sounds. Printed by J. Bentham, and sold by W. Thurlbourn, Cambridge."

Zahn, J.A. 1892. Sound and music. Chicago: no publisher given. 452 pp.

PSYCHOPHYSICS
FRENCH

Baratoux, J. 1888. _De l'unification de la mesure de l'ouïe._ Paris: no publisher given. 16 pp.

Beaunis, Henri Etienne. 1875. _Les principes de la physiologie._ Paris: Berger Levrault and Co. 25 pp.

Beaunis, Henri Etienne. 1884-6. _Recherches expérimentales sur les conditions de l'activité cérébrale et sur la physiologie des nerfs._ Paris: J. -B. Baillier. 2 vols. in 1.

Beaunis, Henri Etienne. 1889. _Les sensations internes._ Paris: Alcan. iii, 256 pp.

Beaunis, Henri Etienne. 1893. _Travaux du laboratoire de psychologie physiologique des hautes études._ Paris: Baillier. 100 pp.

"A collection of miscellaneous bio-bibliographic information on H. Beaunis can be found in the Library of Congress index: WZ 100, qB 381." --L.C. entry annotation.

Beauregard, H. 1893. Recherches sur l'appareil auditif chez les Mammimères. _Journal de l'Anatomy et de la Physiologie,_ 1893.

Binet, Alfred. 1894. _L'application de la psychométrie à l'étude de l'audition colorée._ Paris: no publisher given.

Bonnier, P. 1896. Les derniers théories de l'audition. _Arch. Int. de Laryngologie, IX,_ 218-241.

Bonnier, P. 1898. _L'oreille: anatomie, physiologie, symptomatologie, pathologie._ Paris: no publisher given. 5 vols.

Bonnier, P. 1900. La définition du timbre. _Compte-Rendu Soc. de Biol., LII,_ 300-302.

Bonnier, P. 1900. A propos de la théorie de Helmholtz. Compte-Rendu Soc. De Biol., LII, 302-304.

Charpentier, A. 1890. L'Intensité comparative des sons d'après leur tonalité. Arch. de Physiol. Nor. et Pathol., II(5e ser.), no pp.

See also: Couty, L. 1874.

Chladni, Ernst Florens Friederich. 1809. Traité d'acoustique. Paris: Chez Courcier. xxvii, 375 pp.

Translated from Die Akustik by the author.

Cornu, August, and F. Mercadier. 1869. Sur les intervalles musicaux. Comptes Rendus de l'Académie Royale des Sciences, n/v, 301-8, 424-7.

Corti, A. 1851. Recherches sur l'organe de l'ouïe des mammifères. Zeitschrift fuer wissenschaftlich Zoologie, 3, 109-169.

Dauriac, Lionel. 1886. L'acoustique psychologique. Rev. Philos., XXI, 217-246.

Delage, Yves. 1886. Sur la fonction des canaux semi-circulaires de l'oreille interne. Comptes Rendus de l'Académie Royale des Sciences, CIII (1886), no pp.

Delezenne, C.E.J. 1827. Sur les valeurs numérique des notes de la gamme. Recueil des travaux de la Société des Sciences, de l'Agriculture et des Arts de Lille, 1-56.

"This work (esp. 4-6) is the conventional starting point for the history of pitch discrimination." --Boring (1942), 349.

Fourier, J.B.J. 1822. Théorie analytique de la chaleur. Eng. trans., 1878. No city or publisher given.

Note: Chapter three of this work contains Fourier's mathematical system for generation of sine-wave components.

Gall, F.J., and Spurzheim, G. 1809. Recherches sur le système nerveux. No city or publisher given.

Gelle, M.E. 1886. Rôle de la sensibilité du tympan dans l'orientation au bruit. C.R. Soc. Biol., 3 (ser. 7), 448f.

Gelle, M.E. 1898. L'audition et ses organes. Paris: no publisher given. 326 pp.

Helmholtz, H.L.F. von. 1868-74. Théorie physiologique de la musique. Trad. franc. par A. Gueroult. Paris: Masson. 2 vols.

Henri, Victor. 1894. Review of W. Wundt Experiences acoustiques sur un Pigeon sans labyrinthe (Phil. Stud., IX). Année Psychol., I, 337-339.

Henri, Victor. 1896. Sensations auditives. Année Psychol., 3, 390-401.

"...critical summary of the method and results of [the experiments of P. Mentz (1895)]..." --Diserens (1923)

Herault, A. 1882. La mémoire de l'intonation. Rev. Philos., XIV, 310-312.

Jaell, Marie. 1896. La musique et la psychophysiologie. Paris: Alcan. 171 pp.

Note: Mecklenburg entry conflicts: "1895-6. ... Presses Universitaire de France." Translations: La musica y la psicofisiologia. (Aus dem Franzoesischen ins Spanische uebersetzt von Josefa Lloret de Ballenilla). Madrid (1901): Administracion Die Musik und die Psycho-Physiologie. Aus dem Franzoesichen uebersetzt von Franziska Kromayer. Strassburg, 1905: Verlagsanstalt. viii, 144 pp.

Maillard, C. 1880. L'audiomètre et ses applications. Nancy: no publisher given.

Sauveur, J. 1700. Sur la détermination d'un son fixé. Mémoires de l'Académie Royal des Sciences. Republished: Paris, 1719. 144 pp.

Sauveur, J. 1701. Des intervales des sons, et son application à tous les systèmes et tous les instrumens de musique. *Hist. Acad. Sci. Paris, n/v*, 299-366.

Savart, F. 1825. [Title unknown]. *Ann. chim. phys.*, *30*, 64.

Savart, F. 1831. Note sur la perception des sons graves. *Ann. chim. phys.*, *47*, 69.

Savart, F. 1840. Analyses de cours scientifiques; Cours de Physique expérimentale, professé au Collège de France pendant l'année scolaire 1838-1839, par M.F. Savart, professeur. *L'Institut, Paris, France*, *8*, 69-71.

Savart, F. 1840. Notes sur les causes qui déterminent le degrée d'élévation des sons. *Ann. chim. phys.*, *75*, 705.

Schaik, W.C.L. von. 1895. Sur la limite inférieure des sons perceptibles. *Arch. Neerl. d. Sci. Exactes et Nat.*, *XXIX*, 87.

Schiff, M. 1891. Les rameaux non auditifs du nerf acoustique. *Arch. d. Sci. Phys. et Nat.*, *n/v*, no pp.

Sourian, P. 1883. Les sensations et les perceptions. *Rev. Philos.*, *XVI*, 58-82, 135-161.

Toulouse, E., and Vaschide, N. 1900. Nouvelle méthode pour la mesure de l'acuité auditive des sons. *Comptes Rendus de l'Académie Royale des Sciences*, *CXXX*, 529-530.

Wundt, Wilhelm. 1886. *Elements de Psychologie Physiologique*. Paris: no publisher given. 2 vols.

PSYCHOPHYSICS
GERMAN

Abraham, Otto, and Bruehl, L.J. 1898. Wahrnehmung kuerzester Toene und Geraeusch. _Zeitschrift fuer Psychologie_, _18_, 177-217.

Note: Mecklenburg shows journal as "_Z. fuer Psych. und Physiol_. ..."

Abraham, Otto, and Schaefer, Karl L. 1898. Ueber die maximale Geschwindigkeit von Tonfolgen. _Zeitschrift fuer Psychologie_, _18_, 408-416.

Abraham, Otto and Schaefer, Karl L. 1900/1904. Studien ueber Unterbrechungstoene. _Archiv fuer die gesammte Physiologie_, _n/v_, no pp.

Alberti, Fr. 1890. _Schwindel als Symptom von Ohrkrankheiten_. Halle: no publisher given.

Alberts, ? 1897. Der Gehoersinn. _Naturw. Wochensch._, _XII_, 139-140.

Angell, Frank. 1891. Untersuchungen ueber die Schaetzung von Schallintensitaeten. _Philosophischen Studien_, _VII_, 414-468.

Appunn, Anton. 1898. Schwingungszahlenbestimmungen bei sehr hohen toenen. _Annalen der Physik_, _LXIV_, 409.

Appunn, Anton. 1899. Warum koennen differenztoene nicht mit sicherheit zur Bestimmung hoher Schwingungszahlen angewendet werden? _Annalen der Physik_, _LXVII_, 222.

Appunn, G. 1868. Ueber die Helmholtz'sche Lehre von den Tonempfindungen als Grundlaege fuer die Theorie der Musik, nebst Beschreibung einiger, zum Theil ganz neuer Apparate, welche zur Erlaeuterung und zum Beweis dieser Theorie geeignet sind. _Bericht der Wetterauischen gesammte Gesellschaft den Naturkunde Hanau ueber Zeitabschnitt von 14. October 1863 bis 31. December 1867_, Hanau, 73-90.

Arnheim, F. 1887. Beitraege zur Theorie der Localisation von Schallempfindungen mittelst der Bogengaenge. No city or publisher given.

Baginsky, B. 1881. Die Schwindelerscheinungen nach Ohrverlitzung. Sitzbericht von der Akademie von Wissenschaft, Berlin, 42-7.

Baginsky, B. 1883. Function der Gehoerschnecke. Virchow's Archiv, XCIV, no pp.

Baginsky, B. 1883. Zur Physiologie der Gehoerschnecke. Sitzbericht von der Akademie von Wissenschaft, Berlin, 683-9.

Baginsky, B. 1891. Hoersphaere und Ohrenbewegungen. Archiv fuer Anatomie und Physiologie, 1891.

Barth, A. no date. Beitraege zur Anatomie des Ohres. Zeitschrift fuer Ohrenheilkunde, XVII, no pp.

Barth, A. 1889. Ueber die Darstellung des haeutigen Labyrinthes. Arch. f. Anat. u. Physiol., Physiol. Abth., n/v, no pp.

Bartholomaei. 1877. Anfang des Tastens, Sehens und Hoerens des Kindes. Jahrbuch d. Vereins fuer wissenschaftlich Paedagogie, IV, no pp.

Bauer, K.L. 1878. Die Summationstoene als Differenz- und als Stosstoene aus den Obertoenen der Primaertoene. Annelen der Physik., IV, 516.

Bechterew, W. von. 1885. Ueber die innere Abtheilung des Strickkoerpers und den achten Hirnnerven. Neurol. Centralbl., IV, 1885.

Beckmann, ? 1898. Zur Theorie des Hoerens. Verh. a. Deutsch. Otol. Gesell., V, (Vers. in Wuerzb.), 27-28. Mai 1898.

Bernstein, J. 1871. Untersuchengen ueber den Erregungsvorgang im Nerven- und Muskelsysteme. Carl Winter's Universitaetsbuchhandlung, Heidelberg.

"Bernstein [1871] published a monograph entirely devoted to the (over-all) responses of nerves and muscles to electric stimuli. Applying an ingenious technique, he discovered that electric stimulation initiates a negative nerve impulse with a duration of 0.6 - 0.7 msec. In view of this short duration, he suggested that the nerve is able to produce synchronous impulses up to a stimulation frequency of about 1600 pps. Although Bernstein assumed that also in the auditory nerve synchronism is preserved for frequencies up to 1600 Hz, he did not consider the possibility that pitch might be related to the rate of nerve impulses, but adopted Helmholtz's concept of the specific energies as the basis of pitch." -- Plomp, 1967: Pitch, timbre, and hearing theory ... (Bernstein was Helmholtz's assistant and successor as professor of physiology at Heidelberg). -- Ibid.

Bezold, Fr. 1884-5. Schuluntersuchungen ueber das kindliche Gehoerorgan. Zeitschrift fuer Ohrenheilkunde, XIX, no pp.

Note: entry is from Rand (1905), who cites volume as XIX, XV. Second volume number given by Rand is doubtful.

Bezold, Fr. 1896. Ueber den gegenwaertigen Stand der Hoerprueferungen. Zeitschrift fuer Ohrenheilkunde, XXIX, 1-27. English translation: Archive of Otol., XXV (1896), 274-284.

Bezold, Fr. 1896-7. Demonstration einer kontinuierlichen Tonreihe. Zeitschrift fuer Psychologie, XIII, 161-174.

Bezold, Fr. 1896-1900. Das Hoervermoegen der Taubstummen. Wiesbaden: (1896), 156 pp. Zeitschrift fuer Psychologie, n/v (1900), 78.

Bezold, Fr. 1897. Ueber die funktionelle Pruefung des menschlichen Gehoerorgans. Wiesbaeden: no publisher given. 2 vols. Vol. 1: 240 pp.; Vol. 2: 175 pp.

Bindseil, H.E. 1839. Akustik. Verlag der Horvath'schen Buchhandlung, Potsdam.

Held that the timbre of a given tone originates from its harmonics. --Plomp, 1971: Timbre as a multidimensional attribute...

Blaserna, P. 1876. Die Theorie des Schalls in Beziehung zur Musik. Leipzig: no publisher given.

Bloch, E. 1893. Das Binaurale Hoeren. Zeitschrift fuer Ohrenheilkunde, 24, 25-85.

Boehmer, H. 1863. Die Sinneswahrnehmung. Leipzig: no publisher given.

Boettcher, O. 1886. Rueckblicke auf die neueren Untersuchungen und den Bau der Schnecke, im Anschluss an eigene Beobachtungen. Archiv fuer Ohrenheilkunde, XXXIV, no pp.

Breuer, J. 1891. Ueber die Function der Otolithen-Apparate. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 48, 195-302.

Breuer, Joseph. 1874. Die Function der Bogengaenge des Ohrlabyrinthes. Medicinische Jahrbuch (Wien), 1874. no pp.

Broman, J. 1899. Die Entwicklungsgeschichte der Gehoerknoechelchen beim Menschen. Wiesbaeden: no publisher given. 164 pp.

Brueckmann, ? 1811. Ueber eine merkwuerdige Nervenkrankheit, durch Musik geheit. Archiv fuer medizinische Erfahrungen, I, 8ff.

Brueckner, C. 1888. Function des Labyrinthes. Virchow's Archiv, CXIV, no pp.

Bruehl, G. 1898. Das menschliche Gehoerorgan in acht topographischen Bildern, mit erlaeuterndem Texte. Munich: no publisher given. 11 pp.

Bruhns, C. 1857. Ueber das deutlich Hoeren. Dissertation: Goettingen, 1857.

Chladni, Ernst Florens Friedrich. 1802. Die Akustik, I. Leipzig: B. and H. xxxii, 304 pp.

"Chladni was the great acoustician who discovered how to make sound pictures in dust on vibrating plates; Napolean paid to have the above treatise translated into French." --Boring, 1942: 348.

Chladni, Ernst Florens Friedrich. 1821. E.F.F. Chladni's Beitraege zur praktischen Akustik und zur Lehre von Instrument-bau, enhaltend die Theorie und Anleitung zum Bau des Clavicylinders und damit verwandter Instrumente. Leipzig: B. and H.

Chladni, Ernst Florens Friederich. 1824. Ueber die Hervorbringung der menschlichen Sprachlaute. Ann. Phys., 76, 187-216.

Chladni, Ernst Florens Friedrich. 1830. Neue, unveraenderte Ausgabe [of Die Akustik, I]. Leipzig: B. and H. xxxvi, 242 pp.

Czermak, Joh. 1873. Ueber das Ohr und das Hoeren. Berlin: no publisher given.

Daae, H. 1894. Ueber Doppelhoeren. Zeitschrift fuer Ohrenheilkunde, XXV, 251-268. English translation by A.B. Kibbe: Arch. of Otol., XXIII (1894), 283-290.

Dennert, H. 1887. Akustich-physiologische Untersuchungen. Archiv fuer Ohrenheilkunde, 24, 171-184.

"Although the main stream of experiments since Helmholtz were carried out with simple tones, there have been a few investigations on pitch perception in which complex tones were involved (Koenig, 1876; Dennert, 1887; Hermann, 1890, 1912; Zwaardemaker, 1900). These investigators considered their experimental results as to be at variance with the concept that pitch is determined by the frequency of the fundamental and concluded that the pitch of complex tones is correlated with the periodicity of the stimulus. Owing to the poor control of experimental conditions at that time, others (Pipping, 1895; Everett, 1896; Schaeffer, 1899...) succeeded in their attempt to argue away this conclusion and the frequency-pitch concept maintained its position." --Plomp (1967) Pitch, timbre ... Please note entry conflict: Small (1971) shows title as akustische-physiologische Untersuchungen mit Demonstration.

Donders, F.C. 1864. Zur Klangfarbe der Vocale. Ann. Phys. Chem., 123, 527-528.

"The finding that the differences between vowels are based on specific peaks in the amplitude pattern raised the interesting question of whether, for the same vowel, the frequencies of these peaks do or do not shift in accordance with the frequency of the fundamental. Most investigators (... Donders, 1864) promoted the view that the formant frequencies are approximately constant." --Plomp (1971) Timbre ...

Dove, H.W. 1839. Repertorium der Physik. Berlin: Verlag Veit und Comp.

Volume 3: "The use of dichotic experiments to differentiate between peripheral and central effects is not new ... Dove [1839] used dichotically presented partials to prove that Tartini tones (combination tones arising from monaural distortion) are not subjective but objective. He failed to hear a difference tone when two successive partials were presented to different ears through rubber tubes. Similar experiments were performed later by Thompson [1877, 1878, 1881]. Although both investigators noticed the absence of a distortion tone in the dichotic case, they did not notice, or at least did not report, any musical pitch sensation corresponding to the missing fundamental." --Houtsma/Goldstein (1971)

Dreher, Eugen. 1889. Die Physiologie der Tonkunst.-Halle: Salle.

Dreher, Eugen. 1894. Grundzuege der Aesthetik der musikalischen Harmonie auf psycho-physiologischer Grundlage. Bielefeld: Helmich. 26 pp. Also: Sammlung paedagogischer Vortraege, VII, 1.

Drobisch, M.W. 1852. Ueber musikalische Tonbestimmung und Temperatur. Abhandlung der Mathematisch-Physikalischen Klasse der Kg. Saechsischen Gesellschaft der Wissenschaften, II (1852-55), 1.

Drobisch, M.W. 1855. Nachtraege zur Theorie der musikalischen Verhaeltnisse. Abhandlung der Mathematisch-Physikalischen Klasse der Kg. Saechsischen Gesellschaft der Wissenschaften 1855.

Drobisch, M.W. 1877. Ueber reine Stimmung und Temperatur der Toene. Abhandlung der Mathematisch-Physikalischen Klasse der Kgl. Saechsischen Gesellschaft der Wissenschafted 1877.

Dutczynski, A.L. 1894. Beurteilung und Begriffsbildung der Zeit-Intervalle in Sprache, Vers und Musik. Psychophilosophische Studie. Leipzig: no publisher given.

Eichbaum, Dr. ?. 1888. Ueber subjective Gehoerswahrnehmungen und deren Behandlung. Berlin and Neuwied: no publisher given. 32 pp.

Engel, Gustav. 1867. Die wissenschaftliche Begruendung der musikalischen Intervalle. Der Gedanke, VII, no pp.

Engel, Gustav. 1886. Ueber den Begriff der Klangfarbe. Halle: a.S.C.E.M. Pfeffer.

(Philosophische Gesellschaft zu Berlin. Philosophische Vortraege. N.F. Heft 12, pp. 313-355). [Plomp, 1971: "Neue Folge, ii. Ser., Heft 12, 311-355"]. [Mecklenburg entry 780: "Philosophische Vortraege, herausgegeben von der Philosophischen Gesellschaft zu Berlin. Halle (1887): Steffer, 48 pp."]. "Including simple tones in his classification of the timbres of tones ..., von Helmholtz recognized implicitly that also tones without harmonics are characterized by a typical frequency-dependent timbre. The fact that low tones sound dull and high tones bright is nowadays completely neglected as an indication that, in addition to pitch and loudness, timbre is also an attribute of simple tones. Von Helmholtz did not emphasize this point, but it was advocated explicitly by Engel (1886) and Stumpf (1890) [Tonpsychologie] as a necessary implication of the fact that timbre is an attribute of complex tones. --Plomp (1970): Timbre ...

Engel, Gustav. 1891. Ueber Vergleichungen von Tondistanzen. Zeitschrift fuer Psychologie, 2, 361-378.

Engel, Gustav. 1892. Die Bedeutung der Zahlenverhaltnisse fuer die Tonempfindung. Dresden: no publisher given. 59 pp.

Eschweiler, ?. 1899. Zur Vergleichenden Anatomie der Muskeln und der Topographie des Mittelohres verschiedener Saeugetier. Arch. f. mikr. Anat., LIII, 558-622.

Ewald, J.R. 1894-9. Zur Physiologie des Labrynths. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LIX (1894), 258-275; LXIII (1896), 521-541; LXXVI (1899), 147-188; XCIII (1903).

VI. Mittheilung: Eine neue Hoertheorie. LXXVI, 147-188. (In: Tonndorf (1971), Cochlear mechanics ...; also cited by von Bekesy (1971), Cochlear model ... "Ewald (1899) ... employed a simple mechanical model of the cochlea. When properly stimulated, this model produces a wave pattern along its elastic basilar membrane. This pattern is characteristic for each frequency, but there is no systematic relation between frequency and place in this 'sound pattern theory.'" --Tonndorf (1971), 206-7.

Exner, S. 1876. Zur Lehre von den Gehoersempfindungen. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, XIII, no pp.

Fechner, Gustav Theodor. 1884. Ueber die Frage des Weber'schen Gesetzes und Periodicitaetsgesetzes im Gebiete des Zeitsinnes. Leipzig: S. Hirzel. iii, 108 pp.

Freund, C.S. 1895. Labyrinthtaubheit und Sprachtaubheit. Wiesbaeden: no publisher given. 115 pp.

Friedmann, H. 1901. Ueber kuenstliche Reizung des Ohrlabyrinths. Dissertation: Strassborg. 58 pp.

Genzmer, A. 1873. Die Sinneswahrnehmungen der neugehorenen Menschen. Halle: no publisher given.

Goltz, Fr. 1870. Die physiologische Bedeutung der Bogengaenge des Ohrlabyrinthes. _Archiv fuer der gesammte Physiologie der Menschen und der Thiere_, _III_ (1870), no pp.

Gowers, W.R. 1897. Ueber subjective Gehoersempfindungen. _Wien. med. Bl._, _XX_, 161, 177, 193, 211, 232.

Helmholtz, H.L.F. von. 1852. _Ueber die Natur der menschlichen Sinnesempfindungen_, _Habilitation_. [Professorial Inaugural] Lecture, Koenigsberger naturwissenschaftlichen Unterhaltungen, vol. _3_, 1-20.

Reprinted in: _Wissenschaftliche Abhandlungen von Hermann Helmholtz_, vol. _2_. Leipzig: J.A. Barth, 1883, 591-609.

Helmholtz, H.L.F. von. 1856. Ueber die Combinationstoene. _Monatsberichte der Preussischen Akademie der Wissenschaften_, _n/v_, 279.

Additional entry from Mecklenburg: "1856. Ueber Combinationstoen oder Tartinischen Toene. _Niederrheinische Sitzungsberichte_, Mai 1856." Additional entry from Plomp (1971): "1856. Ueber Combinationstoene. _Ann. Phys. Chem._, _99_ [_Annelen der Physik_, _XCIX_], 497-540.

Helmholtz, H.L.F. von. 1868. Mechanik der Gehoerknoechelchen und des Trommelfells. _Archiv fuer der gesammte Physiologie der Menschen und der Thiere_, _I_, no pp.

Helmholtz, H.L.F. von. 1866. Ueber den Muskelton. _Verhandl. Naturhist. -Medicin. Vereins Heidelberg_, _4_, 88-90.

"In 1866, Helmholtz announced in a lecture that stimulating muscles via their nerves with periodic electric pulses gives rise to synchronous mechanical vibrations of the muscle (Helmholtz, 1868). Up to about 240 pps, these vibrations manifested themselves by a clear tone ..." --Plomp (1967): _Pitch, timbre and hearing theory_.

Helmholtz, H.L.F. von. [1878]. _Das Denken in der Medicin_. 2 Aufl. No city or publisher given.

Helmholtz, H.L.F. von. 1879. Handbuch der Physiologie. Bd. III, Thl. I, Leipzig: no publisher given.

Hennig, Richard. 1897. Die Charakteristik der Tonarten: historische-kritische, und statistische Untersucht vom psycho-physiologischen und musikalischen standpunkt aus. Berlin: F. Duemmler. vi, 131 pp.

Contrast the following entry from Mecklenburg: "Hennig, Karl. 1897. Die Charakteristik der Tonarten. Historisch, kritisch, und statistisch untersucht vom psychologisch-physiologischen und musikalischen Standpunkt aus. Berlin: Duemmler. vi, 132pp.

Hering, M.E. 1875. Ueber Fechner's psychophysisches Gesetz. Vienna: no publisher given. 22 pp.

Hermann, L. 1890. Phonophotographische Untersuchungen, III. Archiv fuer der gesammte Physiologie der Menschen und der Theire, 47, 347-391.

Cf. annotation to Dennert (1887) entry.

Hermann, L. 1896. Zur Frage betreffend den Einfluss der Phasen auf die Klangfarbe. Ann. Phys. Chem., 58, 391-401.

Kamm, M. 1899. Giebt es ein Hoeren ohne Labyrinth? Klin. Vortr. a. d. Geb. d. Otol. u. Phar. -Rhinol., III, 91-108.

Kayser, R. 1897. Ueber subjective Gehoersempfindungen. Halle: no publisher given. 46 pp.

Luft, Eduard. 1888. Ueber die Unterscheidungsempfindlichkeit fuer Tonhoehen. Philosophischen Studien, IV, 511-540. Also, Dissertation: Leipzig, 1888.

Mach, Ernst. 1863. Zur Theorie des Gehoerorgans. Sitzber. Akad. Wiss. Wien. math. -naturw. Cl., XLVIII (2), 283-300.

Mecklenburg (entry 1928) gives: "...Prag/Jena, 1872."

Mach, Ernst. 1865. Ueber den Zeitsinn des Ohres. Sitzber. Akad. Wiss. Wien, math. -naturw. Cl., LI (2), 133-150.

Mach, Ernst. 1866. Einleitung in die helmholtz'sche Musiktheorie. Graz: no publisher given.

Mach, Ernst. 1885. Zur Analyse der Tonempfindungen. Sitzungsbericht der Akademie von Wissenschaft Wiener, 92, 1283-1289.

Mach, Ernst. 1896. Analyse der Empfindungen. Jena: no publisher given. 121 pp.

Cf. Mach 1897 entry, this section.

Mader, L. 1900. Mikrophonische Studien am schallleitenden Apparate des menschlichen Gehoerorganes. Sitzber. Akad. Wiss. Wien, math. -naturw. Cl., CIX, 37-78.

Matte, F. 1894. Experimenteller Beitrag zur Physiologie des Ohrlabyrinths. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LVII, 437-474.

Melati, G. 1901. Ueber binaurales Hoeren. Philosophischen Studien, XVII, 431-461.

Cf. Psychology Review, IX, 85-88.

Melde, F. 1895. Ueber 'resultirende' Toene, sowie einige hierbei gemachte Erfahrungen. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LX, 623-641.

Merkel, Julius. 1887. Das psychophysische Grundgesetz in Bezug auf Schallstaerken. Philosophischen Studien, IV, 117-160, 251-291.

Meyer, Max F. 1896. Ueber Combinationstoene und einige hierzu in Beziehung stehende akustische Erscheinungen. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XI, 177-229. Dissertation, 1896: Berlin. Hamburg/Leipzig (1896): Voss.

Meyer, Max F. 1896-7. Ueber die Rauhigkeit tiefer Toene. Zeitschrift fuer Psychologie, 13, 75-80.

Note: Rand entry (above) conflicts with Chandler and Barnhart entry: "1897. Ueber die Rauhigkeit tiefster Toene."

Meyer, Max F., and Stumpf, Carl. 1897. Schwingungszahlbestimmungen bei sehr hohen Toenen. Ann. d. Physik, 61, 760-779.

Meyer, Max F. 1898. Ueber die Intensitaet der Einzeltoene zusammengesetzter Klaenge. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVII, 1-14.

Meyer, Max F. 1898. Ueber Unterschiedsempfindlichkeit fuer Tonhoehen nebst ueber einige Bemerkungen ueber die Methode der Minimalveraenderungen. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, 16, 352-372.

Note: Mecklenburg entry conflicts: "Ueber die Unterscheidsempfindlichkeit fuer Tonhoehen. Beitraege zur Akustik und Musikwissenschaft, herausgegeben von Carl Stumpf, II, 66ff."

Meyer, Max F. 1898. Zur Theorie der Differenztoene und der Gehoersempfindungen ueberhaupt. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVI, 1-34, XVII, 8-14.

New York Public Library Music Index entry for this work shows publication date as 1897. Ward (1971) also shows: "[1898] ... Beitr. Akust. Musikwiss., 2, 25-65."

Meyer, Max F. 1899. Ueber Beurtheilung zusammengesetzter Klaenge. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XX, 13-33.

See: annotation to Meyer (1898) "Nachtrag ..." entry.

Meyer, Max F. 1899. Ueber die Funktion das Gehoerorgans. Verhandlungen d. Physikal. Ges. zu. Berlin, 17 (5), 49-55.

Meyer, Max F. 1899. Zur Theorie des Hoerens. Pflueger's Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 78, 346-362.

Meyer, Max F. 1900. E. ter Kuile's Theorie des Hoerens. Pflueger's Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 81, 61-75.

Meyer, Max F. 1900. Neue Erklaerung der subjectiven Combinationstoene. Pflueger's Archive fuer der gesammte Physiologie der Menschen und der Thiere, LXXXI, 49-60.

Meyer, Max F. 1900. Zu Schaefers Neuer Erklaerung der Combinationstoene. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LXXXI, 49ff.

Michalis, Alfred. 1895. Vermischte Aufsaetze ueber Musik belehrenden, unterhaltenden und biographischen inhalts, nebst Grundlagen zu einer musikalischen Physiologie. Leipzig: R. Kuehn. iii, 142 pp.

Mecklenburg says "Michaelis", shows publisher as "Verlags-Institut. (142 pp)."

Michalski, L. 1876. Bedeutung der halbzirkelfoermigen Kaenals des Ohrlabyrinths. Greifsw.: no publisher given.

Moos, ?. 1867. Ueber das subjektive Hoeren wirklicher musikalischer Toene. Archiv fuer pathologische Anatomie, XXXIX, 289ff.

Moos, ?. 1871. Pathologische Beobachtungen ueber die physiologische Bedeutung der Hoerheren musikalischen Toene. Archiv fuer Ohren- und Augenheilkunde, II (1871-2), 139ff.

Moos, ?. 1874. Ueber das combinierte Vorkommen mangelhafter Perception gewisser Konsonanten sowie hoher musikalischer Toene und deren physiologische Bedeutung. Archiv fuer Ohren- und Augenheilkunde, IV, 165ff.

Mosche, E. 1898. Zur Methode der richtegen und falschen Faelle im Gebiete der Schallempfindungen. Philosophischen Studien, XIV, 491-549.

See also: Lorenz, G., 1885.

Mueller, F.A. 1882. Das Axiom der Psychophysik und die Bedeutung der Weber'schen Versuche. Marburg: no publisher given. 158 pp.

Mueller, Georg Elias. 1878. Zur Grundlegung der Psychophysik. Berlin: T. Grieben. xvi, 424 pp.

Mueller, Georg Elias. 1882. Revision der Hauptpunkte der Psychophysik. No city or publisher given.

Mueller, J. 1892. Die Untersuchungen der akustischen Funktionen des Ohres. Int. Centralbl. f. Ohrenheilkunde, II, 1-26.

Contains bibliographic material.

Mueller, Johannes. 1826. Zur vergleichenden Physiologie des Gesichtssinnes. No city or publisher given.

Mueller, Johannes. 1838. Handbuch der Physiologie des Menschen. Eng. trans.: Textbook of physiology, 1842.

Plomp (1967) gives: "Verlag J. Hoelscher, Coblenz, Vol. 2, 1840." "[The hypothesis that a specific pitch corresponds to each of the numerous nerve fibres in such a way that pitch increases gradually from the basal to the apical end of the organ of Corti] ... can be considered as an extension of Mueller's (1840) doctrine of 'specific energies' of the different senses, which states that stimulating a fibre of the optical nerve always results in a visual sensation, stimulating a fibre of the acoustical nerve in an auditory sensation, etc." --Plomp (1967).

Muensterberg, Hugo. 1889. [Auditory localization as a function of the semi-circular canals]. Beitraege zur experimentellen Psychologie, 2, 182-234.

Bracketed title by this compiler.

Munk, Hermann. 1868. Untersuchungen ueber das Wesen der Nerven-Erregung. No city or publisher given.

Munk, Hermann. 1889. Ueber die centralen Organe fuer das Sehen und das Hoeren bei den Wirbelthieren. Sitzbericht d. k. preuss. Akad. d. Wiss. zu Berlin, XXXI (20 Juni, 1889), 615-634.

Mygind, H. 1894. Taubstummheit. Berlin and Leipzig: no publisher given. 285 pp.

Natanson, ?. 1844. [Expansion of Johannes Mueller's principle of specific nerve energies]. Arch. physiol. Heilk., 3, 515-535.

Bracketed title by this compiler; see Boring (1942, pp. 403-4).

Oesch, Alb. 1898. Was koennen wir ohne Schnecke hoeren? Basel: no publisher given. 66 pp.

Ohm, G.S. 1839. Bemerkungen ueber Combinationstoene und Stoesse. Ann. Phys. Chem., 47, 463-466.

"Ohm (1839) published a general formula for the rate of ... beats: two tones of M and N Hz, respectively, with M:N only slightly different from m:n (m and n both small integers), give rise to [mN - nM] beats per sec. The most promoted explanations of these beats were in terms of combination tones ... De Morgan (1864) proved that Ohm's formula agrees with the rate of waveform variations of the superimposed sinusoids, suggesting that the beats may be due to phase sensitivity of the ear." --Plomp (1971): Timbre...

Ohm, G.S. 1843. Ueber die Definition des Tones, nebst daran geknuepfter Theorie der Sirene und aenlicher tonbildener Vorrichtungen. Ann. Phys. Chem., 135, 497-565.

See Seebeck (1841) entry, this section, for relevant annotation. Conflicting entries: Plomp (1970, 1971) gives volume and pages as "59, 513-565." Tonndorf (1971) and Houtsma/Goldstein (1971) concur with Plomp.

Ohm, G.S. 1844. Noch ein Paar Worte ueber die Definition des Tones. Ann. Phys. Chem., 62, 1-18.

Pfaundler, L. 1878. Ueber die geringste absolute Anzahl von Schallimpulsen, welche zur Hervorbringung eines Tones noetig ist. Sitzbericht Akad. Wiss. Wien, math. -naturw. Cl., LXXVI, 561-572.

Pipping, H. 1895. Zur Lehre von den Vocalklaengen. Z. Biol., 13, 524-583.

See annotation to the Dennert (1887) entry, this section.

Politzer, A. 1876. Studien ueber die Paracussis loci. Archiv fuer Ohrenheilkunde, XI, 231-236.

Preyer, Wilhelm. 1876. Ueber die grenzen der Tonwahrnehmung. Jena: H. Dufft. vi, 72 pp.

Note: In the Library of Congress index, Preyer is entered as "Preyer, William," and is cross-referenced from "Preyer, Thierry William." See especially: "Die Empfindlichkeit des Intervallensinnes," page 24, and "Die Empfindlichkeit fuer Tonhoehen,", p. 24.

Preyer, Wilhelm. 1887. Die Wahrnehmung der Schallrichtung mittelst der Bogengaenge. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 40, 588-616.

Preyer, Wilhelm. 1889. Ueber Combinationstoene. Annalen der Physik, XXXVIII, 131ff.

Preyer, Wilhelm. 1891. Ueber den Ursprung des Zahlbegriffes aus dem Tonsinn und ueber das Wesen der Primzahlen. Beitraege zur Psychologie und Physiologie des Sinnesorgane, n/v, 1ff.

Ranke, Otto. no date given. Die Gleichrichter-Resonanztheorie. Ein Erweiterung der Helmholtz'chen Resonanztheorie des Gehoers durch physikalische Untersuchung der Fluessigkeitsschwingungen in der Cochlea. Munich o.J.: Lehmann. 90 pp.

Reichert, C.B. 1871. Gehoerschnecke beim Menschen und den Saeugetieren. Archiv fuer Anatomie und Physiologie, n/v, no pp.

Riemann, Ludwig. 1896. _Populaere Darstellung der Akustik in Bezeihung zur Musik_. Braunschw.: no publisher given. 157 pp.

Roeber, A. 1834. Untersuchungen des Hrn. Scheibler in Crefeld ueber die sogenannten Schlaege, Schwegungen oder Stoesse. _Ann. Phys. Chem._, _32_, 333-362, 492-520.

"...so-called 'beats of mis-tuned consonances were investigated for the first time by Scheibler (Roeber, 1834) ... discovered that three simultaneous simple tones of (n-1)p, np, and (n+1)p Hz(n=integer), with one tone slightly mistuned, give rise to a beat sensation." --Plomp (1971)

Rostosky, P. 1899. _Ueber functionelle Beziehungen beider Gehoerorgane_. Leipzig: Dissertation. 167 pp.

Rudinger, N. 1888. Zur Anatomie und Entwickelung des inneren Ohres. _Monatssch. f. Ohrenheilkunde_, _XXII_, no pp.

Ruths, Christoph. 1897. _Experimental-Untersuchungen ueber Musikphantome und ein daraus erschlossenes Grundgesetz der Entstehung der Wiedergabe, und der Aufnahme von Tonwerken_. (_I_: Induktive Untersuchungen ueber die Fundamentalgesetze der psychischen Phaenomene usw.). Darmstadt 1897 (oder 1898): Schlapp. xx, 456 pp.

Rand (1905) gives: "1898. _Induktive Untersuchungen ueber die Fundamentalgesetze der psychischen Phaenomene_. Darmstadt: H.L. Schlapp. 455 pp."

Sala, L. [1894]. Ueber den Ursprung des Nervus acusticus. _Arch. f. mikr. Anat._, _XLIII_, no pp.

Note: Rand (1905) gives incomplete entry. Date given above was added through comparison with the Eschweiler entry (this section).

Schaefer, Karl L. 1891. Ein Versuch ueber die intrakranielle Leitung leisester Toene von Ohr zu Ohr. _Zeitschrift fuer Psychologie_, _II_, 111-142.

Schaefer, Karl L. 1892-3. Ist eine cerebrale Entstehung von Schwebungen moeglich? Philosophischen Studien, IV (1892), 348-350; V (1893), 397-411.

Schaefer, Karl L. 1895. Beweise gegen Wundt's Theorie von der Interferenz akustischer Erregugen im Centralorgan. [Concerning Wundt's theory of acoustically-stimulated interference in the inner ear]. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LXI, 544-550.

Schaefer, Karl L. 1899. Die Bestimmung der unteren Hoergrenze. Zeitschrift fuer Psychologie, XXI, 161-173.

Schaefer, Karl L. 1899. Eine neue Eklaerung der subjectiven Combinationstoene auf Grund der Helmholtz'schen Resonanzhypothese. Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 78, 505-526.

See annotation to Dennert, H. (1887) entry, this section. New York Public Library Music Index entry for this article gives journal and volume as: "Arch. f. d. ges. Physiol., LXXXI, 505-525. Cf. Ibid., LXXXI, 49-60." Mecklenburg confirms the Chandler and Barnhart entry (above).

Schischmanow, I. 1889. Untersuchungen ueber die Empfindlichkeit des Intervallsinnes. Philosophischen Studien, V, 558-600.

Mecklenburg gives: "Schichmanow, Iwan."

Schleiden, ?. 1857. Die Natur der Toene und die Toene der Natur. No city or publisher given.

Schubring, Gustav. 1867. Die philosophische und die physikalische Theorie der Musik. Zeitschrift fuer die gesammte Naturwissenschaft, XXX, 185.

Schumann, F. 1890. Ueber das Gedaechtniss fuer Komplexe gleicher Schalleindruecke. Zeitschrift fuer Psychologie, I, 75-80.

Schwalbe, G. 1887. Lehrbuch der Anatomie der Sinnesorgane. Erl., 1887. No city or publisher given.

Seebeck, A. 1841. Beobachtungen ueber einige Bedingungen der Entstehung von Toenen. _Ann_. _Phys_. _Chem_., _53_, 417-436.

"G.S. Ohm postulated in 1843 that the ear performs a Fourier analysis upon the incoming signal -- a logical assumption since a listener is able to discern the various partials of a complex tone. Helmholtz in 1863, endorsed Ohm's 'acoustic law' and at the same time suggested a _mode_ by which the cochlea might execute the required analysis ... There was, of course, some criticism of [Ohm's] hypothesis. Seebeck (1841), a contemporary of Ohm's, studied the perception of complex tones produced by a siren. He felt that some of his results were incompatible with the assumption of a Fourier analysis, but rather indicated a _waveform_ or _time_ _analysis_. It is a curious fact that Ohm (1843), who apparently did not conduct acoustic experiments of his own, cited Seebeck's findings in support of his own thesis. Seebeck (1843), in turn wrote a rebuttal, but it found little attention in his own time. Apparently, the Fourier principle with its clear-cut mathematical formulation was too powerful to be put aside. In recent times, [several investigators] have taken up Seebeck's experiments again, confirmed his results, and expanded upon his concepts." --Tonndorf (1971).

Seebeck, A. 1843. Ueber die Sirene. _Ann_. _Phys_. _Chem_., _60_ (ser. 2), 449-481.

See annotation to Seebeck (1841) entry, this section.

Seebeck, A. 1844. Ueber die Definition des Tones. _Ann_. _Phys_. _Chem_., _63_, 353-368.

Seebeck, A. 1844. Ueber die Erzeugung von Toene durch getrennte Eindrucke, mit Beziehung auf die Definition des Tones. _Ann_. _Phys_. _Chem_., _63_, 368-380.

Seebeck, A. 1849. _Akustik_. _In_: _Repertorium_ _der_ _Physik_, _8_ (Berlin: Verlag von Veit und Comp.).

Corroborates Willis' (1830) premise that timbre originates from the harmonics of a complex tone. --Plomp (1971).

Seebeck, J.T. 1846. Beitraege zur Physiologie des Gehoer- und Gesichtesinnes. _Poggendorf's Annelen._, _68_, no pp.

Seidl, Arthur. 1898. (_Besprechung von Ch. Ruths "Experimental- Untersuchungen ueber Musik-Phantome."_) Darmstadt: no publisher given. (_Musikalisches Wochenblatt 1898_), _n/v_, no pp.

Parentheses from Mecklenburg.

Starke, Paul. 1886. Die Messung von Schallstaerken. _Philosophischen Studien_, _III_, 264-304.

Starke, Paul. 1889. Zum Mass der Schallstaerke. _Philosophischen Studien_, _V_, 157-169.

Stern, L. William. 1896-1900. Die Wahrnehmung von Tonveraenderungen. _Zietschrift fuer Psychologie_, _XI_ (1896), 1-30; _XXI_ (1899), 360-387; _XXII_ (1899-1900), 1-12.

Stumpf, Carl. 1873. _Ueber den psychologischen Ursprung der Raumvorstellung_. Leipzig: S. Hirzel. viii, 324 pp.

Stumpf, Carl, ed. 1890. Ueber Vergleichungen von Tondistanzen. _Zeitschrift fuer Psychologie_, _I_, 419-462.

Stumpf, Carl. 1896. Ueber die Ermittlung von Obertoenen. _Wiedemann's Ann._, _LVII_, 600. Also: Leipzig: no publisher given.

Stumpf, Carl. 1898. Zum Einfluss der Klangfarbe auf die Analyse von Zusammenklaengen. _Beitraege zur Akustik und Musikwissenschaft_, _II_, 168.

Stumpf, Carl. 1899. Beobachtungen ueber subjective Toene und ueber Doppelthoeren. _Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane_, _XXI_, 100-121.

Stumpf, Carl. 1901. Ueber das Erkennen von Intervallen und Accorden bei sehr kurzer Dauer. _Zietschrift fuer Psychologie_, _XXVII_, 148-186.

Tarchanow, J. 1878. Das Telephon als Anzeiger der Nerven- und Musclestroeme beim Menschen und den Thieren. St. Petersburger med. Wochenschrift, 3, 353ff.

Tischer, Ernst. 1883. Bemerkungen ueber die messung von Schallstaerken. Philosophischen Studien, I, 543-555.

Ulrici, Hermann. 1863. Physiologische Erklaerung und psychologische Bedeutung der Gehoersempfindungen. Zeitschrift fuer Philos. und phil. Kr., XLIII, 78.

Urbantschitsch, V. 1881. Ueber das An- und Abklingen akustischer Empfindungen. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 25, 323.

Urbantschitsch, V. 1881. Zur Lehre von der Schallempfindung. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 24, 574-595.

Note: Some sources give pageanation as "574-7." Contains bibliographic material.

Urbantschitsch, V. 1888. Ueber den Einfluss einer Sinneserregung auf die uebrigen Sinnesempfindungen. Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 42, 3-4.

"...[Urbantschitsch] investigated the influence of auditory stimuli on the sense impressions, particularly on normally minimal visual stimuli. He found that patches of color observed at a distance at which the color could scarcely be recognized were brought clearly into the sensory field, by sounding a tuning fork. In short, the threshold of color perception is lowered by tonal stimuli. Tuning forks of high pitch, applied to both ears, were most effective. The influence [of sound upon threshold perceptibility of] the different colors is variable. Barely legible print was often read when a tone accompanied the effort. Tastes, odors, and touch are similarly affected by sound, and pain is increased by jarring noises. Finally Urbantschitsch claims to have produced photisms, or phenomena of colored audition, by having the subject observe a grey disk on white paper, or an undulating white surface, and describe the colors perceived while different tuning forks were sounded. The experiments, if valid, indicate that the subjects of audition coloree are merely striking examples of the normal psychological influence of one sense upon the other." --Diserens (1923)

Urbantschitsch, V. 1895. <u>Ueber Hoeruebungen bei Taubstummheit und bei Ertaubung im spaeteren Lebensalter</u>. Wien: no publisher given. 135 pp.

Urbantschitsch, V. 1899. Ueber den Einfluss von Schallenempfindungen auf die Schrift. <u>Pfluegers Arch.</u>, <u>74</u>, 43-46.

Weber, E.H. 1846. <u>Der Tastsinn und das Gemeingefuehl</u>. No city or publisher given.

Weber, E.H. 1848. Ueber die Umstaende durch welche man geleitet wird manche Empfindungen auf auessere Objecte zu beziehen. <u>Ber. saech. Ges. Wiss.</u>, <u>2</u>, 226-237.

Wolf, Oskar. 1899. Die Hoerpruefung mittelst der Sprache. <u>Zeitschrift fuer Ohrenheilkunde</u>, <u>XXXIV</u>, 289-311.

Wundt, Wilhelm. 1856. <u>Beitraege zur Theorie der Sinneswahrnehmung</u>. No city or publisher given.

Wundt, Wilhelm. 1873. <u>Grundzuege der physiologischen Psychologie</u>. 2 vols. Leipzig: no publisher given. 2nd ed., 1880: Verlag W. Engelmann, Leipzig; 2 vols.

"In the second edition of his work "Grundzuege..." (1880), [Wundt] criticized Helmholtz's assumption that place is correlated with pitch. Accepting that the different locations along the basilar membrane are tuned to different frequencies..., Wundt proposed an alternative...: Tones give rise to synchronous nerve impulses whose rate determines pitch." --Plomp (1967)

Wundt, Wilhelm. 1891. Vergleichungen von Tondistanzen. <u>Philosophischen Studien</u>, <u>VI</u>, 605-640.

Wundt, Wilhelm. 1893. Ist der Hoernerv direct durch Tonschwigungen erregbar? <u>Philosophischen Studien</u>, <u>VIII</u>, 641-652.

Wundt, Wilhelm. 1894. Akustische Versuch an einer labyrinthlosen Taube. _Philosophischen Studien_, _IX_, 496-509.

Wundt, Wilhelm. 1895. Zur Frage der Hoerfaehigkeit labyrinthloser Tauben. _Archiv fuer der gesammte Physiologie der Menschen und der Thiere_, _61_, 339-341.

"As arguments in favour of his conception [that tones give rise to synchronous nerve impulses whose rate determines pitch], Wundt considered the phenomenon of binaural beats and the (incorrect) view that the auditory nerve can be stimulated directly by sound (Wundt, 1893, 1895)." --Plomp (1967)

Wundt, Wilhelm. 1902. _Grundzuege der physiologischen Psychologie_. 5. Aufl.: Leipzig, 1902.

Volume _II_, pages 63-138, 370-8 concern music, sound perception.

Ziehen, T. 1891. _Leitfaden der physiologischen Psychologie_. Jena: no publisher given. 176 pp.

Zimmermann, G. 1900. _Die Mechanik des Hoerens und ihre Stoerungen_. Wiesbaeden: no publisher given. 100 pp.

Zwaardemaker, H. 1894. Der Umfang des Gehoers in den verschiedenen Lebensjahren. _Zeitschrift fuer Psychologie_, _VII_, 12-28.

Zwaardemaker, H. 1894. Sprachgehoer und generelles-Tongehoer. _Zeitschrift fuer Ohrenheilkunde_, _XXV_, 232-248. Eng. trans. by A.B. Kibbe: _Arch_. _of Otol_., _XXIII_ (1894), 291-303.

Zwaardemeker, H. 1900. Ueber Intermittenztoene. _Arch_. _Anat_. _Physiol_., _Physiol_. _Abt_., (Suppl. Band), 60-67.

See annotation to the Dennert (1887) entry, this section.

PSYCHOPHYSICS
ITALIAN

Battelli, F. 1896-7. Sul limite inferiore dei suoni percettibili. _Giorn. d. R. Accad. di Med. di Torino, XLIV_ (1896), 478-486.

For french translation: _Arch. Ital. de Biol., XXVII_ (1897), 202-9.

Mantovani, G. 1896. _Psicologia fisiologica_. Milan: no publisher given. 165 pp.

Sergi, G. 1882. _Teoria fisiologica della percezione_. Milano: no publisher given. Cf.: _Rev. Philos., XIV_, 566-574; and in: _Riv. di Filos. Scient., I_, 325-9.

Some conflict among sources concerning Sergi's first initial; Chandler and Barnhart gives "H.", Diserens gives "G."

Tafani, A. 1885. _L'organo dell'udito_. Firenze: no publisher given.

PSYCHOPHYSICS
LATIN

Haller, Albrecht von. 1747 _et seq_. _Prima linae physiologiae_. Eng. trans., 1766 _et seq_. No publisher given.

Haller, Albrecht von. 1752. De partibus corporis humani sensibilibus et irritabilibus. _Comment. Soc. reg. Sci. Gottingensis (Gesellschaft fuer Wissenschaft, Goettingen)_, _II_, 114-158.

Haller, Albrecht von. 1757-66. _Elemente physiologiae corporis humani_. 8 vols. No city or publisher given.

Helmholtz, H.L.F. von. 1842. _De Fabrica Systematis nervosi Evertebratorum_. Inaugural-Dissertation: Berlin.

Reprinted in: _Wissenschaftliche Abhandlungen von Hermann Helmholtz_, vol. _2_. Leipzig: J.A. Barth, 1883, 663-679.

Weber, E.H. 1834. _De Tactu_. No city or publisher given.

PSYCHOPHYSICS
SPANISH

Besteiro, J. 1897. La psicofisica. Madrid: no publisher given. 144 pp.

MUSICAL ELEMENTS AND CONSTRUCTS
DUTCH

No documents found.

MUSICAL ELEMENTS AND CONSTRUCTS
ENGLISH

Abbutt, T.C. 1893-4. Music, rhythm, and muscle. Nature, 49, 340.

Angell, Frank, and Harwood, H. 1899. Experiments on discriminations of clangs for different intervals of time. American Journal of Psychology, XI, 67-69.

Note: Conflicting entries; Rand (above) enters pages as 67-69, Chandler and Barnhart enters pages as 65-69.

Bolton, Thaddeus. 1894. Rhythm. American Journal of Psychology, 6, 145-238.

Howes (1927) Borderland... discusses Bolton's experiments which led to this article; see especially pages 88-100.

Bosanquet, R.H.M. 1881. On the history of the theory of the beats of mistuned consonances. Philosophy Magazine, XII, 270-282.

Bosanquet, R.H.M. 1881. On the beats of consonances of the form h:1. Philosophy Magazine, XI (5th ser.), 420-436, 492-506.

Cross, Charles R., and Goodwin, Harry M. 1893. Some considerations regarding Helmholtz's theory of consonance. Proceedings of the American Academy of Arts and Sciences (New Series), 19, 1-12.

Note: Mecklenburg (entry 580) conflicts, gives: 1891. Some considerations regarding Helmholtz theory of consonance. Proc. of the Amer. Acad. of Arts and Sci. of Boston, XXVII, 130-132.

Donovan, J. 1889. Music and action: Affinity between rhythm and pitch. London: no publisher given. 138 pp.

Everett, J.D. 1896. On resultant tones. Phil. Mag., 41, 199-207.

See annotation: Dennert, H. 1887.

Gardiner, William. 1832. _The music of nature, or an attempt to prove that what is passionate and pleasing in the art of singing, speaking and performing upon musical instruments, is derived from the sounds of the animated world_. London: Longman. Reprint, Boston (1840 or 1841): Ditson.

Gardiner, William. 1847. Melodies from the music of nature. London: Novello.

Gowers, W.R. 1896. The Bradshaw lecture on subjective sensations of sound. _British Medical Journal, II_, 1429-36. Also: _Lancet, II_, 1357-63.

Hannover (Koenig), George von. 1841. _Ideas and reflections on the properties of music_. London: Colburn.

Heffernan, James. 1877-8. On musical beats and their relation to consonance and dissonance. _Proceedings of the Musical Association, XIV_, no pp.

Hullett, J.W.H. 1894. _Mechanical music composer_. (Parts 1, 1a, 2). Adelaide; folio.

Maclean, Charles. 1895. On some causes of the changes of tone-colour proceeding in the most modern orchestra. _Proceedings of the Musical Association, XXI_, 77-102.

MacDougall, E. 1902. The relation of auditory rhythm to nervous discharge. _Psychological Review, IX_, 460-536.

MacDougall, E. 1902. Rhythm time and number. _American Journal of Psychology, XIII_, 88-97.

Mach, Ernst. 1886. _Contributions to the analysis of the sensations_. Jena: no publisher given [Fischer?]. English translation: Chicago, 1895: no publisher given.

"A fuller treatment of the problems of this lecture will be found in my _Contributions to the analysis of the sensations_ (Jena, 1886), English translation, Chicago, 1895. J.P. Soret, _Sur la perception du beau_ (Geneva, 1892) also regards repetition as a principle of aesthetics. His discussions of the aesthetical side of the subject are much more detailed than mine. But with respect to the psychological and physiological foundation of the principle, I am convinced that the Contribution to the analysis of the sensations go deeper. --Mach (1894)" --Ernst Mach, introductory footnote to lecture "On symmetry" from: Popular scientific lectures (1898), 89f.

Mach, Ernst. 1897. Analysis of the sensations. [The analysis of the sensations and the relation of the physical to the psychical]. Eng. trans. of: Die Analyse der Empfindungen und das verhaeltniss des physischen zum psychischen. Eng. trans. Chicago and New York: Open Court Publishing Co., 1902. 120 pp.

Mach, Ernst. 1898. Popular scientific lectures. Eng. trans. by Thomas J. McCormack. "Third edition, revised and enlarged." 59 cuts, diagrams. Chicago: Open Court Publishing Co. [Copyrights: pp. 1-258, 338-374: 1894; pp. 259-281: 1896; 282-308: 1897; 309-337: 1898]. viii, 385 pp.

Pages 32-47 ('On the causes of harmony'): "Now that we have made ourselves acquainted with overtones and beats, we may proceed to the answer of our main question, Why do certain relations of pitch produce pleasant sounds, consonances, others unpleasant sounds, dissonances? It will readily be seen that all the unpleasant effects of simultaneous sound-combinations are the result of beats produced by those combinations (42) ... Only such sounds are consonant as possess in common some portion of their partial tones ... Consonance is the coalescence of sounds without appreciable beats!" (44) Pages 89-106 ('On symmetry'): 99-104 deal explicitly with musical symmetry and its perception. ["Delivered before the German Casino of Prague, in the winter of 1871"]. Appendix I ('A contribution to the history of acoustics'): "This article, which appeared in the Proceedings of the German Mathematical Society of Prague for the year 1892, is printed as a supplement to the article of 'The causes of harmony,' at page 32." Ibid., 375.

Meyer, Max F. 1900. Elements of a psychological theory of melody. Psychology Review, 7, 241-273.

On pages 400-405 of this volume can be found a review of this Meyer article by C.K. Wead.

Morgan, A. de. [1864]. On the beats of imperfect consonances. Cambridge Philosophical Society, X, 129-141.

Plomp (1971) gives journal as "Trans. Cambr. Phil." "...proved that Ohm's formula agrees with the rate of waveform variations of the superimposed sinusoids, suggesting that the beats may be due to phase sensitivity of the ear. The latter opinion was defended by Koenig (1876) but rejected by most investigators. Recent experiments (Plomp 1967) have put forward new evidence ... that these beats ... have indeed their origin in the ear's phase sensitivity." --Plomp (1971): Timbre...

Pease-Cheney, Simeon. 1887-9. Bird music. The Century Magazine, XIII (1887), 845; XIV (1888), 709, 908; XV (1888), 97; XVI (1889), 234.

Pole, W. 1877. On the philosophy of harmony. Proceedings of the Musical Association, IV, 74-83.

Pole examines Helmholtz's Tonempfindungen (1863), mentions later developments such as Appun's set of tonometers.

Riemann, Hugo. 1895. Catechism of Aesthetics. London: Augener. "(Engl. Uebersetzung vor. No)."

Rucker, A.W., and Edser, E. 1895. On the objective reality of combination tones. Philosophy Magazine, 39 (series 5), 341.

Salmon, Thomas. 1705. The theory of music reduced to arithmetical and geometric proportions. Philosophical Transactions, 5, 243-246.

Spottiswoode, William. 1879. On beats and combination tones. Proceedings of the Musical Association, V, 118-130.

Squire, C.R. 1901. A genetic study of rhythm. _American Journal of Psychology_, _XII_, 492-589.

Stone, W.H. 1881. The causes of the rise in orchestral pitch. _Proceedings of the Musical Association_, _7_, 99-116.

Stone attributes the rising tendency of orchestral pitch since the time of Handel to aural discrimination problems such as masking and beat tones, along with a lack of standardization pitch generators.

Strutt, J.W. [Lord Rayleigh]. 1876. On our perception of the direction of a source of sound. _Proceedings of the Musical Association_, _2_, 75-84.

Strutt, J.W. [Lord Rayleigh]. 1878. The mutual influence of two sounds nearly in unison. _Proceedings of the Musical Association_, _V_, 27-33.

Sully, James. 1879. Animal music. _The Cornhill Magazine_, _XL_, 605ff.

Thomson, W. 1878. On beats of imperfect harmonies. _Proceedings of the Royal Society (Edinburgh)_, _9_, 602-612.

"...[Thomson] called attention to the fact that ... beats already occur at very low [sound pressure levels], so that it is very improbable that the phenomenon is due to non-linear distortion in the ear, as was assumed by von Helmholtz (1863) and most other investigators..." --Plomp (1971) Note: Houtsma/Goldstein (1971) shows Thomson only by title: Baron Kelvin.

Wake, C. Staniland. 1896-7. Musical tone and color. _Music_, _XI_, 171-183.

Wallaschek, Richard. 1895. On the difference of time and rhythm in music. _Mind_, _4_, 28-35.

Wallis, John. 1677. On the trembling of consonant strings. _Philosophical Transactions_, _II_, 380-392.

Wilford, ?. 1876. _Evolution of sound_. London: no publisher given.

Rand (1905) enters this work in "Helmholtz; related articles" classification of the subject index.

Young, T. 1800. Outlines of experiments and inquiries respecting sound and light. _Philosophical Transactions of the Royal Society_, _I_ (part 1), 106-150.

"Young (1800) and Koenig (1876), expanding a suggestion made by Smith (1749), proposed that the same envelope changes, when sufficiently slow, are heard as beats will, when sufficiently rapid, be perceived as difference tones... These authors regarded any periodic change in the stimulus as a basis for the perception of a tone. However, the precise nature and the location of the central mechanism responsible for the interpretation of waveform periodicity were never specified..." --Small (1971); the "Smith (1749)" entry cited is: "Smith, R. 1749. _Harmonics, or the philosophy of musical sounds_. Printed by J. Bentham, and sold by W. Thurlbourn, Cambridge."

Zahn, J.A. 1892. _Sound and music_. Chicago: no publisher given. 452 pp.

MUSICAL ELEMENTS AND CONSTRUCTS
FRENCH

Bonnier, P. 1900. La définition du timbre. Compte-Rendu Soc. de Biol., LII, 300-302.

Bonnier, P. 1900. A propos de la théorie de Helmholtz. Compte-Rendu Soc. De Biol., LII, 302-304.

Cornu, August, and F. Mercadier. 1869. Sur les intervalles musicaux. Comptes Rendus de l'Académie Royale des Sciences, n/v, 301-8, 424-7.

Dunan, Ch. 1895. A propos de l'espace sonore. Rev. de Met. et de Mor., III, 704-707.

Ferrand, ?. 1895. Essais physiologiques sur la musique. Bulletin de l'Académie de Médecine de Paris, XXXIV (IIle Serie), 226, 276.

Sauveur, J. 1700. Sur la détermination d'un son fixé. Mémoires de l'Académie Royal des Sciences. Republished: Paris, 1719. 144 pp.

Sauveur, J. 1701. Des intervales des sons, et son application à tous les systèmes et tous les instrumens de musique. Hist. Acad. Sci. Paris, n/v, 299-366.

MUSICAL ELEMENTS AND CONSTRUCTS
GERMAN

Abraham, Otto, and Schaefer, Karl L. 1898. Ueber die maximale Geschwindigkeit von Tonfolgen. Zeitschrift fuer Psychologie, 18, 408-416.

Abraham, Otto and Schaefer, Karl L. 1900/1904. Studien ueber Unterbrechungstoene. Archiv fuer die gesammte Physiologie, n/v, no pp.

Appunn, Anton. 1899. Warum koennen differenztoene nicht mit sicherheit zur Bestimmung hoher Schwingungszahlen angewendet werden? Annalen der Physik, LXVII, 222.

Bailly, Edmond. 1900. Das Toenende Phaenomen in der Natur. No city, no publisher given.

Bauer, K.L. 1878. Die Summationstoene als Differenz- und als Stosstoene aus den Obertoenen der Primaertoene. Annelen der Physik., IV, 516.

Bezold, Fr. 1896-7. Demonstration einer kontinuierlichen Tonreihe. Zeitschrift fuer Psychologie, XIII, 161-174.

Bezold, Fr. 1897. Die Stellung der Konsonanten in der Tonreihe. Zeitschrift fuer Ohrenheilkunde, XXX, 114-121.

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., n/v, 79-106. (Also, Berlin, 1896, no publisher given).

"...presents...notes on the influence of music on the organism. Most of the paper is devoted to the physiological and motor affects of rhythm." --Diserens (1923).

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., 81, 84.

Note: Diserens (1923) gives same journal, but gives volume LXXXC, which must be a typographical error, and gives pages 79-106. "...Most of the paper is devoted to the physiological and motor affects of rhythm, but several observations on tonal affects on man and animals are recorded. The author reports an experiment of his own in which a violent pain appeared in an apparently sound tooth upon hearing a soprano sing a high note (B) at a concert, a quarter tone too high. Examination of the tooth disclosed slight decay. The hyper-irritability of the nerve was thus excited by irradiation of an auditory stimulus. The observation accords with the conclusion of Urbantschitsch [1888: Ueber den Einfluss einer Sinneserregung...] that auditory stimuli lower the sensory threshold. Billroth also mentions seeing a young "great Dane" fall down as if in a faint when a village brass band struck up a (march)." --Diserens (1923)

Billroth, Th. 1894-5. Wer ist Musikalisch? Deutscher Rundschau., LXXI (1894), 79; LXXIV (1895), 385.

Also: Wer ist Musikalisch? Herausgegeben von Eduard Hanslick. Berlin: Stavanger. 2. Auflage 1896, 3. Auflage 1898, 4. Auflage 1912, 5. Auflage Berlin 1946: Paetel. 246 pp. Please note conflict: Max Schoen (1940), p. 235 says 1896, Berlin.

Brandt, S. 1861. Ueber Verschiedenheit des Klangs (Klangfarbe). Ann. Phys. Chem., CXII, 324-336.

Brueckmann, ? 1811. Ueber eine merkwuerdige Nervenkrankheit, durch Musik geheit. Archiv fuer medizinische Erfahrungen, I, 8ff.

Buch, Einar. 1899. Ueber die 'Verschmelzung' von Empfindungen, besonders bei Klangeindruecken. Philosophischen Studien, XV, 1-66, 183-278.

Note: Mecklenburg conflicts with Rand entry (above): Mecklenburg gives year as 1899, vols I, II, and 1900, vol. XV, 1.

Buecher, Karl. 1847. Arbeit und Rhythmus. Leipzig: no publisher given. 412 pp. 6th edition, 1924.

Note: Fortescu cites 1899 edition.

Chladni, Ernst Florens Friedrich. 1787. Entdeckungen ueber die Theorie des Klangs. Leipzig: Bey Weidmanns erbur und Reich. i, 77 pp.

Chladni, Ernst Florens Friedrich. 1800-1801. Ueber die wahre Ursache des Consonirens und Dissonirens. Allgemeine musikalische Zeitung 1800/1801, 337, 353.

Cornelius, H. 1892-3. Ueber Verschmelzung und Analyse. Vierteljahrschrift fuer wissenschaftliche Philosophie, 16, 404-446; 17 (1893), 3-75.

Dennert, H. 1887. Akustich-physiologische Untersuchungen. Archiv fuer Ohrenheilkunde, 24, 171-184.

"Although the main stream of experiments since Helmholtz were carried out with simple tones, there have been a few investigations on pitch perception in which complex tones were involved (Koenig, 1876; Dennert, 1887; Hermann, 1890, 1912; Zwaardemaker, 1900). These investigators considered their experimental results as to be at variance with the concept that pitch is determined by the frequency of the fundamental and concluded that the pitch of complex tones is correlated with the periodicity of the stimulus. Owing to the poor control of experimental conditions at that time, others (Pipping, 1895; Everett, 1896; Schaeffer, 1899...) succeeded in their attempt to argue away this conclusion and the frequency-pitch concept maintained its position." --Plomp (1967) Pitch, timbre ... Please note entry conflict: Small (1971) shows title as akustische-physiologische Untersuchungen mit Demonstration.

Dennert, H. 1896. Zur Wahrnehmung der Geraeusche. Archiv fuer Ohrenheilkunde, XLI, 109.

Donders, F.C. 1864. Zur Klangfarbe der Vocale. Ann. Phys. Chem., 123, 527-528.

"The finding that the differences between vowels are based on specific peaks in the amplitude pattern raised the interesting question of whether, for the same vowel, the frequencies of these peaks do or do not shift in accordance with the frequency of the fundamental. Most investigators (... Donders, 1864) promoted the view that the formant frequencies are approximately constant." --Plomp (1971) Timbre ...

Dove, H.W. 1839. Repertorium der Physik. Berlin: Verlag Veit und Comp.

Volume 3: "The use of dichotic experiments to differentiate between peripheral and central effects is not new ... Dove [1839] used dichotically presented partials to prove that Tartini tones (combination tones arising from monaural distortion) are not subjective but objective. He failed to hear a difference tone when two successive partials were presented to different ears through rubber tubes. Similar experiments were performed later by Thompson [1877, 1878, 1881]. Although both investigators noticed the absence of a distortion tone in the dichotic case, they did not notice, or at least did not report, any musical pitch sensation corresponding to the missing fundamental." --Houtsma/Goldstein (1971)

Drobisch, M.W. 1852. Ueber musikalische Tonbestimmung und Temperatur. Abhandlung der Mathematisch-Physikalischen Klasse der Kg. Saechsischen Gesellschaft der Wissenschaften, II (1852-55), 1.

Drobisch, M.W. 1855. Nachtraege zur Theorie der musikalischen Verhaeltnisse. Abhandlung der Mathematisch-Physikalischen Klasse der Kg. Saechsischen Gesellschaft der Wissenschaften 1855.

Drobisch, M.W. 1877. Ueber reine Stimmung und Temperatur der Toene. Abhandlung der Mathematisch-Physikalischen Klasse der Kgl. Saechsischen Gesellschaft der Wissenschafted 1877.

Ebhart, K. 1898. Zwei Beitraege zur Psychologie des Rhythmus und des Tempo. Zeitschrift fuer Psychologie, 18, 99-154.

Ehrenfels, C. von. 1890. Ueber Gestaltqualitaeten. Vierteljahrschrift fuer wissenschaftlich Philosophie, 14, 249-292.

"...points out that the existence of melodic transposition means that a melody exists independently of the tones which constitute it ... precursor of gestalt psychology of music." --Boring (1942): 16.

Engel, Gustav. 1867. Die wissenschäftliche Begruendung der musikalischen Intervalle. Der Gedanke, VII, no pp.

Engel, Gustav. 1886. Ueber den Begriff der Klangfarbe. Halle: a.S.C.E.M. Pfeffer.

(Philosophische Gesellschaft zu Berlin. Philosophische Vortraege. N.F. Heft 12, pp. 313-355). [Plomp, 1971: "Neue Folge, ii. Ser., Heft 12, 311-355"]. [Mecklenburg entry 780: "Philosophische Vortraege, herausgegeben von der Philosophischen Gesellschaft zu Berlin. Halle (1887): Steffer, 48 pp."]. "Including simple tones in his classification of the timbres of tones ..., von Helmholtz recognized implicitly that also tones without harmonics are characterized by a typical frequency-dependent timbre. The fact that low tones sound dull and high tones bright is nowadays completely neglected as an indication that, in addition to pitch and loudness, timbre is also an attribute of simple tones. Von Helmholtz did not emphasize this point, but it was advocated explicitly by Engel (1886) and Stumpf (1890) [Tonpsychologie] as a necessary implication of the fact that timbre is an attribute of complex tones. --Plomp (1970): Timbre ...

Engel, Gustav. 1891. Ueber Vergleichungen von Tondistanzen. Zeitschrift fuer Psychologie, 2, 361-378.

Faist, A. 1897. Versuche ueber Tonverschmelzung. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XV, 102, 289.

Schoen (1940), Kreitler and Kreitler (1972), and Chandler/ Barnhart conflict with Mecklenburg on pageanation; all give: 189-205.

Gardiner, William. no date. Die Musik der Natur. [German translation: "weitere Angaben nicht zu ermitteln"]. No city or publisher given.

Goldschmidt, V. 1901. Ueber Harmonie und Complication. Berlin: no publisher given. 136 pp.

Gowers, W.R. 1897. Ueber subjective Gehoersempfindungen. Wien. med. Bl., XX, 161, 177, 193, 211, 232.

Grassman, H. 1877. Ueber die physikalische Natur der Sprachlaute. Ann. Phys. Chem., I, 606-629.

"The finding that the differences between vowels are based on specific peaks in the amplitude pattern raised the interesting question of whether, for the same vowel, the frequencies of these peaks do or do not shift in accordance with the frequency of the fundamental. Most investigators (...Grassman, 1877 ...) promoted the view that the formant frequencies are approximately constant." --Plomp (1971), Timbre ...

Haecker, Valentin. 1900. Der Gesang der Voegel, sein anatomischen und biologischen Grundlagen. Jena: G. Fischer. 102 pp.

Haellstroem, Gustav Gabriel. 1832. Von den Combinationstoenen. Annelen der Physik., XXIV, 438ff.

Hannover (Koenig), George von. 1858. Ideen und Betrachtungen ueber die Eigenschaften der Musik. Hannover: 2. Auflage 1858: Helwing. 50 pp.

Hannover (Koenig), George von. 1879. Ueber Musik und Gesang. Wien: no publisher given.

Heim, Albert. 1874 (1873?). Die Toene der Wasserfaelle. Verhandlungen der Schweizerischen Naturforschenden Gesellschaft Schaffhausen, LVI, 209.

Helmholtz, H.L.F. von. 1856. Ueber die Combinationstoene. Monatsberichte der Preussischen Akademie der Wissenschaften, n/v, 279.

Additional entry from Mecklenburg: "1856. Ueber Combinationstoen oder Tartinischen Toene. Niederrheinische Sitzungsberichte, Mai 1856." Additional entry from Plomp (1971): "1856. Ueber Combinationstoene. Ann. Phys. Chem., 99 [Annelen der Physik, XCIX], 497-540.

Helmholtz, H.L.F. von. 1859. Ueber die Klangfarge [Klangfarbe?] der Vocale. Ann. Phys. Chem., 18, 280-290.

Helmholtz, H.L.F. von. 1862. Ueber die arabisch-persich Tonleiter. Verhandlungen des natur-historisch-medicinische Vereins zur Heidelberg, II, 216-217.

Reprinted in: Wissenschaftliche Abhandlungen von Hermann Helmholtz, vol. 1. Leipzig: J.A. Barth, 1882, 424-426.

Hermann, L. 1890. Phonophotographische Untersuchungen, III. Archiv fuer der gesammte Physiologie der Menschen und der Theire, 47, 347-391.

Cf. annotation to Dennert (1887) entry.

Hermann, L. 1891. Zur Theorie der Combinationstoene. Pfluegers Arch. Physiol., 49, 499-518.

[Bonn: Archiv fuer der gesammte physiologie der Menschen und der Thiere].

Hermann, L. 1894. Beitraege zur Lehre von der Klangwahrnehmung. Arch. fuer d. ges. Physiol., LVI, 467-499.

[Bonn: Archiv fuer der gesammte Physiologie der Menschen und der Thiere].

Hermann, L. 1896. Zur Frage betreffend den Einfluss der Phasen auf die Klangfarbe. Ann. Phys. Chem., 58, 391-401.

Hoffman, Johann Leonhard. 1786. Versuch einer Geschichte der mahlerischen Harmonie ueberhaupt und der Farbenharmonie insbesondere, mit Elaeuterungen aus der Tonkunst und vielen praktischen Anmerkungen. Halle: J.C. Handel. xviii, 157 pp.

Hostinsky, Ottokar. 1879. Die Lehre von den musikalischen Klaengen. Prague: Dominicus.

Mecklenburg entry gives: "1878 (1879). Die Lehre vondem musikalischen Klaengen. Ein Beitrag zur aesthetischen Begruendung der Harmonielehre."

Kayser, R. 1897. <u>Ueber subjective Gehoersempfindungen</u>. Halle: no publisher given. 46 pp.

Mach, Ernst. 1866. <u>Einleitung in die helmholtz'sche Musiktheorie</u>. Graz: no publisher given.

Mach, Ernst. 1885. Zur Analyse der Tonempfindungen. <u>Sitzungsbericht der Akademie von Wissenschaft Wiener</u>, <u>92</u>, 1283-1289.

Mach, Ernst. 1886. <u>Analyse der Empfindungen</u>. Jena: no publisher given. 121 pp.

Cf. Mach 1897 entry, this section.

Meinong. A. 1891. Zur Psychologie der Komplexionen und Relationem. <u>Zeitschrift fuer Psychologie</u>, <u>2</u>, 245-265.

Meinong, A., and Witasek, St. 1897. Zur experimentellen Bestimmung der Tonverschmelzungsgrade. <u>Zeitschrift fuer Psychologie</u>, <u>XV</u>, 189-205.

Melde, F. 1895. Ueber 'resultirende' Toene, sowie einige hierbei gemachte Erfahrungen. <u>Archiv fuer der gesammte Physiologie der Menschen und der Thiere</u>, <u>LX</u>, 623-641.

Mentz, P. 1895. Die Wirkung akustischer Sinnesreize auf Puls und Athmung. <u>Wundt Philosophischen Studien [Leipzig]</u>, <u>XI</u>, 61-124, 371-392, 563-602.

Note: Chandler and Barnhart conflicts with Diserens (above), shows volume as <u>X</u>. "Mentz conducted experiments on the influence of auditory stimuli on the movements of circulation and respiration under the varying conditions of attention. The apparatus used consisted of the Marey sphygmograph and pneumograph. He found that auditory stimuli, noises as well as simple sounds, produce a retardation of the pulse, and a retardation or acceleration of the respiration, correlated with the duration of the stimulus and the presence or absence of voluntary attention ... if [a listener] does not pay particular attention or does not attempt to analyze the selection a retardation of the pulse ensues; if he analyzes the music acceleration appears. In an examination of the pulse during the musical selection, Mentz found that a marked variation in intensity produced retardation. Disagreeable dissonances are accompanied by acceleration; agreeable consonance by retardation." --Diserens (1923)

Meumann, E. 1894. Untersuchungen zur Psychologie und Aesthetik des Rhythmus. Philosophischen Studien, X, 249-332, 393-430. Also: Leipzig: Englemann, 1894.

Meyer, Max F. 1896. Ueber Combinationstoene und einige hierzu in Beziehung stehende akustische Erscheinungen. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XI, 177-229. Dissertation, 1896: Berlin. Hamburg/Leipzig (1896): Voss.

Meyer, Max F. 1896-7. Ueber die Rauhigkeit tiefer Toene. Zeitschrift fuer Psychologie, 13, 75-80.

Note: Rand entry (above) conflicts with Chandler and Barnhart entry: "1897. Ueber die Rauhigkeit tiefster Toene."

Meyer, Max F. 1896. Nachtrag zu dieser Abhandlung. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVIII, 274-293.

"Thirty years ago I pointed out in three publications that 'consonance' (also called 'fusion' by Stumpf) is not a term corresponding to a single psychological concept, that it is not capable of being defined unambiguously: "Ueber Tonverschmelzung und die Theorie der Konsonanz", "Nachtrag zu dieser Abhandlung", "Ueber Beurteilung zusammengesetzter Klaenge." Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVII, pp. 401-421, 1898/XVIII, pp. 274-293, 1898/XX, pp. 13-33, 1899. It took thirty years before any other psychologist joined me in assuming an attitude as critical as mine toward the term 'consonance' and similar terms in simultaneous and successive tones ..." --Max F. Meyer (1929). The musician's arithmetic. The University of Missouri Studies, IV (no. 1), 99f.

Meyer, Max F. 1898. Ueber die Intensitaet der Einzeltoene zusammengesetzter Klaenge. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVII, 1-14.

Meyer, Max F. 1898. Ueber Tonverschmelzung und die Theorie der Consonanz. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVII (1898), 401-421; XVII (1898), 274-293.

Cf. C. Stumpf, "Erwiderung," Ibid., 294-302. See: annotation to Meyer (1898) "Nachtrag ..." entry. Note: Schoen (1940) cites only vol. 17 data.

Meyer, Max F. 1898. Zur Theorie der Differenztoene und der Gehoersempfindungen ueberhaupt. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XVI, 1-34, XVII, 8-14.

New York Public Library Music Index entry for this work shows publication date as 1897. Ward (1971) also shows: "[1898] ... Beitr. Akust. Musikwiss., 2, 25-65."

Meyer, Max F. 1899. Ueber Beurtheilung zusammengesetzter Klaenge. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XX, 13-33.

See: annotation to Meyer (1898) "Nachtrag ..." entry.

Meyer, Max F. 1900. Neue Erklaerung der subjectiven Combinationstoene. Pflueger's Archive fuer der gesammte Physiologie der Menschen und der Thiere, LXXXI, 49-60.

Meyer, Max F. 1900. Zu Schaefers Neuer Erklaerung der Combinationstoene. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, LXXXI, 49ff.

Michaelis, Christian Friedrich. 1879. Zur Lehre von den Klaengen der Konsonanzen. Berlin: no publisher given.

Molldur (Kieninger), Karl. 1880. <u>Die Kunst und Wissenschaft der Musik</u>. <u>I</u>: Die Musik in ihrem Verhaeltnis zur Religion. Lorch (1880), 2. Aufl. Lorch 1903: Rohm. <u>II</u>: Musik als Medium zur Krankenheilung. Lorch 1903: Rohm. <u>II</u>: Musik als Farben-Komposition zur Unterstuetzung der Tonmusik bei der seelischen Heilung (Heilung aller Seelen?). Lorch 1903: Rohm. <u>IV</u>: Musik als Geisterdemonstration Entsprechungswissenschaft - nebst geistigem "Darwinismus" als verklaerten Sphaeren. Lorch 1903: Rohm (insgesamt 296 pp).

Moos, ?. 1867. Ueber das subjektive Hoeren wirklicher musikalischer Toene. <u>Archiv fuer pathologische Anatomie</u>, <u>XXXIX</u>, 289ff.

Moos, ?. 1874. Ueber das combinierte Vorkommen mangelhafter Perception gewisser Konsonanten sowie hoher musikalischer Toene und deren physiologische Bedeutung. <u>Archiv fuer Ohren- und Augenheilkunde</u>, <u>IV</u>, 165ff.

Newton, Sir Isaac. 1704. <u>Optiks</u>. 2nd ed., 1717; with additions and corrections, 1718; 3rd ed., 1721; 4th ed., (posthumous), 1730; reprint 1931.

Contains Newton's erroneous hypothesis that there are seven colors in the color spectrum due to the fact that there are seven notes in the diatonic scale.

Oesterley, Hermann. 1885. Beobachtungen ueber die Wirkungsweise der Musik. <u>Deutsche Revue</u>, <u>IV</u>, 66.

Ohm, G.S. 1839. Bemerkungen ueber Combinationstoene und Stoesse. <u>Ann</u>. <u>Phys</u>. <u>Chem</u>., <u>47</u>, 463-466.

"Ohm (1839) published a general formula for the rate of ... beats: two tones of M and N Hz, respectively, with M:N only slightly different from m:n (m and n both small integers), give rise to [mN - nM] beats per sec. The most promoted explanations of these beats were in terms of combination tones ... De Morgan (1864) proved that Ohm's formula agrees with the rate of waveform variations of the superimposed sinusoids, suggesting that the beats may be due to phase sensitivity of the ear." --Plomp (1971): Timbre...

Oppel, J. 1871. Ueber Vogelstimmen, insbesondere Kuckucksruf und Amselschlag. Der Zoologische Garten, XII/2, no pp.

Pipping, H. 1895. Zur Lehre von den Vocalklaengen. Z. Biol., 13, 524-583.

See annotation to the Dennert (1887) entry, this section.

Pohl, R. 1888. Die Hoehenzuege der musikalische Entwicklung. Leipzig: no publisher given. 373 pp.

Polak, A.J. 1900. Ueber Zeiteinheit in Bezug auf Konsonanz, Harmonie und Tonalitaet. Leipzig: no publisher given.

Preyer, Wilhelm. 1878. Die Theorie der musikalischen Konsonanz. Sitzbericht der Jenaischen Gesellschaft fuer Medizin und Naturwissenschaft, n/v, no pp.

Preyer, Wilhelm. 1879. Zur Theorie der Konsonanz. In: Akustische Untersuchungen. Jena: G. Fischer. 66 pp.

Preyer, Wilhelm. 1889. Ueber Combinationstoene. Annalen der Physik, XXXVIII, 131ff.

Reuleaux, H. 1880. Das singende Tal bei Thronecken. Koblenz: no publisher given.

Riemann, Hugo. 1873 (1874?). Vom musikalischen Hoeren. Dissertation: Goettingen.

Riemann, Hugo. 1875. Die objective Existenz der Untertoene in der Schallwelle. Allgemeine deutsche Musikzeitung 1875, 25-26.

Riemann, Hugo. 1886. Wurzelt der musikalische Rhythmus in Sprachrhythmus? Vierteljahrschrift fuer Musikwissenschaft, n/v, 495ff.

Riemann, Hugo. 1888 oder 1890. Katechismus der Musik-Aesthetik. Wie hoeren wir Musik? Grundlinien der Musikaesthetik. Leipzig 1888 oder 1890, 2. Auflage 1903, 3. Auflage 1911, 4. Auflage 1919, 5. Auflage 1921, 6. Auflage Leipzig 1923: Hesse (Max Hesses illustrierte Katechismen XVII). viii, 100 pp.

Riemann, Hugo. [1895-1901]. Zur Theorie der Konsonanz und Dissonanz. Praeludien und Studien, III, no pp.

[Praeludien und Studien. Gesammelte Aufsaetze zur Aesthetik, Theorie und Geschichte der Musik. 3 Baende. Leipzig 1895-1901: Seemann (II: vi, 234 pp.; III: 228 pp.)]. --Mecklenburg entry 2542; [ ] Mecklenburg 1540.

Riemann, Ludwig. 1896. Populaere Darstellung der Akustik in Bezeihung zur Musik. Braunschw.: no publisher given. 157 pp.

Rischbeiter, W. 1888. Die Gesetzmaessigkeit in der Harmonik. Regensberg: no publisher given. 169 pp.

Roeber, A. 1834. Untersuchungen des Hrn. Scheibler in Crefeld ueber die sogenannten Schlaege, Schwegungen oder Stoesse. Ann. Phys. Chem., 32, 333-362, 492-520.

"...so-called 'beats of mis-tuned consonances were investigated for the first time by Scheibler (Roeber, 1634) ... discovered that three simultaneous simple tones of (n-1)p, np, and (n+1)p Hz(n=integer), with one tone slightly mistuned, give rise to a beat sensation." --Plomp (1971)

Roentgen, E. 1893. Einiges ueber Theorie und Praxis im musikalischen Dingen. Vierteljahrschrift fuer Musikwissenschaft, 9, no pp.

Sapper, ?. 1890. Ueber Tonfolgen und Verwendung von Dur und Moll beim Vogelgesang. Neue Musikzeitung 1890, no pp.

Schaefer, Karl L. 1890. Ueber die Wahrnehmung und Lokalisation von Schwebungen und Differenztoenen. Zeitschrift fuer Psychologie, I, 81-98.

Schaefer, Karl L. 1891. Ein Versuch ueber die intrakranielle Leitung leisester Toene von Ohr zu Ohr. Zeitschrift fuer Psychologie, II, 111-142.

Schaefer, Karl L. 1899. Eine neue Eklaerung der subjectiven Combinationstoene auf Grund der Helmholtz'schen Resonanzhypothese. Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 78, 505-526.

See annotation to Dennert, H. (1887) entry, this section. New York Public Library Music Index entry for this article gives journal and volume as: "Arch. f. d. ges. Physiol., LXXXI, 505-525. Cf. Ibid., LXXXI, 49-60." Mecklenburg confirms the Chandler and Barnhart entry (above).

Schischmanow, I. 1889. Untersuchungen ueber die Empfindlichkeit des Intervallsinnes. Philosophischen Studien, V, 558-600.

Mecklenburg gives: "Schichmanow, Iwan."

Schleiden, ?. 1857. Die Natur der Toene und die Toene der Natur. No city or publisher given.

Schulze, R. 1898. Ueber Klanganalyse. Philosophischen Studien, XIV, 471-489.

Schumann, F. 1890. Ueber das Gedaechtniss fuer Komplexe gleicher Schalleindruecke. Zeitschrift fuer Psychologie, I, 75-80.

Scripture, Edward W. 1892. Einige Beobachtungen ueber Schwebungen und Differenztoene. Philosophischen Studien, VII, 630-2.

Scripture, Edward W. 1893. Ist eine cerebrale Entstehung von Schwebungen moeglich? Philosophischen Studien, VIII, 638-640.

Seidl, Arthur. 1898. (Besprechung von Ch. Ruths "Experimental- Untersuchungen ueber Musik-Phantome.") Darmstadt: no publisher given. (Musikalisches Wochenblatt 1898), n/v, no pp.

Parentheses from Mecklenburg.

Steinitzer, Max. 1885. Psychologische Wirkungen der musikalischen Formen. Munich: Reidel. ix, 130 pp.

Mecklenburg gives: Ueber die psychologische Wirkungen..."

Sterne, Carus. 1890. Musikalischer Sand. Promethius, I, 257.

Stumpf, Carl. 1886. Ueber der Vorstellung von Melodien. _Zeitschrift fuer Philosophie_, _89_, 45-57.

Stumpf, Carl. 1896. Ueber die Ermittlung von Obertoenen. _Wiedemann's Ann._, _LVII_, 600. Also: Leipzig: no publisher given.

Stumpf, Carl. 1897. Neueres ueber Tonverschmelzung. _Zeitschrift fuer Psychologie_, _XV_, 280-303, 354.

Stumpf, Carl. 1898. Die Unmusikalisch und die Tonverschmelzung. _Zeitschrift fuer Psychologie_, _17_, 422-435.

Stumpf, Carl, and Meyer, Max. 1898. Massbestimmungen ueber die Reinheit consonanter Intervalle. _Zeitschrift fuer Psychologie_, _XVIII_, 321-404. Also: _Beitr. Akust. Musikwiss._, _II_, 84-167.

Stumpf, Carl. 1898. Ueber die dualistische Konsonanz Definition und die Lehre von der Klangvertretung. _Beitraege zur Akustik und Musikwissenschaft_, _I_ (Heft), 84-108.

Stumpf, Carl. 1898. Konsonanz und Dissonanz. _Beitraege zur Akustik und Musikwissenschaft_, _I_, 1-108. Also: Leipzig: Verlag von Johann Ambrosius Barth, 1898. vi, 108 pp.

Kreitler and Kreitler (1972) conflict on pageanation: " 91-107." Schoen (1940) confirms the Rand entry (above).

Stumpf, Carl. 1898. Zum Einfluss der Klangfarbe auf die Analyse von Zusammenklaengen. _Beitraege zur Akustik und Musikwissenschaft_, _II_, 168.

Stumpf, Carl. 1898-1901. Geschichte des Konsonanzbegriffs. _Abhandlung der bayerischen Akademie der Wissenschaft; 1898-1901 philos. -philol. classe._, _21_ (Abt. 1), 1-78. Also: Munich: Franz. x, 261 pp.

Stumpf, Carl. 1899. Beobachtungen ueber subjective Toene und ueber Doppelthoeren. _Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane_, _XXI_, 100-121.

Stumpf, Carl. 1901. Ueber das Erkennen von Intervallen und Accorden bei sehr kurzer Dauer. Zietschrift fuer Psychologie, XXVII, 148-186.

Urbantschitsch, V. 1888. Ueber den Einfluss einer Sinneserregung auf die uebrigen Sinnesempfindungen. Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 42, 3-4.

"...[Urbantschitsch] investigated the influence of auditory stimuli on the sense impressions, particularly on normally minimal visual stimuli. He found that patches of color observed at a distance at which the color could scarcely be recognized were brought clearly into the sensory field, by sounding a tuning fork. In short, the threshold of color perception is lowered by tonal stimuli. Tuning forks of high pitch, applied to both ears, were most effective. The influence [of sound upon threshold perceptibility of] the different colors is variable. Barely legible print was often read when a tone accompanied the effort. Tastes, odors, and touch are similarly affected by sound, and pain is increased by jarring noises. Finally Urbantschitsch claims to have produced photisms, or phenomena of colored audition, by having the subject observe a grey disk on white paper, or an undulating white surface, and describe the colors perceived while different tuning forks were sounded. The experiments, if valid, indicate that the subjects of audition coloree are merely striking examples of the normal psychological influence of one sense upon the other." --Diserens (1923)

Voigt, W. 1890. Ueber den Zusammenklang zweier einfacher Toene. Nachrichten von der Gesellschaft der Wissenschaften zur Goettingen (1890), 159.

Weissmann, Adolf. 1889. Gedanken ueber Musik bei Tieren und beim Menschen. Deutsche Rundschau, LXI, 50.

Wimmer, J. 1843. Ueber die Stimmung der Blechinstrumente. Allgemeine Wiener Musikzeitung, 3, 75.

Wundt, Wilhelm. 1895. Zur Frage der Hoerfaehigkeit labyrinthloser Tauben. _Archiv fuer der gesammte Physiologie der Menschen und der Thiere_, _61_, 339-341.

"As arguments in favour of his conception [that tones give rise to synchronous nerve impulses whose rate determines pitch], Wundt considered the phenomenon of binaural beats and the (incorrect) view that the auditory nerve can be stimulated directly by sound (Wundt, 1893, 1895)." --Plomp (1967)

Zwaardemeker, H. 1900. Ueber Intermittenztoene. _Arch. Anat. Physiol., Physiol. Abt._, (Suppl. Band), 60-67.

See annotation to the Dennert (1887) entry, this section.

MUSICAL ELEMENTS AND CONSTRUCTS
ITALIAN

Tanzi, E. 1891. Cenni ed esperimenti sulla psicologia dell-udito. _Riv. di Filos. Scient._, _n/v_, no pp.

"...published an account of experiments on the reaction time for major and minor chords. The keys of a pianoforte, the reagent's key and a chronoscope were connected in a single circuit ... The conclusion is that minor chords produce more rapid reaction than do the major chords, a fact that may have some relation to the prevalence of minor chords in primitive music." --Diserens (1923).

MUSICAL ELEMENTS AND CONSTRUCTS
LATIN

No documents found.

MUSICAL ELEMENTS AND CONSTRUCTS
SPANISH

No documents found.

MUSICAL PERCEPTION
DUTCH

No documents found.

MUSICAL PERCEPTION
ENGLISH

Allen, Grant. 1877. Physiological aesthetics. London: no publisher given.

Baker, F.C. 1897. On the effect of music on caged animals. American Naturalist, XXXI, 460-463.

Banister, H.C. 1885-6. Music as a language. Proceedings of the Musical Association, n/v, 107-124.

Bell, A. Melville. 1882. Sounds and their relations. London: no publisher given.

Blackburn, Vernon. 1898. The fringe of an art. Appreciations in music. London: Unicorn Press. New York: Mansfield. 176 pp.

Breakspeare, Eustace J. 1880. Musical aesthetics; with especial reference to Dr. Ed. Hanslick's essay, 'Vom musikalische Schoenen.' Proceedings of the Musical Association, VI, 59-79.

Brinkerhoff, C. 1892. Color analogy in music. The Echo, 9 (no. 2), 1.

The Echo: published in LaFayette, Indiana.

Buchner, L. 1880. Mind in animals. English translation: A. Besant. London: Freethought.

"Occasional references to animals effected [sic] by music: '...spiders living in a room are attracted out by the playing of a piano, guitar, or violin especially when the music is tender and not too loud.' (320)" --Shaffer (1971): The psychology of music: a bibliography.

Cobb, Gerard. 1884. On certain principles of musical exposition considered educationally and with special reference to current systems of musical theory. Part 1 and 2. Proceedings of the Musical Association. 10th Session, 1883-4. Part 1, 125-151. Part 2, 153-184.

Colman, W.B. 1894. On so-called 'colour-hearing.' Lancet, no. 3683, 795, 849.

Colman, W.B. 1898. Further remarks on 'colour-hearing.' Lancet, I, 22-24.

Corning, James Leonard, M.D. 1899. The use of musical vibrations, before and during sleep; supplementary employment of chromatoscopic figures; a contribution to the therapeutics of the emotions. Medical Record, 55 (Jan. 21, 1899), 79-86. Also: New York: Publisher's Printing Co., 24 pp. (Reprint from the Medical Record article).

Note: Schoen (1940) confirms the N.Y. Pub. Library entry (above); but Fortescu conflicts: enters author as Corning, T.L.

Davison, J.T.R. 1899. Music in medicine. The Lancet, n/v, 1160.

"...summarizes and confirms Dogiel's [1880] and Tarchanoff's [1894; both of these works may be found in this bibliography.] experiments on the physiological effects of music. On the basis of such experiments the theory is advanced 'that music exercises its influence over the body, without the influence of the highest nervous centers,' and that the human organism participates in the tendency to vibrate synchronously with music which sometimes obtains in the animal world, a theory which in a modified and improved form has been restated recently (1918) by Dr. Beaunis." --Diserens (1923)

Dixon, H. 1899. Music and medicine considered from a physiological, pathological and therapeutic standpoint (abstract of paper). The Lancet, n/v, 1815.

"Dixon reported the repetition of experiments similar to those of Dogiel [1880] with similar results, i.e., increased blood pressure and cardiac action, and variations in respiration. He does not state his method or the number and nature of his subjects, but mentions several physiological effects of music which are not reported by other experimenters. Among such effects are 'perspiration, desire to micturate, lachrymation, and rarely, laughter.'" --Diserens (1923)

Downey, June E. 1897. A musical experiment. American Journal of Psychology, 9, 63-69.

Note: Kreitler and Kreitler (1972) give "June A. Downey."

Ellis, Alexander J. 1876. On the sensitiveness of the ear to pitch and change of pitch in music. Proceedings of the Musical Association, III, 1-32.

Fowler, J.A. 1896. Music or the language of tone. Phrenological Magazine, September/October.

Gardiner, William. 1832. The music of nature, or an attempt to prove that what is passionate and pleasing in the art of singing, speaking and performing upon musical instruments, is derived from the sounds of the animated world. London: Longman. Reprint, Boston (1840 or 1841): Ditson.

Gardiner, William. 1847. Melodies from the music of nature. London: Novello.

Gilman, Benjamin Ives. 1892-3. Report on an experimental test of musical expressiveness. American Journal of Psychology, 4, 42-73; 5 (1893), 558-576.

Conflict: Mecklenburg says 1891-2 (vol. 4), 558; 1892 (vol. 5), 42. Chandler and Barnhart is confirmed by Schoen, Kreitler and Kreitler.

Goddard, Joseph. 1894. Colour compared with music and painting. Musical Opinion, 18, 777-778. [London].

Goodrich, A.H. 1881. Music as a language. New York: no publisher given.

Ireland, William W. 1894. On affections of the musical faculty in cerebral disease. Journal of Medical Science, XL, 354-367.

James, William. 1890. Principles of psychology. No city or publisher given.

Volume 1 (533-549) contains James' evaluation of

Fechner and of psychophysics. --Boring (1942). Howes (1927): "A systematic psychology of the emotions; the earliest specimen, followed by Ribot, McDougall." -pp 50, 51.

Lussy, Mathis. 1863. *Traite de l'expression musicale*. Nancy (1863), 2e edition 1874, 8e edition Nancy 1904: Berger-Levrault. Deutsch: Leipzig 1886 (uebersetzt von F. Vogt); English: London 1885 (translated by E. von Glehn).

MacDougall, Robert. 1898. Musical imagery: a confession of experience. *Psychological Review*, *V*, 463-476.

Conflict: Schoen (1940) says "McDougall."

Mach, Ernst. 1886. *Contributions to the analysis of the sensations*. Jena: no publisher given [Fischer?]. English translation: Chicago, 1895: no publisher given.

"A fuller treatment of the problems of this lecture will be found in my *Contributions to the analysis of the sensations* (Jena, 1886), English translation, Chicago, 1895. J.P. Soret, *Sur la perception du beau* (Geneva, 1892) also regards repetition as a principle of aesthetics. His discussions of the *aesthetical* side of the subject are much more detailed than mine. But with respect to the psychological and physiological foundation of the principle, I am convinced that the *Contribution to the analysis of the sensations* go deeper. --Mach (1894)" --Ernst Mach, introductory footnote to lecture "On symmetry" from: *Popular scientific lectures* (1898), 89f.

Mach, Ernst. 1897. *Analysis of the sensations*. [*The analysis of the sensations and the relation of the physical to the psychical*]. Eng. trans. of: *Die Analyse der Empfindungen und das verhaeltniss des physischen zum psychischen*. Eng. trans. Chicago and New York: Open Court Publishing Co., 1902. 120 pp.

Mach, Ernst. 1898. Popular scientific lectures. Eng. trans. by Thomas J. McCormack. "Third edition, revised and enlarged." 59 cuts, diagrams. Chicago: Open Court Publishing Co. [Copyrights: pp. 1-258, 338-374: 1894; pp. 259-281: 1896; 282-308: 1897; 309-337: 1898]. viii, 385 pp.

Pages 32-47 ('On the causes of harmony'): "Now that we have made ourselves acquainted with overtones and beats, we may proceed to the answer of our main question, Why do certain relations of pitch produce pleasant sounds, consonances, others unpleasant sounds, dissonances? It will readily be seen that all the unpleasant effects of simultaneous sound-combinations are the result of beats produced by those combinations (42) ... Only such sounds are consonant as possess in common some portion of their partial tones ... Consonance is the coalescence of sounds without appreciable beats!" (44) Pages 89-106 ('On symmetry'): 99-104 deal explicitly with musical symmetry and its perception. ["Delivered before the German Casino of Prague, in the winter of 1871"]. Appendix I ('A contribution to the history of acoustics'): "This article, which appeared in the Proceedings of the German Mathematical Society of Prague for the year 1892, is printed as a supplement to the article of 'The causes of harmony,' at page 32." Ibid., 375.

Marshall, H.R. 1894. Pain, pleasure, and aesthetics. New York: MacMillan.

Meyer, Max F. 1900. Elements of a psychological theory of melody. Psychology Review, 7, 241-273.

On pages 400-405 of this volume can be found a review of this Meyer article by C.K. Wead.

Parr, W. Alfred. 1900. The power and influence of music considered from a psycho-physiological point of view. Florence: Claudian Press. 18 pp.

Patrici, M.L. 1896-7. Music and the cerebral circulation of man; adapted from the Italian of prof. M.L. Patrici. Music, XI, 232-242.

"Patrici" is probably a printing error or an anglicization; see "Patrizi, M.L." entry (Italian), this section.

Riemann, Hugo. 1895. _Catechism of Aesthetics_. London: Augener. "(Engl. Uebersetzung vor. No)."

Schmitt, Hans. 1895. _The natural laws of musical expression_. Eng. trans.: Frances A. van Santford. Chicago: Summy.

Smith, E.A. 1895. The influence of music upon life and health. _Music_, _VIII_, 361-365.

Stainer, Sir John. 1892. _Music in its relation to the intellect and the emotions_. London: Novello, Ewer, and Co. 64 pp.

Note: "The substance of this essay was delivered as a professional lecture in the Sheldonian theatre, Oxford, on June 8, 1892." --O.S.U. Music Library catalogue card abstract.

Stearns, R.E.D. 1890. Instances of the effects of musical sounds on animals. _American Naturalist_, _24_, 236-7, 125-7, 238, 26-9.

"[Stearns] notes a pet bird who becomes excited [by] 'Rule Britannica' on flute..." --Shaffer (1971).

Steed, Orlando. 1880. On the beauty of touch and tone: an inquiry into the physiological and mechanical principles involved in their cultivation. _Proceedings of the Musical Association_, _VI_, 31-58.

Author is given as "Steed, A. Orlando" by some sources.

Talbot, E.B., and Darlington, L. 1897-8. Distraction by musical sounds; the effect of pitch upon attention. _American Journal of Psychology_, _9_, 332-343.

"...experimented on the influence of music on the discrimination of lifted weights ... the authors conclude that music facilitates attention, the middle octaves having the greatest influence... in opposition to Fere's results [1887], they find that there is no essential relation between pitch and dynamogenic effect." —Diserens (1923); [ ] mine.

Thorp, G.E. 1894. Colour audition and its relation to the voice. Edin. Medical Journal, XL, 21-5.

Turpin, James. 1883. Some practical bearings of the study of acoustics upon music as an art. Proceedings of the Musical Association, 9, 71-93.

[March 5, 1883]. Turpin states that Helmholtz's work may be the basis of a scientific (experimental) esthetics.

Wallaschek, Richard. 1893. Primitive music. London: Longmans, Green, and Co. xi, 326 pp.

Chapter 5: Physical and psychical influence of music. Chapter 6: Heredity and development.

Warthin, A.S. 1894. Some physiological effects of music on hypnotized subjects. The Medical News, 65, 89-94.

"Warthin ... attempted to determine experimentally the influence of music on a group of hypnotized subjects. There were seven subjects ... pulse tracings were taken by means of appropriate apparatus, and the suggestion was given to pay attention to nothing but the music and to retain the memory of the effect on awakening... When Wagner's 'Ride of the Valkyries' was played on the piano, the pulse of the [first] subject was accelerated, while the amplitude and the pressure increased. As the music continued, the pulse rose from a normal of 60 to 120 per minute, the entire body being bathed in perspiration ... the same experiments were repeated with the other subjects with similar results ... music was also found to facilitate the hypnotic process as Braid and Moll assert in their manuels." —Diserens (1923); [ ] mine. Diserens gives pages as 89-92.

Whomes, Edmund. 1887. Key color. Proceedings of the Musical Association, XIII, 83-98.

Whomes attempted to discount the objective existence of chromasthesia through a tone perception experiment; the subjects were the assembled members of the Royal Musical Association. The results of the experiment were somewhat confused, mainly due to an amount of resistance, among certain members of the audience, to Whomes' opinion that color-hearing is a myth.

Wilford, ?. 1876. Evolution of sound. London: no publisher given.

Rand (1905) enters this work in "Helmholtz; related articles" classification of the subject index.

Wimmer, S.J. 1889. The influence of music and its therapeutic value. New York Medical Journal, L, 258-260.

Zahn, J.A. 1892. Sound and music. Chicago: no publisher given. 452 pp.

MUSICAL PERCEPTION
FRENCH

Anonymous. 1843. Du pouvoir social et de l'influence morale de la musique. _Bibliotheque Suisse_, _XLVI_, 226; _XLVII_, 107.

Arreat, L. 1895. _Mémoire et imagination. Peintres, musiciens, poètes et orateurs_. Paris: Alcan.

Axbel, ? 1890. _Harmonie des vibrations. Le son et la lumière et leurs rapports communs_. Paris: Robert. 10 pp.

Baratoux, J. 1888. _L'audition colorée_. Paris: no publisher given.

Beaunis, Henri Etienne, and Binet, Alfred. 1892. Sur deux cas d'audition colorée. _Rev. Philos._, _XXXIII_, 448-461.

Beauquier, Charles. 1865. La musique et la sensibilité physique. _Revue politique et litteraire_, _II_, 791.

Beauquier, Charles. 1865. _Philosophie de la musique_. Paris: Germer Baillier. New York: Baillier Brothers. viii, 204 pp.

Benoist, E. 1899. L'audition colorée. _L'Independant Med._, _V_, 97-100.

Benoist, E. 1899. _Contribution à l'étude de l'audition colorée_. Paris: no publisher given. 47 pp.

Binet, Alfred. 1892. Le problème de l'audition colorée. _Rev. d. Deux Mondes_, _CXIII_, 586-614.

Binet, Alfred. 1894. _L'application de la psychométrie à l'étude de l'audition colorée_. Paris: no publisher given.

Binet, Alfred, and Courtier, Jules. 1895. Circulation capillaire de la main. _Année Psychologie_, _2_, 87-167.

"In connection with a study of the capillary circulation of the hand, carried out on four subjects by means of the Marey sphygmograph and the plethysmograph, these authors found a diminution of the amplitude of the pulse in response to the sudden sound of a gong." --Diserens (1923)

Binet, Alfred, and Courtier, Jules. 1896. L'influence de la vie emotionelle sur le coeur, la respiration, et la circulation capillaire. _Année Psychologie_, _3_, 65-126.

"...investigated the influence of musical stimuli on respiration and circulation. The former was studied by means of the pneumograph, the latter by the plethysmograph. The reactions of a single subject were studied ... sad melodies accelerate respiration by 216 [respirations per minute] on the average, considerably diminish the amplitude and produce irregularities in both acceleration and amplitude of respiration. Gay music e.g., military marches, produced an acceleration of 3.8 [respirations per minute] and showed less tendency to reduce amplitude... With respect to circulation, purely sensorial excitations produce a slight lessening of the amplitude of pulsation. Dissonances produce a greater effect of the same nature. Sad music has almost no influence, while gay music nearly always provokes a reduction." --Diserens (1923) Note: I think that the first respiration rate change given by Diserens is improbable; a rate change of 2.6 respirations per minute would seem more likely. --D.B.

Blaserna, P. 1877. _Le son et la musique_. Paris: no publisher given.

Breton, A. 1897. Nouveau cas d'audition colorée. _Rev. Gen. de Clin. et de Thérap._, _XI_, 279.

Castillon (fils). 1804. Recherches sur le principe du beau et sur son application à la musique. _Abhandlungen der Preussischen Akademie der Wissenschaften_, _n/v_, 3.

Claparede, E. 1900. Sur l'audition colorée. _Rev. Philos._, _XLIX_, 515-7.

Clavier, J. 1899. L'audition colorée. _Annales des sciences psychologiques_, _IX_, 237-251.

Combarieu, Jules. 1893. L'expression objective en musique d'après le langage instinctif. Revue philosophique, XXXV (1), 124.

Combarieu, Jules. 1894. Les rapports de la musique et de la poésie, considerées au point de vue de l'expression. Thesis: Paris. Paris, 1894: Alcan.

Couty, L., and Charpentier, A. 1874. Effets cardio-vasculaires des excitations des sons. Arch. de Physiol., 4, 525-583.

"The earliest well controlled experiments on response to auditory stimuli...the auditory stimuli employed were in part mere noises, but since whistling was also used, the results have some bearing on response to musical elements. The experiments were carried out on dogs... sudden stimuli...generally produced increased cardiac tension and acceleration of pulse ranging from ten to one hundred per cent... kymographic records were taken of the cardiovascular effects..." --Diserens (1923)

Cozauet, A (Jean d'Udine). 1897. De la corrélation des sons et des coleurs en art. Paris: Fischbacher.

Daubresse, M. 1900. L'audition colorée. Rev. Philos., XLIX, 300-305. Cf. Ibid., 515-7.

Dauriac, Lionel. 1900. L'hypnotisme et la psychologie musicale. Revue Philosophique, 50, 390-395.

"De Rochas [See Rochas d'Aiglun, 1900] later presented an amplified version of his experiments and conclusions in a book reviewed favorably by L. Dauriac...the latter regards De Rochas' work as a distinct forward step in the study of musical reactions, but advises caution in the use of the hypnotic method, and in the acceptance of data derived from this source..." --Diserens (1923)

Destouches, L. 1899. La musique et quelques uns de ses effets sensoriels. These. Paris (1899). 2me edition Paris 1900: Editions scientifiques. 82 pp.

Favre, Louis. 1900. La musique des couleurs [et les musiques de l'avenir]. Paris: Schleicher. xv, 114 pp.

Fere, C., and Londe, ?. 1887. Sensation et mouvement. Paris: no publisher given.

Pp. 36-41: "[In 1885] Fere and Londe investigated the effects of tones produced by vibrating tuning forks on the dynamometric records of a single subject. In the first series of experiments a large number of forks ranging from 50 to 100 [Hz] were employed and large differences in dynamometric pressure, varying with the pitches of the tones, were noted. In another series of experiments, ... the muscular force increased with the intensity of the stimuli. ... the general conclusion is that sounds are dynamogenic, i.e., muscular energy increases with the intensity and pitch of auditory stimuli, a result that is to be expected in the light of the previous experiments." --Diserens (1923).

Flournoy, Th. 1892. Enquête sur l'audition colorée. Arch. d. Sci. Physiol. et Nat., XXVIII, 505-8.

Flournoy, Th. 1893. Les phénomènes de la synopsie. Audition colorée. Paris: Geneve.

Cf.: Psychology Review, I, 318-22.

Galton, Francis, and Grueber, Ed. 1893. L'audition colorée et les phénomènes similaires. Paris: no publisher given.

Grafe, A. 1897. Note sur un nouveau cas d'audition colorée. Rev. de Med., XVII, 192-6.

Grafe, A. 1898. Sur un cas à rattacher à ceux d'audition colorée. Rev. de Med., XVIII, 225-8.

Gretrey, A.E.M. no date. Essais sur la musique. In: Chomet, H. 1875. The influence of music on health and life. New York: Putnam.

"Earliest observations on the physiological effects of music, which partake of the nature of experiment in the generally accepted sense ... mentions the effect of music on the heart and the circulation of the blood ..." --Diserens (1923): Reactions to musical stimuli. The Psychological Bulletin, 20 (no. 4), 173-199.

Griveau, Maurice. 1896. L'interprétation artistique de l'orage. Rivista Musicale Italiana 1896, 684.

Grueber, Eduard. 1893. Questionnaire sur l'audition colorée. Rev. Philos., XXXV, 499-502.

Guenon, A. 1898. Influence de la musique sur les animaux et en particulier sur le cheval. Chalons-sur-Marne: Librairie civile et militaire. 136 pp.

Note: Rand entry (above) conflicts with Fortescu entry on author's name; Fortescu shows Guenon, L.A. Mecklenburg entry 1118 shows: "Guenon, Ad. ... Chalons-sur-Marne: Union. 136p."

Guiband, M. 1898. Contribution à l'étude expérimentale de l'influence de la musique sur la circulation et la respiration. Année Psych., 5, 645-649.

"...Guiband followed up Binet and Courtier's study [1895] of the effect on respiration and circulation by very methodical investigations along the same lines at the University of Bordeaux. His method and apparatus were similar to Binet's, but were not confined to the study of a single individual. His conclusions quoted 'in extenso' in a review by Binet, including the following: All individuals do not react in the same way to similar musical stimuli, whether simple or complex. Moreover, some subjects react to every kind of musical stimulus, while others react only to certain ones ... when musical selections are used as stimuli, vascular and respiratory reactions become ... more varied. Inconstant in direction, they follow the evolution of the melody in a given individual ... Respiration is regular when the melody is calm, and becomes irregular, sometimes deep, sometimes shallow, when rhythm or intensity is modified. The rhythm of respiration tends to adapt itself to the rhythm of the music especially when the latter grows slower." --Diserens (1923)

Hanslick, Eduard. 1894. De beau dans la musique. Edité par Charles Bannelier. 2e edition Paris: Macquet.

Hartmann, Ludwig. 1898. Critique musicale: Réalisme ou Idéalisme. Lettres. Rom: Tipogr. Cooperativa. 8 pp.

Jaell, Marie. 1896. La musique et la psychophysiologie. Paris: Alcan. 171 pp.

Note: Mecklenburg entry conflicts: "1895-6. ... Presses Universitaire de France." Translations: La musica y la psicofisiologia. (Aus dem Franzoesischen ins Spanische uebersetzt von Josefa Lloret de Ballenilla). Madrid (1901): Administracion Die Musik und die Psycho-Physiologie. Aus dem Franzoesichen uebersetzt von Franziska Kromayer. Strassburg, 1905: Verlagsanstalt. viii, 144 pp.

Kastner, Johann Georg. 1856. La harpe d'école et la musique cosmique. Paris: no publisher given.

Lussy, Mathis. 1863. Traité de l'expression musicale. Nancy (1863), 2e edition 1874, 8e edition Nancy 1904: Berger-Levrault. Deutsch: Leipzig 1886 (uebersetzt von F. Vogt); English: London 1885 (translated by E. von Glehn).

Milet, J. 1892. Pamphlet sur l'audition colorée. Thesis: Montpellier. Paris: no publisher given.

Moch, G. 1898. Le calcul et la réalisation des conditions colorées. Rev. Scient., X (ser. 4), 225-230.

Pedrono, ?. 1882. De l'audition colorée. Annales d'oculistique, LXXXVIII, no pp.

Phillipe, J. 1894. L'audition colorée des aveugles. Rev. Scient., I, 806-9.

Cf.: Psychology Review, I, 433.

Pontecoulant, Adolph le Doulcet, Comte de. 1868. Les phénomènes de la musique; ou, Influence du son sur les êtres animes, par le marquis de Pontecoulant. Paris: Libraire Internationale. 159 pp.

Quinet, E. 1885-6. Ce que dit la musique. La nouvel Revue, XXXIII (1885), 328; XLI (1886), 568.

Rochas D'Aiglun, E.A.A. 1900. Les sentiments, la musique, et le geste. Grenoble: H. Falque et F. Perrin. iii, 279 pp. Also: Nouvelle Rev., 114, 384-389, 587-602.

"[Rochas D'Aiglun conducted an] investigation ... on the influence of music on behavior during hypnosis. According to De Rochas, isolated tones provoke a trembling extending to all parts of the body, the character of the reaction varying with the pitch and intensity of the notes. Very high tones evoked the expression of pain, very low tones that of anguish or terror. Chords excite the same reaction as simple tones, and dissonances at any part of the scale produce an expression of suffering ... the author concludes that the phenomena observed are pure reflexes, set off by auditory stimuli, without the intervention of the will..." --Diserens (1923)

Roger, Joseph Louis. 1803. Traité des effets de la musique sur le corps humain, par Joseph Louis Roger ... traduit du latin, et augmenté de notes, par Etienne Sainte-Marie. Paris: Chez Brunot. xxxviii, 352 pp.

"[The] original appeared in 1758 under the title: Tentamen, de vi soni et musices in corpore humano. Cf.: Eitner." --N.Y. Public Library Music Index catalogue card annotation.

Soret, J.P. 1892. Sur la perception du beau. Geneva: no publisher given.

"...J.P. Soret, Sur la perception du beau (Geneva, 1892), also regards repetition as a principle of aesthetics. His discussions of the aesthetical side of the subject are much more detailed than mine. But with respect to the psychological and physiological foundation of the principle, I am convinced that the Contributions to the analysis of the sensations [see Mach (1896), this section] go deeper." --Mach (1894); Ernst Mach, Popular scientific lectures (1898), 89f.

Suarez de Mendoza, F. 1890. L'audition colorée. Paris (2nd ed., 1899): no publisher given. 164 pp.

Tarchanow, J. 1894. L'influence de la musique sur l'homme et les animaux. Archives Italiens de la Biologie, XXI, 313-317.

Author's name shown by some sources as "Tarchanoff." "As early as 1888 Tarchanoff noted variations in the electric conductivity of subjects subjected to the stimulus of an electric bell ... In an interesting communication to the International Congress of Rome in 1895, Professor Tarchanoff presented results obtained by means of the Mosso ergograph, which resemble those of Fere's [1887] experiments. He notes that music exercises a powerful influence on the muscular activity of man, increasing or diminishing it according to the nature of the melodic stimuli. When a subject is completely fatigued by working on the ergograph and can no longer raise the weight, gay music of rapid movement causes the fatigue to vanish for a variable time, and the subjects are able to raise the weight once more; i.e., do additional work. Sad, slow music in the minor key [sic] produces the opposite effect... A third series of experiments on human beings showed that the electric currents determined by the skin of the hand and registered by Wiedemann's galvanometer are modified by the influence of music. Since these cutaneous currents were then regarded as due to increase of secretory activity, Tarchanoff concluded that music influences the activity of the cutaneous glands... [Tarchanoff] reported that decapitated animals respond to sound stimuli by violent struggling, although Professor Henri [V. Henri (1894)] was unable to confirm these results, in a similar experiment of his own ... a second series of experiments was made on dogs and guinea pigs in order to determine the quantity of oxygen consumed and the quantity of carbon dioxide gas eliminated in 24 hours under varying conditions of rest and auditory stimulation by means of an electric bell sounding every five seconds. During these 24 hours of persistent stimulation the consumption of oxygen increased 12.01 per cent for dogs and 10.94 per cent for guinea pigs. During the same period the elimination of carbonic acid gas increased 11.64 per cent and 11.11 per cent for the

respective animals." --Diserens (1923)

Villoteau, Guillaume Andre. 1807. Mémoire sur la possibilité et l'utilité d'une théorie exacte des principes naturels de la musique. Paris: Imp. Imperiale. 88 pp.

Villoteau, Guillaume Andre. 1807. Recherches sur l'analogie de la musique avec les arts qui ont pour l'imitation du langage, pour servir d'introduction à l'étude des principes naturels de cet art... Paris: Imp. Imperiale. 3 uols.

Vivier, A.J. 1893. Mémoire sur la désaccord qui existe entre les mathématiciens et les musiciens sur les vrais rapports des sons musicaux. Paris: no publisher given. 23 pp.

Weber, Johann. 1899. Les Illusions musicales et la verité sur l'expression. 2e édition, Paris: Fischbacher. 250 pp.

MUSICAL PERCEPTION
GERMAN

Anonymous. 1827. Das Musikalische-Komische. Allgemeine musikalische Zeitung 1827, 329.

Anonymous. 1844. Einige Worte ueber den Einfluss der Musik. Allgemeine musikalische Zeitung 1844, 361.

Anonymous. 1878. Das Urteilen ueber Musik. Helvetia, I, 401.

Anonymous. 1882. Zur Charakteristik der Tonarten. Neue Musikzeitung 1882, 10-11; 1897, 4; 1906, 24.

Apel, August. 1799-1800. Ueber Ton und Farbe. Allgemeine musikalische Zeitung, n/v, 753, 769.

Apel, M. 1895. Kants Erkenntnistheorie. Berlin: no publisher given. 147 pp.

B., C.D.v. 1858. Das Ethische in der Musik. Neue Berliner Musikzeitung, n/v, 353.

B. (F.L.) 1816. Musik und Malerie. Allgemeine musikalische Zeitung, n/v, 293.

B. (F.L.) 1824. Ideal und Wirklichkeit, auch in Beziehung auf Tonkunst. Allgemeine musikalische Zeitung, n/v, 249.

Bagge, Selmar. 1860. Gedanken und Ansichten ueber Musik. Wien: no publisher given.

Bagge, Selmar. 1882. Das Musikalische-Schoene, Vortrag. Basel: no publisher given.

Bamberg, ? 1851. Ueber das Tragische in der Tonkunst. Neue Berliner Musikzeitung, n/v, 295.

Batka, Richard. 1899. Musikaesthetische Streifzuege. Herausgegeben von Carl Stumpf. Leipzig: Diederichs. 288 pp.

Bauer, W.A. 1836. Ueber den Einfluss der Musik auf den Menschen in gesundem und krankem Zustand (Zustanden?). Wien: no publisher given.

Berg, H. 1877. Die Lust an der Musik erklairt. Nebst einem Anhang: Die Lust an den Farben, den Formen und der koerperlichen Schoenheit. Berlin: no publisher given.

Note: Kreitler and Kreitler conflicts with incomplete Mecklenburg citation given above; K. and K. shows: Berlin: Behr, 1879.

Bie, Oskar. 1885. Der Naturalismus in der Musik. Allgemeine Musikzeitung 1885, 149.

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., n/v, 79-106. (Also, Berlin, 1896, no publisher given).

"...presents...notes on the influence of music on the organism. Most of the paper is devoted to the physiological and motor affects of rhythm." --Diserens (1923).

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., 81, 84.

Note: Diserens (1923) gives same journal, but gives volume LXXXC, which must be a typographical error, and gives pages 79-106. "...Most of the paper is devoted to the physiological and motor affects of rhythm, but several observations on tonal affects on man and animals are recorded. The author reports an experiment of his own in which a violent pain appeared in an apparently sound tooth upon hearing a soprano sing a high note (B) at a concert, a quarter tone too high. Examination of the tooth disclosed slight decay. The hyper-irritability of the nerve was thus excited by irradiation of an auditory stimulus. The observation accords with the conclusion of Urbantschitsch [1888: Ueber den Einfluss einer Sinneserregung...] that auditory stimuli lower the sensory threshold. Billroth also mentions seeing a young "great Dane" fall down as if in a faint when a village brass band struck up a (march)." --Diserens (1923)

Billroth, Th. 1894-5. Wer ist Musikalisch? Deutscher Rundschau., LXXI (1894), 79; LXXIV (1895), 385.

Also: Wer ist Musikalisch? Herausgegeben von

Eduard Hanslick. Berlin: Stavanoer. 2. Auflaoe 1896, 3. Auflage 1698, 4. Auflage 1912, 5. Auflage Berlin 1946: Paetel. 246 pp. Please note conflict: Max Schoen (1940), p. 235 says 1896, Berlin.

Blaserna, P. 1876. Die Theorie des Schalls in Beziehung zur Musik. Leipzig: no publisher given.

Boecklin, August von. 1811. Fragmente zur hoeheren Musik und fuer aesthetische Tonliebhaber. Freyberg/Konstanz: Herder. 84 pp.

Boehm, J.W. 1830. Analyse de Schoenen in der Musik. Wien: no publisher given.

Brendel, Karl Franz. 1855. (Polemik geoen Eduard Hanslick). Rheinische Musik- und Theaterzeitung, XLII, 8-10.

Cassel, Paulus. 1882. Die Musik und ihr Einfluss auf die Menschen. Berlin: no publisher given.

Note: dissertation?

Chalupecky, H. 1904. Farbenhoeren. Wien. klin. Rundschau, XVIII (1904), 273-6, 395-7, 412-4, 431-2.

Clavier, J. 1899-1900. L'audition coloree. L'Anne Psychol., V, 161. Also: Rev. d. Sciences, XI (1900), 975-985.

Csillage, Carl. 1854. Aesthetik der Tonkunst in Verbindung mit einer ausfuehrlichen Grammatik und Poetik der Musiksprache. Pressburg: no publisher given. -

Dennert, H. 1896. Zur Wahrnehmung der Geraeusche. Archiv fuer Ohrenheilkunde, XLI, 109.

Dogiel, J. 1880. Ueber den Einfluss der Musik auf den Blutkreislauf. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, n/v, 416-428.

Note conflicting sourse from Mecklenburg: Archiv fuer Anatomie und physiologie, Physiologische Abteilung 1880, p416. "To Dogiel ... belongs the credit of having carried out the first systematic experiments on the influence of music proper on the organism ... executed two series of experiments on the influence of music on

the circulation of the blood: the first on human circulation, the second on that of animals, chiefly dogs and rabbits. The experiments on human beings were made by means of the plethysmograph; on animals by taking the cardiac pulse on the cartoid artery. The sources of auditory stimuli were Koenig's diapason with resonance boxes, the violin, clarinet, flute, and a metal whistle ... the general conclusions of Dogiel's study are as follows: (1) music exhibits an influence on the circulation of the blood in man as in animals (2) blood pressure sometimes rises and sometimes falls ... (3) the action of the musical sounds and of the whistles on animals and man expresses itself for the most part by the acceleration of the cardiac contractions. The automatic centers of the heart work more energetically (4) the variations of the circulation as a result of musical influence agree with the respiratory changes, although they can be observed independently of the latter (5) the variations of the circulation depend on the pitch, intensity, and timbre of the sound (6) in the variations of the blood pressure, the idiosyncracies of the individual, whether man or animal, are plainly apparent and even the nationality in case of man has some effect." --Diserens (1923)

Draeseke, Felix. 1884. Die Charakteristik der Tonarten. Neue Zeitschrift fuer Musik, LI, 357.

Droenewolf, O. 1867. Ueber das Verhaeltnis der Musik zu den anderen Kuensten. Neue Zeitschrift fuer Musik, LXIII, 17, 29, 39.

Engel, Gustav. 1867. Die wissenschaftliche Begruendung der musikalischen Intervalle. Der Gedanke, VII, no pp.

Engel, Gustav. 1884. Aesthetik der Tonkunst. Berlin: no publisher given. 421 pp.

Fechner, Gustav Theodor. 1873. Einige Ideen zur Schoepfungs- und Entwicklungsgeschichte der Organismen. Leipzig: B. and H.

Fechner, Gustav Theodor. 1876. Vorschule der Aesthetik. Leipzig: B. and H., 1876. 2nd. ed., 1897-8.

Kreitler and Kreitler (see notes to Chapter 5, p.

382) mention Fechner's 1876 treatise in reference to "preferences for the Golden Section" and "other proportions of form."

Fink, Gottfried Willhelm. 1836. Ueber den Reiz des Haesslichen auch in der Musik. Allgemeine musikalische Zeitung, 1836, 3.

Fink, Gottfried Wilhelm. 1845. Geschichtliche Andeutungen ueber den Einfluss der kirchlichen Musik auf das Gemuet. Zeitschrift fuer historische Theologie, XV (1), 127.

Foehlisch, D.J.F. 1823. Ueber Menschenbildung durch das Schoene, mit besonderer Ruecksicht auf Ton- und Zeichenkunst, hauptaechlich in den Mittelschulen. Wertheim: no publisher given.

Frankl, L. von. 1891. Ueber den Verlust des musikalischen Ausdrucksvermoegens. Deutsche Zeitschrift fuer Nervenheilkunde, I, 283.

Franz, K.W. 1801-2. Ueber Gemuetsstimmung in musikalischer Hinsicht, ein psychologisch-aesthetischer Versuch. Allgemeine musikalische Zeitung, n/v, 657.

Gardiner, William. no date. Die Musik der Natur. [German translation: "weitere Angaben nicht zu ermitteln"]. No city or publisher given.

Gerstenkorn, Franz. 1857. [Polemik gegen Eduard Hanslick]. Neue Zeitschrift fuer Musik, n/v, no pp.

Geyer, F. 1858. Ueber das Natuerliche in der Kunst. Neue Berliner Musikzeitung 1858, 177, 185, 193.

Goldschmidt, Hugo. 1895. Objektivitaet des kuenstlerischen Urteils und der musikalische Interpret. Allgemeine Musikzeitung 1895, 653, 667.

Grueber, Eduard. 1893. Psychologischer Frageboden ueber Gehoerfarben, Gehoerfiguren, und Gehoerhelligkeiten. Leipzig: no publisher given.

Haase, Rudolf. 1882. Die Bedeutung der Musik als Bildungsmittel und ihre Beziehungen zur Poesie. Koethen: no publisher given.

Hand, Ferdinand G. 1837. Aesthetik der Tonkunst. 2 Baende. Leipzig 1837-41; 2. Auflage, Leipzig 1846: Hockhausen. [2nd edition] iv, 630 pp.

Hanslick, Eduard. 1854. Vom musikalische-Schoenen. Leipzig: B. and H. 196 pp. Eng. trans., 1891: no publisher given. 174 pp.

From Mecklenburg entry 1188: Vom Musikalisch-Schoenen. Ein Beitrag zur Revision der Aesthetik der Tonkunst. Leipzig 1854, 2. Auflage 1858, 6. Auflage, 1881, 7. Auflage 1885, 8. Auflage ca. 1891-95, 9. Auflage 1896, 10. Auflage 1902, 11. Auflage 1910, 12. Auflage 1918, 13. -15. Auflage Leipzig 1922: B. and H. (viii, 176 pp.) (Spanish, 1879, Italian, 1884, Norwegian 1885, English 1891, Russian 1895, Japanese 1924). Schoen cites the 1891 English translation.

Hartmann, E. von. 1886. Zur Aesthetik der Tonkunst. Deutsche Rundschau, XLVI, 72.

Hausegger, Friederich von. 1885. Die Musik als Ausdruck. Wien, 1885; 2. Auflage Wien 1887: Konegen. 238 pp.

Mecklenburg entry also cites: Bayerische Blaetter 1884, 1888, 198ff. Incomplete citation given by Schoen.

Hauser, ?. 1834. Versuch ueber das Schoene in der Musik. Erfurt: no publisher given.

Heinse, Wilhelm. 1805. Musikalische Dialoge, oder philosophische Unterredungen beruehmter Gelehrter, Dichter und Tonkunstler ueber den Kunstgeschmack in der Musik. Leipzig: Graeff. 238 pp.

Hiller, Ferdinand von. 1880. Wie hoeren wir Musik? Deutsche Rundschau, XXIV, 432ff.

Hirschfeld, Robert. 1885. Das kritische Verfahren Eduard Hanslick's. Wien 1885, 3. Aufl. 1895: Loewit.

Hoffman, Johann Leonhard. 1786. <u>Versuch einer Geschichte der mahlerischen Harmonie ueberhaupt und der Farbenharmonie insbesondere, mit Elaeuterungen aus der Tonkunst und vielen praktischen Anmerkungen</u>. Halle: J.C. Handel. xviii, 157 pp.

Hoffmann, E.T.A. 1812. Johannes Kreislers, des Kapellmeisters Gedanken (Disseriuncula) ueber den hohen Wert der Musik. <u>Allgemeine Musikzeitung 1812</u>, no pp.

Hoffmann, E.T.A. [1814]. <u>Phantasiestuecke in Callots Manier</u>. Leipzig, 1924: no publisher given.

Hoffmann, E.T.A. 1814. Ueber einen Ausspruch Sacchinis und ueber den sogenannten Effekt in der Musik. <u>Allgemeine Musikzeitung 1814</u>, no pp.

Hoffmann, E.T.A. 1816. Ahnungen aus dem Reich der Toene. <u>Morgenblatt 1816</u>, no pp.

Hoffgartner, Friedrick Karl. 1847. <u>Die Musik in ihrer Beziehung zur Aesthetik und zur Heilkunst</u>. Dissertation: Wien.

Horstig, C.G. 1824. Ueber den Einfluss der Tonkunst auf Menschenveredelung. <u>Caecilia 1824</u>, 59.

Hostinsky, Ottokar. 1877. <u>Das Musikalisch-Schoene und das Gesammtkunstwerk vom Standpunkt der formalen Aesthetik</u>. Leipzig: B. and H.

Hueffer, Franz. 1875. <u>Die Poesie in der Musik</u>. Aus dem Englischen uebersetzt. Leipzig: no publisher given.

Jan, Carl von. 1867. Die Tonarten bei Platon. <u>Neues Jahrbuch fuer Philosophie und Paedagogik 1867</u>, (oder) <u>Biographisches Jahrbuch fuer Altertumskunde 1867</u>.

Jan, Carl von. 1893. Die Harmonie der Sphaeren. <u>Philologus, LII</u>, 13ff.

Kalischer, Alfred Chr. S.L. 1888. <u>Musik und Moral</u>. Hamburg: Richter.

Katterfeldt, Julius. 1845. Die Musik als Foerderungsmittl der religioesen Erbauung. Kiel: Universitaets-Buchhandlung.

Kausch, Johann Joseph. 1782. Psychologische abhandlung ueber den einfluss der Ton und ins besondere der Musik auf die Seele; nebst einem Anhange ueber den unmittelbaren zwek der schoenen Kunste. Breslau: Bei J.F. Korn, dem aelteren. xvi, 200 pp.

Lussy, Mathis. 1863. Traite de l'expression musicale. Nancy (1863), 2e edition 1874, 8e edition Nancy 1904: Berger-Levrault. Deutsch: Leipzig 1886 (uebersetzt von F. Vogt); English: London 1885 (translated by E. von Glehn).

Mahling, Friedrich. 1926. Das Problem der "Audition coloree;" eine historische-kritische Untersuchung. Leipzig: Akademische Verlagsgesellschaft m.b.H. 136 pp.

Bibliography: 102-136.

Mentz, P. 1895. Die Wirkung akustischer Sinnesreize auf Puls und Athmung. Wundt Philosophischen Studien [Leipzig], XI, 61-124, 371-392, 563-602.

Note: Chandler and Barnhart conflicts with Diserens (above), shows volume as X. "Mentz conducted experiments on the influence of auditory stimuli on the movements of circulation and respiration under the varying conditions of attention. The apparatus used consisted of the Marey sphygmograph and pneumograph. He found that auditory stimuli, noises as well as simple sounds, produce a retardation of the pulse, and a retardation or acceleration of the respiration, correlated with the duration of the stimulus and the presence or absence of voluntary attention ... if [a listener] does not pay particular attention or does not attempt to analyze the selection a retardation of the pulse ensues; if he analyzes the music acceleration appears. In an examination of the pulse during the musical selection, Mentz found that a marked variation in intensity produced retardation. Disagreeable dissonances are accompanied by acceleration; agreeable consonance by retardation." --Diserens (1923)

Metz, Karl. 1898. Das deutsche Kunstlied. Musikaesthetische Betrachtungen, nebst einem Anhang: Farbe und Ton. Leipzig (1898, 1901): Merseberger. viii, 116 pp. (Saengerhalle 30/53).

Meumann, E. 1894. Untersuchungen zur Psychologie und Aesthetik des Rhythmus. Philosophischen Studien, X, 249-332, 393-430. Also: Leipzig: Englemann, 1894.

Michaelis, Christian Friedrich. 1806-7. Ueber das Humoristische in der Musik. Allgemeine musikalische Zeitung 1806/7, 725.

Michaelis, Christian Friedrich. 1807-8. Ueber das Idealische der Tonkunst. Allgemeine musikalische Zeitung 1807/8, 449.

Molldur (Kieninger), Karl. 1880. Die Kunst und Wissenschaft der Musik. I: Die Musik in ihrem Verhaeltnis zur Religion. Lorch (1880), 2. Aufl. Lorch 1903: Rohm. II: Musik als Medium zur Krankenheilung. Lorch 1903: Rohm. II: Musik als Farben-Komposition zur Unterstuetzung der Tonmusik bei der seelischen Heilung (Heilung aller Seelen?). Lorch 1903: Rohm. IV: Musik als Geisterdemonstration Entsprechungswissenschaft - nebst geistigem "Darwinismus" als verklaerten Sphaeren. Lorch 1903: Rohm (insgesamt 296 pp).

Nohl, Ludwig. 1878. Zum Komischen in der Musik. Allgemeine deutsche Musikzeitung 1878, 25.

Oersted, H. Chr. 1808. Ueber die Gruende des Vergnuegens, welches die Toene hervorbringen. Leipzig (1951): Gesammelte Schriften III.

Oersted, H. Chr. 1851. Die Naturwirkung des geordneten Lautausdrucks. Leipzig (1951): Gesammte Schriften III.

Pastor, Willy. 1889, 1890, 1893. Aufsaetze zur Aesthetik und Psychologie der Musik. Musikalisches Wochenblatt, n/v, no pp.

Piper, Ferdinand. 1850. Von der Harmonie der Sphaeren. Berlin: no publisher given.

Filmed as received

without page(s) 369 .

UNIVERSITY MICROFILMS.

Riemann, Ludwig. 1896. Populaere Darstellung der Akustik in Bezeihung zur Musik. Braunschw.: no publisher given. 157 pp.

Rischbeiter, W. 1888. Die Gesetzmaessigkeit in der Harmonik. Regensberg: no publisher given. 169 pp.

Ritter, H. 1886. Die Aesthetik der Tonkunst in ihren wichtegsten Grundzuegen. Wuerzburg: Stahel.

Ritter, H. 1892. Studien und Skizzen aus Musik- und Kulturgeschichte, sowie Musikaesthetik. 2. Auflage, Dresden: Hertz. 186 pp.

Sachs, E.M. 1887. Das Verhaeltnis der Sprache zur Musik. Allgemeine Musikzeitung, n/v, 479, 491, 501.

Schasler, Max. 1881. Die Ironie in der Musik. Neue Zeitschrift fuer Musik 1881, 385, 397, 405.

Schasler, Max. 1882. Die Musik und Malerei in ihrer Stellung zueinander im System der Kunst. Neue Zeitschrift fuer Musik 1882, 1, 13, 25, 37.

Schaul, Johann Baptist. 1809. Briefe ueber den Geschmack in der Musik. Karlsruhe: no publisher given.

Schilling, Gustav. 1838. Versuch einer Philosophie des Schoenen in der Musik, oder Aesthetik der Tonkunst. Mainz: no publisher given.

Mecklenburg gives: "('Warnung' vor dem 'Versuch einer Philosophie des Schoenen in der Musik oder Aesthetik der Tonkunst'). Allgemeine musikalische Zeitung 1838, n/v, 807."

Schneider, Paul. 1892. Ueber das Darstellungsvermoegen der Musik. Eine Untersuchung an der Hand von Professor Eduard Hanslicks Buch "Vom Musikalisch-Schoenen." Opeln./Leipzig: Marke. 126 pp.

Schneider, Peter Joseph. 1835. System einer medizinischen Musik ... Bonn: C. Georgi. 2 vols.

Mecklenburg also gives: "Die Musik und Poesie. Nach ihren Wirkungen historisch-kritisch dargestellt.

(System einer medizinischen Musik). 2 Teile, Bonn."

Schucht, J. 1857. Die Sentimentalitaet in den Tondichtungen der Neuzeit. *Neue Berliner Musikzeitung 1857*, 249, 257, 265.

Schucht, J. 1881. Die ethische Wirkung der Musik und das Moralprinzip in der Kunst. *Neue Zeitschrift fuer Musik 1881*, 357, 365, 373.

Schucht, J. 1891. Der Realismus in Poesie und Musik. *Neue Zeitschrift fuer Musik 1891*, 243.

Schuetze, Stephan. 1830. Ueber Gefuehl und Ausdruck in der Musik. *Caecilia*, *XII*, 237.

Schuetze, Stephan. 1834. Ueber das Verhaeltnis der Komik zur Musik. *Caecilia*, *XVI*, 197. Erwiderung durch Kaeferstein, p. 245.

Seidl, Arthur. 1898. (*Besprechung von Ch. Ruths "Experimental- Untersuchungen ueber Musik-Phantome."*) Darmstadt: no publisher given. (*Musikalisches Wochenblatt 1898*), *n/v*, no pp.

Parentheses from Mecklenburg.

Sommer, Hans. 1898. *Die Wertschaetzung der Musik*. Muenchen: Kastner und Lossen. Also: *Abdruck aus 'Kunstwart'*, *XI*, 13-15.

Sonneck, O.G. 1897. *Ein kritisch-polemisches Referat ueber die "Musik-aesthetische Streitfragen usw." von F. Roesch als Protest gegen den Symbolismus in der Musik*. Frankfurt (M): Knauer. 96 pp.

Spanuth, A. 1878. Das Komische in der Musik. *Allgemeine deutsche Musikzeitung 1878*, 1.

Stade, Fritz. 1870. *Vom Musikalisch-Schoenen. Mit Bezug auf Dr. E. Hanslicks gleichnamigen Schrift*. Leipzig, 1870; 2. Auflage Leipzig, 1904: Kahnt. 48 pp.

Stein, K. 1833-4 Versuch ueber das Komische in der Musik. _Caecilia_, _XV_, 221. (Vgl. von Schuetze ebenda, _XVI_ (1834), 197, und Nachschrift von Stein ebenda, p. 245: "Ueber Komische Musik." In Erwiderung der Abhandlung von K. Stein im _60_. Heft der _Caecilia_: "Versuch ueber das Komische in der musik." (_Allgemeine musikalische Zeitung 1834_, 249, 269).

Stumpf, Carl. 1886. Ueber der Vorstellung von Melodien. _Zeitschrift fuer Philosophie_, _89_, 45-57.

Stumpf, Carl. 1898. Zum Einfluss der Klangfarbe auf die Analyse von Zusammenklaengen. _Beitraege zur Akustik und Musikwissenschaft_, _II_, 168.

Tappert, Wilhelm. no date. Notenmalerei und Notenscherze. (Weitere Angaben nicht zu ermitteln).

Tappert, Wilhelm. 1868. Zooplastik in Toenen. _Musikalische Studien 1868_, no pp.

Thimus, Albert (Freiherr) von. 1868-76. _Die harmonikale Symbolik des Alterthums_. Koeln: M. Du Mont-Schauberg. 2 volumes.

Volume _I_: "Die esoterische zahlen lehre und harmonik der Pythagoreer in ihren bezeihungen zu aelteren griecheschen und morgenlaendischen quellen, insbesondere zur altsemitisch-hebraeisch ueberlieferung." Volume _II_: "Der technisch-harmonikale und theosophisch-kosmographische inhalt der Kabbalistischen buchstaben-symbole des althebraeischen buechlein's Jezirah. Die Pythagorisch-platonische lehre vom werden des hebraeischen wie chamitisch-altaegyptischen weisheitslehre und zur heiligen ueberlieferung die urzeit." --New York Public Library Music Index catalogue card annotation; confirmed by Mecklenburg.

Urbantschitsch, V. 1888. Ueber den Einfluss einer Sinneserregung auf die uebrigen Sinnesempfindungen. _Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere_, _42_, 3-4.

"...[Urbantschitsch] investigated the influence of auditory stimuli on the sense impressions, particularly

on normally minimal visual stimuli. He found that patches of color observed at a distance at which the color could scarcely be recognized were brought clearly into the sensory field, by sounding a tuning fork. In short, the threshold of color perception is lowered by tonal stimuli. Tuning forks of high pitch, applied to both ears, were most effective. The influence [of sound upon threshold perceptibility of] the different colors is variable. Barely legible print was often read when a tone accompanied the effort. Tastes, odors, and touch are similarly affected by sound, and pain is increased by jarring noises. Finally Urbantschitsch claims to have produced photisms, or phenomena of colored audition, by having the subject observe a grey disk on white paper, or an undulating white surface, and describe the colors perceived while different tuning forks were sounded. The experiments, if valid, indicate that the subjects of audition coloree are merely striking examples of the normal psychological influence of one sense upon the other." --Diserens (1923)

Vierordt, K. von. 1885. Die Schall- und Tonstaerke und das Schalleitungsvermoegen der Koerper. Tuebingen: no publisher given. 274 pp.

Wagner, ?. 1891-2. Musikalisch-dramatische Parallelen. Beitrage zur Erkenntnis von der Musik als Ausdruck. Gesammelt von mehreren Wagnerianer, erlaeutert durch Einen. Sonderabdruck aus den Bayreuther Blaettern, 1891/1892. Bayreuth, 1903: Bayreuther Blaetter.

Wagner, E.D. 1878. Versuch einer Darstellung des Symbolischen in der Musik. Neue Berliner Musikzeitung 1878, 257, 265, 273, 281, 289, 299.

Wallaschek, Richard. 1891. Ueber die Bedeutung der Aphasie fuer den musikalischen Ausdruck. Vierteljahrschrift fuer Musikwissenschaft, [jahrg.] 7, 53-73.

Wallaschek, Richard. 1892. Das musikalische Gedaechtniss und seine Leistungen bei Katalepsie, im Traum und in der Hypnose. Vierteljahrschrift fuer Musikwissenschaft, 7, 204-251.

Wallaschek, Richard. 1894. Die Bedeutung der Aphasie fuer die Musikvorstellung. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, VI, 8.

Weber, F.A. 1800-1801. Ueber komische Charakteristik und Karikatur in praktischen Musikwerken. Allgemeine Musikalische Zeitung 1800/1801, 137, 157.

Weber, F.A. 1801-1802. Von dem Einfluss der Musik auf den menschlichen Koerper und ihrer medizinischen Anwendung. Allgemeine Musikalische Zeitung 1801/1802, 561, 577, 593, 609.

Wendt, A. 1808-1809. Einfluss der Musik auf den Charakter. Allgemeine musikalische Zeitung 1808/1809, 81, 97.

Wendt, A. 1826. Ausdruck in der Musik. Caecilia, IV, 173.

Witmer, L. 1893. Zur experimentellen Aesthetik einfacher raeumlicher Formverhaeltnisse. Philosophische Studien, 9, 96-114; 209-263.

Kreitler and Kreitler (1972) cite this paper, pages 382-3, in reference to "preferences for the Golden Sction and other proportions of form."

Woelfflin, Eduard von. 1897-8. Zur Geschichte der Tonmalerei. Sitzungberichte der Bayerischen Akademie der Wissenschaft, II, 2.

Wolf, William. 1894. Ueber Tonmalerei. Gesammelte musikaesthetische Aufsaetze 1894, no pp.

Wundt, Wilhelm. 1902. Grundzuege der physiologischen Psychologie. 5. Aufl.: Leipzig, 1902.

Volume II, pages 63-138, 370-8 concern music, sound perception.

Ziller, Fritz. 1876. Die Musik und das Komische. Dissertation, Goettingen. Halle: Schmidt. 50 pp.

Zimmermann, Robert. 1885. Referat ueber Eduard Hanslicks "Vom Musikalisch-Schoenen." Vierteljahresschrift fuer Musikwissenschaft, I, 251-252.

MUSICAL PERCEPTION
ITALIAN

Bernardini, C., and Ferrari, Guilio C. 1896. Richerche sperimental sull memoria musicale nei frenastensici. Riv. sper. Freniatria., 22, 315-323.

Dutto, Uberto. 1896. Influenzo della musica sulla Termogenesi animale. Rendiconte della R. Acedemia dei Lincei, 5, no pp.

"Following the work of Tarchanoff [1894], Dr. Dutto ... of the laboratory of physiology of Rome, executed a series of tests to determine the influence of musical stimuli on thermogenesis of animals. For the purpose of extending the investigations of Dogiel [1880] and Tarchanoff, various animals were subjected to the influence of music by letting them hear an organ during an hour or an hour and one-half. Under these conditions he found that thermogenesis increased in birds generally; hares, guinea pigs, and chickens, however, showed a diminution...Dutto thinks that music determines a state of special psychic tension during which the afflux of blood to the peripheral circulatory system is diminished with a consequent decrease in the radiated heat...If music, as Dutto contends, acts as a stimulus to organic metabolism, we have an explanation of the result of Tarchanoff who found that dogs and guinea pigs consume more oxygen and eliminate more carbon dioxide when subjected to the influence of music." --Diserens (1923)

Ferrari, Guilio C. 1894. L'Idea nel Bello musicale. Rivista Italiana di Filosofie, n/v, no pp.

Ferrari, Guilio C. 1895. La Liberte e la Regolarita nella Arti belle e nella Musica. Rivista Italiana di Filosofia, n/v, no pp.

Ferrari, Guilio C. 1897. Richerche sperimentali sulla natura dell'emozione musicale. Rivista musicale Ital., 4, 328-329.

"...repeated the experiments of Patrizi [1896] on normal, feebleminded, and idiotic individuals. ...

concludes that there are vasomotor activities after a musical emotion only when the individual is in a state of psychological inferiority; when the superior psychic functions have vanished; and when mental coordination ceases to inhibit emotion. In short, the effect appears when an organic disorder exists." --Diserens (1923) Trivial problem: there is some disagreement as to Ferrari's middle initial. Mecklenburg says "M", Diserens says "E", and all other sources agree on "C".

Galli, Amintore. 1881. Storia teoretica ed estetica della Musica: Programmi e sunti di Lizioni. No city or publisher given.

Galli, Amintore. 1897. Estetica della Musica, Ossia del Bello nella Musica sacra, teatrale e da Concerto. Torino, 1897; 2. Edizione, Torino, 1900: Bocca. 1046 pp.

Gamucci, B. 1875. Considerazioni sul Bello musicale. Akten des Kgl. Musikalischen Instituts zu Florens 1875.

Mantovani, Tancredi. 1892. Il Studio della Estetica musicale. Trieste: no publisher given.

Ovio, G. 1898. Sugli occhiali colorati. Ann. di Ottal., XXVII, 317-374.

Patrizi, M.L. 1896. Primi esperimenti intorno all'influenza della musica sulla circulazione del Sangue nel cervello umano. Riv. Musicale Ital., 3, no pp. Also: Arch. di Psichiat., 17 (1896), 390-406.

Mecklenburg also shows: "Patrizi, Mariano L. 1896. Primi esperimenti intorno al'influenza della musica sulla circulazione del Sangue nel Cervello del'Uomo. Torino: Bocca." "Emanuel Favre, a boy of thirteen years of age, was severely wounded in the head by an axe. The wound was 13 cm. in length, cleaving the bones of the skull for the entire distance. Restored to health the boy presented a soft cicatrice, through which the pulsations of the brain were plainly visible, and changes of the cerebral circulation could be accurately determined ... Plethysmographs were used to determine changes in circulation; for registering the pulse of the brain a cup of gutta percha was made with an electric connection capable of showing the slightewt modification in volume or pulsation. The results were recorded on a kymograph. In general it was found that pulsations took a higher range after a musical note, or a very near repetition of the same note. High notes produced greater changes than tones of lower pitch ... Patrizi is undecided whether the variations in cerebral volume are autonomic neuromuscular functions, or passive reflections of general vasomotor phenomena. He points out, however, that his results diverge from those of Fere [1887] and Tarchanoff [1894], since the substitution of lively for melancholy music did not produce an increase of volume as these investigators assumed. In a book published several years later [1902. La nuova fisiologia della emozione musicale. Modena: no publisher given], Patrizi enlarges on the observations reported above in the effort to establish a musical esthetics founded on physiological principles." --Diserens (1923). Bracketed material supplied by this compiler.

Sergi, G. 1893. Dolore e Piacere. Milano: no publisher given.

"...gives a critical resume of the experiments of Dogiel on reactions to music. Sergi interprets these results in terms of the James-Lange theory of emotion and concludes that musical emotions entirely lack intellectual character." --Diserens (1923).

Sokolov, B.P. 1897. [Facts and theory of color-hearing]. Voprosy Filos., VIII, no pp.

Vescovi, P. de. 1897. Visione cromatizzata delle parole (audizione colorata). Arch. Ital. di Otol., V, 273-341.

Vallanis, Luigi Alberto. 1896. Come si sente e come si dovrebbe sentire la musica. Torino: Lattes.

MUSICAL PERCEPTION
LATIN

Aristedes, Quintillianus. De musica libri III. Hrsg. von Albert Jahn. Berlin, 1882: no publisher given.

Note: Entered in the Mecklenburg subject index under "Symbolism."

Hansen, J.N. 1833. De musicae in corpus humanum vi. Berlin: no publisher given. [Dissertation].

Hausen, Hans Niels. 1833. De musicae in corpus humanum vi. Dissertatio inauguralis psychologico-medica quam ... die XX. m. Augusti a. MDCCCXXXIII ... publice defendet, scriptor Joannes Nicolaus Hansen. Berolini [Dissertation, Berlin]: Typis Nietackianis. 37pp.

Compare with entry from Mecklenburg: Hansen, J.N. 1833.

MUSICAL PERCEPTION
SPANISH

No documents found.

ABILITY
DUTCH

No documents found.

ABILITY
ENGLISH

Allen, Grant. 1878. Note deafness. Mind, III, 152-167.

Anonymous. no date. Sound blindness. London Journal of Education, IX, 475.

Bleyer, J.M. 1897. Tone Blindness. Journal of Eye, Ear, and Throat Disease, II, 1f..

Ellis, Albert. 1896. Phrenology and musical talent. Blackpool: Human Nature Office. 24 pp.

Gilbert, J. Allen. 1893. Experiments on the musical sensitiveness of school children. New Haven: Stud. Yale Psych. Lab., I, 80-87.

Mecklenburg conflicts with Chandler and Barnhart; gives: vol. 2 (1894), 105.

Jadassohn, Salomon. 1899. A practical course in ear training or a guide for acquiring relative and absolute pitch. Translated by Le Roy B. Campbell. Leipzig (1899), 2nd ed., Leipzig (1905): B. and H. 80 pp.

Meyer, Max F. 1899. Is the memory of absolute pitch capable of development through training? Psychology Review, 6, 514-516.

Squire, C.R. 1901. A genetic study of rhythm. American Journal of Psychology, XII, 492-589.

Van Cleve, J.S. 1897-8. Concerning musical memory. Music, XII (1897), 636-644; XIII (1898), 158-166.

Wallaschek, Richard. 1893. Primitive music. London: Longmans, Green, and Co. xi, 326 pp.

Chapter 5: Physical and psychical influence of music. Chapter 6: Heredity and development.

ABILITY
FRENCH

Arreat, L. 1895. Mémoire et imagination. Peintres, musiciens, poètes et orateurs. Paris: Alcan.

Bronislawski, Venceslaus-Handelsman. 1900. Contribution à l'étude l'amusie et de la localisation des centres musicaux. Thesis. Bordeaux: Gounouilhou. 76 pp.

Cabanes, L.A. 1899. Les phthisiques célèbres. La maladie de Chopin d'après des documents inedits. La chronique médicale, n/v, 673.

Dauriac, Lionel. 1892. De l'oreille musicale, essai sur la psychologie du musicien. Orleans: Girardot.

Dauriac, Lionel. 1895. De l'intellegence musicale et de ses conditions objectives et subjectives. Revue Philosophique, XXXIX, 31, 238.

Dauriac, Lionel. 1895. La mémoire musicale. Revue Philosophique, XXXIX, 400.

Poiree, Elie. 1898. Etude sur le discours musical. Revue internationale de musique, n/v, 129-141.

Poiree, Elie. 1899. Etude sur le discours musical. Essais de technique et d'esthétique musicales 1899/2, no pp.

Mecklenburg entry (above) unclear; could mean 1899, vol. II, or 1899-1902, no volume given.

ABILITY
GERMAN

Bezold, Fr. 1896-1900. Das Hoervermoegen der Taubstummen. Wiesbaden: (1896), 156 pp. Zeitschrift fuer Psychologie, n/v (1900), 78.

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., n/v, 79-106. (Also, Berlin, 1896, no publisher given).

"...presents...notes on the influence of music on the organism. Most of the paper is devoted to the physiological and motor affects of rhythm." --Diserens (1923).

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., 81, 84.

Note: Diserens (1923) gives same journal, but gives volume LXXXC, which must be a typographical error, and gives pages 79-106. "...Most of the paper is devoted to the physiological and motor affects of rhythm, but several observations on tonal affects on man and animals are recorded. The author reports an experiment of his own in which a violent pain appeared in an apparently sound tooth upon hearing a soprano sing a high note (B) at a concert, a quarter tone too high. Examination of the tooth disclosed slight decay. The hyper-irritability of the nerve was thus excited by irradiation of an auditory stimulus. The observation accords with the conclusion of Urbantschitsch [1888: Ueber den Einfluss einer Sinneserregung...] that auditory stimuli lower the sensory threshold. Billroth also mentions seeing a young "great Dane" fall down as if in a faint when a village brass band struck up a (march)." --Diserens (1923)

Billroth, Th. 1894-5. Wer ist Musikalisch? Deutscher Rundschau., LXXI (1894), 79; LXXIV (1895), 385.

Also: Wer ist Musikalisch? Herausgegeben von Eduard Hanslick. Berlin: Stavanger. 2. Auflage 1896, 3. Auflage 1898, 4. Auflage 1912, 5. Auflage Berlin 1946: Paetel. 246 pp. Please note conflict: Max

Schoen (1940), p. 235 says 1896, Berlin.

Binder, ? 1889. Das Morel'sche Ohr. Arch. f. Psychiatrie, XX. Also: Berlin (1889), no publisher given. 55 pp.

Branckmann, K. 1896. Die im kindlichen Alter auftretende Schwerhoerigkeit und ihre paedagogische Wuerdigung. Leipzig: no publisher given. 103 pp.

Brendel, Karl Franz. 1847. Ueber musikalische Recensionen. Neue Zeitschrift fuer Musik, XXVI (1847), 102, 106, 114, 153, 163; XXVII (1847), 254.

Eccarius-Sieber, Artur. 1898 (1899?). Die musikalische Gehoerbildung. Berlin: 2. Auflage Berlin 1902: Simrock.

Engel, Gustav. 1889. Ueber den Stimmumfang sechsjaehriger Kinder. Hamburg: no publisher given.

Gerber, P.H. 1898. Mozarts Ohr. Deutsche medizinische Wochenschrift, XXIV, 351.

Hermann, ?. 1873. Richard Wagner. Streiflichter aus Dr. Puschmanns psychiatrischer Studie. Munich: no publisher given.

Hiller, Ferdinand von. 1880. Wie hoeren wir Musik? Deutsche Rundschau, XXIV, 432ff.

Jadassohn, Salomon. 1899. Das absolute Tonbewusstsein; die Lehre vom musikalischen Hoeren. Leipzig: S. and H.

Peterson, J. 1898. Ueber Erziehung durch Musik und ueber Talent. Berlin: Schlesinger. 44 pp.

Pringsheim, C. 1873. Richard Wagner und der "Spezialist der Psychiatrie." Eine Beleuchtung der Puschmannschen Studie. Berlin: Schneider.

Probst, Moriz. 1899-1900. Ueber die Lokalisation des Tonvermoegens. Archiv fuer Psychiatrie und Nervenkrankheiten, XXXII (1899), 387; 1900/2 [XXXIII?], no pp.

Puschmann, Th. 1873. Richard Wagner. Eine psychiatrische Studie. 3. Auflage, Berlin: Behr.

Schaaffhausen, ?. 1885. Einige Reliquien beruehmter Maenner. Robert Schumanns Gehirn und Hoerorgane. Korrespondenzblatt der Deutschen Gesellschaft fuer Anthropologie, Ethnologie und Urgeschichte, XV (10), 147-149.

Walther, Eduard. 1882. Geschichte des Taubschte, XV (10), 147ns. Leipzig: no publisher given.

Walther, Eduard. 1895. Handbuch der Taubstummenbildung. Berlin: no publisher given. 748 pp.

Wavruch, ?. 1842. Aerztlicher Rueckblick auf Ludwig van Beethovens letzte Lebensepoche. Wiener Zeitschrift, 30.4.1842.

Zwaardemaker, H. 1894. Der Umfang des Gehoers in den verschiedenen Lebensjahren. Zeitschrift fuer Psychologie, VII, 12-28.

ABILITY
ITALIAN

Caluci, E. 1894. Sulla Genesi del Senso musicale. Venice: Ferrari.

Ferrari, Guilio C. 1889. Primi esperimenti sull immaqionazione musicale. Rivista musicale Ital., 6, 159-175.

Perrod, Giovanni. 1896. La Sensibilita meteorica in R. Wagner. Rivista Musicale Italiana, n/v, 562-576.

ABILITY
LATIN

No documents found.

ABILITY
SPANISH

No documents found.

APPLIED MUSIC PSYCHOLOGY
DUTCH

Hoorn, P.G. van. 1817. Waarneming einer genezing van eene bijzondere zenuwziekte door de muzijk. <u>Natuurkundige Vrhandelingen van de Hollandsche Maatschappij der Wetenschappen te Harlem</u>, <u>VIII</u>, 217ff.

APPLIED MUSIC PSYCHOLOGY
ENGLISH

Atlee, E.A. 1804. _An inaugural essay on the influence of music in the cure of diseases_. Philadelphia: no publisher given.

Baker, F.C. 1897. On the effect of music on caged animals. _American Naturalist_, _XXXI_, 460-463.

Beardsley, G.L. 1882-3. The medical uses of music. _New England Medical Monthly_, _I_, 214-216.

Chomet, H. 1875. _The influence of music on health and life_. New York: Putnam.

Cobb, Gerard. 1884. On certain principles of musical exposition considered educationally and with special reference to current systems of musical theory. Part 1 and 2. _Proceedings of the Musical Association_. 10th Session, 1883-4. Part 1, 125-151. Part 2, 153-184.

Corning, James Leonard, M.D. 1899. The use of musical vibrations, before and during sleep; supplementary employment of chromatoscopic figures; a contribution to the therapeutics of the emotions. _Medical Record_, _55_ (Jan. 21, 1899), 79-86. Also: New York: Publisher's Printing Co., 24 pp. (Reprint from the _Medical Record_ article).

Note: Schoen (1940) confirms the N.Y. Pub. Library entry (above); but Fortescu conflicts: enters author as Corning, T.L.

Cutter, Ephraim. 1891. _The relation of medicine and music_. No publication data given.

Held by the New York Public Library.

Davison, J.T.R. 1899. Music in medicine. _The Lancet_, _n/v_, 1160.

"...summarizes and confirms Dogiel's [1880] and Tarchanoff's [1894; both of these works may be found in this bibliography.] experiments on the physiological effects of music. On the basis of such experiments the theory is advanced 'that music exercises its influence over the body, without the influence of the highest nervous centers,' and that the human organism participates in the tendency to vibrate synchronously with music which sometimes obtains in the animal world, a theory which in a modified and improved form has been restated recently (1918) by Dr. Beaunis." --Diserens (1923)

Dixon, H. 1899. Music and medicine considered from a physiological, pathological and therapeutic standpoint (abstract of paper). _The Lancet_, _n/v_, 1815.

"Dixon reported the repetition of experiments similar to those of Dogiel [1880] with similar results, i.e., increased blood pressure and cardiac action, and variations in respiration. He does not state his method or the number and nature of his subjects, but mentions several physiological effects of music which are not reported by other experimenters. Among such effects are 'perspiration, desire to micturate, lachrymation, and rarely, laughter.'" --Diserens (1923)

Duncan, P. Martin, and William Millard. 1866. _A manual for the classification, training, and education of the feeble-minded, imbecile, and idiotic_. London: Longmans, Green.

See especially page 191 in the Kraft (1963) _J.R.M.E._ article for a discussion of the use of music in mental and moral instruction.

Engel, Carl. 1876. Music and medicine. _Musical myths and facts_, _II_, 84-113. London: no publisher given. 2 volumes.

Fisher, H. no date. _Psychology for music teachers. Laws of thought applied to sounds and their symbols, with other relevant matter_. London: Curwen. 188 pp.

Hadden, J. Cuthbert. 1896. Music as a medicine. _Music_, _9_, 359-368. Also: Chicago: no publisher given.

Ireland, William W. 1894. On affections of the musical faculty in cerebral disease. *Journal of Medical Science*, *XL*, 354-367.

Jadassohn, Salomon. 1899. *A practical course in ear training or a guide for acquiring relative and absolute pitch*. Translated by Le Roy B. Campbell. Leipzig (1899), 2nd ed., Leipzig (1905): B. and H. 80 pp.

McNaught, William G. 1899. The psychology of sight-singing. *Proceedings of the Musical Association*, *XXVI*, 35-55.

Meyer, Max F. 1899. Is the memory of absolute pitch capable of development through training? *Psychology Review*, *6*, 514-516.

Patrici, M.L. 1896-7. Music and the cerebral circulation of man; adapted from the Italian of prof. M.L. Patrici. *Music*, *XI*, 232-242.

"Patrici" is probably a printing error or an anglicization; see "Patrizi, M.L." entry (Italian), this section.

Rush, Samuel. *A discourse on the moral influence of sounds, delivered before the Chester County cabinet of natural science, January 18, 1839*. Philadelphia: Chester County Cabinet of Natural Science. 32 pp.

Sequin, Edouard. 1866. *Idiocy and its treatment by the physiological method*. New York: William Wood.

Page 149: "Sequin stressed the functional nature of listening, the anomalies of hearing in the mentally defective: 'the wild boy educated by Itard did not hear the report of a pistol discharged behind his head, but heard the fall of a nut upon the floor.'" --Kraft (1966)

Smith, E.A. 1895. The influence of music upon life and health. *Music*, *VIII*, 361-365.

Smith, W. MacDonald. 1888. The physiology of pianoforte playing, with a practical application of a new theory. *Proceedings of the Musical Association*, *XIV*, 43-66.

Smith, W. MacDonald. 1894. From brain to keyboard; new and complete practical solution of all technical difficulties. Proceedings of the Musical Association, XXI, 17-33.

Steed, Orlando. 1880. On the beauty of touch and tone: an inquiry into the physiological and mechanical principles involved in their cultivation. Proceedings of the Musical Association, VI, 31-58.

Author is given as "Steed, A. Orlando" by some sources.

Talbot, E.B., and Darlington, L. 1897-8. Distraction by musical sounds; the effect of pitch upon attention. American Journal of Psychology, 9, 332-343.

"...experimented on the influence of music on the discrimination of lifted weights ... the authors conclude that music facilitates attention, the middle octaves having the greatest influence... in opposition to Fere's results [1887], they find that there is no essential relation between pitch and dynamogenic effect." --Diserens (1923); [ ] mine.

Warthin, A.S. 1894. Some physiological effects of music on hypnotized subjects. The Medical News, 65, 89-94.

"Warthin ... attempted to determine experimentally the influence of music on a group of hypnotized subjects. There were seven subjects ... pulse tracings were taken by means of appropriate apparatus, and the suggestion was given to pay attention to nothing but the music and to retain the memory of the effect on awakening... When Wagner's 'Ride of the Valkyries' was played on the piano, the pulse of the [first] subject was accelerated, while the amplitude and the pressure increased. As the music continued, the pulse rose from a normal of 60 to 120 per minute, the entire body being bathed in perspiration ... the same experiments were repeated with the other subjects with similar results ... music was also found to facilitate the hypnotic process as Braid and Moll assert in their manuels." --Diserens (1923); [ ] mine. Diserens gives pages as 89-92.

Wimmer, S.J. 1889. The influence of music and its therapeutic value. New York Medical Journal, L, 258-260.

APPLIED MUSIC PSYCHOLOGY
FRENCH

Berthoud, Samuel Henry. 1853. Une cure operée par la musique. New York: C. Lassalle. 96 pp.

Burq, V. 1874. De la gymnastique pulmonaire contre la phthisie. Chronique musicale, 5, 97-104+.

Dauriac, Lionel. 1900. L'hypnotisme et la psychologie musicale. Revue Philosophique, 50, 390-395.

"De Rochas [See Rochas d'Aiglun, 1900] later presented an amplified version of his experiments and conclusions in a book reviewed favorably by L. Dauriac...the latter regards De Rochas' work as a distinct forward step in the study of musical reactions, but advises caution in the use of the hypnotic method, and in the acceptance of data derived from this source..." --Diserens (1923)

Desessartz, Jean Charles. 1802. Réflexions sur la musique considerée comme moyen curatif, lues à la séance publique de l'Institute national des sciences et arts, le 20 vendemiaire an XI. Paris: Baudouin, imprimeur. i, 20 pp.

Fournier, ?. 1819. Essai sur la musique considerée sous le rapport de son influence sur l'homme en santé et sur l'homme malade. Bibliotheque Universelle Suisse, XI, 289.

Hospital, Pierre. 1897. Histoire médicale de la musique et de la danse. Conférences faites à la Société contre l'ignorance (Cercle clermontois de le Ligue de l'enseignment). Clermont-Ferrand: G. Mont-Louis. 62 pp.

Mojon, [Benedetto]. 1803. Mémoire sur l'utilité de la musique, tant dans l'état de santé, que dans celui de maladie; traduit de la seconde édition italienne, avec notes, par C.D. Muggetti. Paris: Fournier. 48 pp.

Rambosson, J. 1876. Spécification des diverses influences de la musique dans ses applications à l'hygiène et à la médecine. Bulletin de l'Académie de Médecine de Paris, V (Serie 2), 1041.

Rambosson, J. 1877. Spécification des diverses influences de la musique sur la physique et sur le moral, par M.J. Rambosson. Paris: A. Picard. 39 pp.

"Extrait du Recueil des séances et travaux de l'Académie des Sciences morales et politiques." Compare Mecklenburg's entry: "Les diverses influences de la musique sur le physique et sur le moral. Séances et Travaux de l'Académie des Sciences morales et politiques de l'Institut de France, CIX (1878, Ser. 1), 115ff."

Rochas D'Aiglun, E.A.A. 1900. Les sentiments, la musique, et le geste. Grenoble: H. Falque et F. Perrin. iii, 279 pp. Also: Nouvelle Rev., 114, 384-389, 587-602.

"[Rochas D'Aiglun conducted an] investigation ... on the influence of music on behavior during hypnosis. According to De Rochas, isolated tones provoke a trembling extending to all parts of the body, the character of the reaction varying with the pitch and intensity of the notes. Very high tones evoked the expression of pain, very low tones that of anguish or terror. Chords excite the same reaction as simple tones, and dissonances at any part of the scale produce an expression of suffering ... the author concludes that the phenomena observed are pure reflexes, set off by auditory stimuli, without the intervention of the will..." --Diserens (1923)

Roger, Joseph Louis. 1803. Traité des effets de la musique sur le corps humain, par Joseph Louis Roger ... traduit du latin, et augmenté de notes, par Etienne Sainte-Marie. Paris: Chez Brunot. xxxviii, 352 pp.

"[The] original appeared in 1758 under the title: Tentamen, de vi soni et musices in corpore humano. Cf.: Eitner." --N.Y. Public Library Music Index catalogue card annotation.

Rolland, ?. 1853. Influence de la musique sur la guérison des maladies. *Soc. archeologique de Sens, III*, 117-144.

Seguin, Edouard. 1846. *Traitement moral, hygiène, et education des idiots et des autres enfants arriérés ou retardés dans leur développement, agités de mouvements involontaires, débiles, muets non-sourds, bègues, etc.* Paris: J.B. Bailliere.

Pages 385-392: "Seguin devoted many rhapsodic passages to music and even to noise, 'wrongly said to be without worth, since it has no place in an orchestra.' He provided a fairly elaborate description of the various conditions of listening and hearing, the classes of sounds, and the physiological aspects of audition. ...[Seguin] pointed out, above all, that education in music for the idiot has as its primary object bringing the child to the threshold of speech in those cases where speech is very defective." --Kraft (1963).

Soula, H. 1883. *Essai sur l'influence de la musique en médecin*. Paris: no publisher given. 68 pp.

APPLIED MUSIC PSYCHOLOGY
GERMAN

Anonymous. 1830. Wohltaetige Wirkung der Musik auf Geisteskranke. In besonderer Beziehung auf die Werke von G.A.E. Nostitz und J. Ankendorf: Beschreibung der Kgl. Saechsischen Heil- und Verpflegungsanstalt Sonnenstein. Allgemeine musikalische Zeitung 1830, 605.

Anonymous. 1840. Irren-Heilung durch Musik. Ein Besuch im Bicetre. Nach dem Franzoeschischen. Allgemeine musikalische Zeitung 1840, 886ff.

Anonymous. 1840. Ueber den Tarantismus und sein Kur vorzueglich mit Musik. Allgemeine musikalische Zeitung 1840, 753.

Anonymous. 1844. Einige Worte ueber den Einfluss der Musik. Allgemeine musikalische Zeitung 1844, 361.

Barth, Ernst. 1898. Ueber den gesundheitlichen Wert des Singens. Leipzig: no publisher given.

Bartholomaei. 1877. Anfang des Tastens, Sehens und Hoerens des Kindes. Jahrbuch d. Vereins fuer wissenschaftlich Paedagogie, IV, no pp.

Bauer, W.A. 1836. Ueber den Einfluss der Musik auf den Menschen in gesundem und krankem Zustand (Zustanden?). Wien: no publisher given.

Bezold, Fr. 1884-5. Schuluntersuchungen ueber das kindliche Gehoerorgan. Zeitschrift fuer Ohrenheilkunde, XIX, no pp.

Note: entry is from Rand (1905), who cites volume as XIX, XV. Second volume number given by Rand is doubtful.

Branckmann, K. 1896. Die im kindlichen Alter auftretende Schwerhoerigkeit und ihre paedagogische Wuerdigung. Leipzig: no publisher given. 103 pp.

Brunner, M. 1897. Die methodischen Hoeruebungen in der Taubstummenschule. Wien. klin. Wochensch., X, 779-782.

Bryk, Siegfried. 1894. Medicinischer Gebrauch der Musik in altern und neuer Zeit. Neue Zeitschrift fuer Music 1894, 521.

Engel, Gustav. 1889. Ueber den Stimmumfang sechsjaehriger Kinder. Hamburg: no publisher given.

Erdmann, ?. 1809. Ueber den Einfluss der Musik auf Kranke. Archiv fuer medizinische Erfahrungen, II, 121.

Mecklenburg entry gives: 1899/2.

Fink, Gottfried Wilhelm. 1845. Geschichtliche Andeutungen ueber den Einfluss der kirchlichen Musik auf das Gemuet. Zeitschrift fuer historische Theologie, XV (1), 127.

Guthmann, Friedrich. 1805-6. Vermischte Gedanken psychologischen Inhalts fuer praktische Musiker. Allgemeine musikalische Zeitung, n/v, 81.

H.S.K. 1847. Die Musik als Heilmittel. Wien 1847. Neue Ausg. Wien 1867: Capellen. 32 pp.

Hausegger, Friederich von. 1884. Zur Frage der Erziehung fuer und durch die Musik. Allgemeine deutsche Musikerziehung, n/v, 339-349.

Held, H. 1897. Zur Kenntnis der peripheren Gehoerleitung. Archiv fuer Anatomie und Entwicklungsgeschichte, n/v, 350-360.

Herder, Johann Gottfried von. 1801. Wirkt die Musik auf Denkungsart und Sitten? Adrastea, n/v, no pp.

Herder, Johann Gottfried von. 1888. Ob Malerei oder Tonkunst eine groessere Wirkung gewaehre? Ein Goettergespraech. Saemtliche Werke, XV, Berlin 1888.

Hoffgartner, Friedrick Karl. 1847. Die Musik in ihrer Beziehung zur Aesthetik und zur Heilkunst. Dissertation: Wien.

Horstig, C.G. 1824. Ueber den Einfluss der Tonkunst auf Menschenveredelung. Caecilia 1824, 59.

Meyer, Max F. 1899. Die Tonpsychologie, ihre bisherige Entwicklung und ihre Bedeutung fuer die musikalische Paedagogik. Zeitschrift fuer paedagogische Psychologie, I, 74-85, 180-189, 245-254.

Mecklenburg (entry 2055) conflicts; shows date as 1895/1899, shows volumes as I, II-IV.

Molldur (Kieninger), Karl. 1880. Die Kunst und Wissenschaft der Musik. I: Die Musik in ihrem Verhaeltnis zur Religion. Lorch (1880), 2. Aufl. Lorch 1903: Rohm. II: Musik als Medium zur Krankenheilung. Lorch 1903: Rohm. II: Musik als Farben-Komposition zur Unterstuetzung der Tonmusik bei der seelischen Heilung (Heilung aller Seelen?). Lorch 1903: Rohm. IV: Musik als Geisterdemonstration Entsprechungswissenschaft - nebst geistigem "Darwinismus" als verklaerten Sphaeren. Lorch 1903: Rohm (insgesamt 296 pp).

Raudnitz, Leipold. 1840. Die Musik als Heilmittel, oder: Der Einfluss der Musik auf Geist und Koerper des Menschen, und deren Anwendung in verscheidenen Krankheiten. Nebstanhang: Diatetik fuer Saenger und solche Musiker, welche Blasinstrumente behandeln... Prague: G. Haase Soehne. iv, 136 pp.

Schneider, Peter Joseph. 1835. System einer medizinischen Musik ... Bonn: C. Georgi. 2 vols.

Mecklenburg also gives: "Die Musik und Poesie. Nach ihren Wirkungen historisch-kritisch dargestellt. (System einer medizinischen Musik). 2 Teile, Bonn."

Tigretier, ?. 1833. Eine abyssinische Krankheit, welche mit Musik Kuriert wird, ihre Aehnlichkeit mit dem Tarantismus. Vom Mailaender Correspondenten. Nebst Zusatz der Redaktion. Allgemeine Musikalische Zeitung 1833, 137.

Urbantschitsch, V. 1899. Ueber den Einfluss von Schallenempfindungen auf die Schrift. Pfluegers Arch., 74, 43-46.

Wallaschek, Richard. 1892. Das musikalische Gedaechtniss und seine Leistungen bei Katalepsie, im Traum und in der Hypnose. _Vierteljahrschrift fuer Musikwissenschaft_, _7_, 204-251.

Weber, F.A. 1801-1802. Von dem Einfluss der Musik auf den menschlichen Koerper und ihrer medizinischen Anwendung. _Allgemeine Musikalische Zeitung 1801/1802_, 561, 577, 593, 609.

APPLIED MUSIC PSYCHOLOGY
ITALIAN

Bernardini, C., and Ferrari, Guilio C. 1896. Richerche sperimental sull memoria musicale nei frenastensici. _Riv. sper. Freniatria._, _22_, 315-323.

Ferrario, Guiseppe. 1825. _Influenza del Suono, del Canto e della Declamazione sull'Uono in Istato di Salute e di Malattia_. Milano: Visag. 2nd ed., Milano, 1841: Visag.

Marques, Joaquim Jose. 1884. A musica e a medicina. _Amphion_, _I_ (6no. 10), 4-5.

Patrizi, M.L. 1896. Primi esperimenti intorno all'influenza della musica sulla circulazione del Sangue nel cervello umano. _Riv. Musicale Ital._, _3_, no pp. Also: _Arch. di Psichiat._, _17_ (1896), 390-406.

Mecklenburg also shows: "Patrizi, Mariano L. 1896. _Primi esperimenti intorno al'influenza della musica sulla circulazione del Sangue nel Cervello del'Uomo_. Torino: Bocca." "Emanuel Favre, a boy of thirteen years of age, was severely wounded in the head by an axe. The wound was 13 cm. in length, cleaving the bones of the skull for the entire distance. Restored to health the boy presented a soft cicatrice, through which the pulsations of the brain were plainly visible, and changes of the cerebral circulation could be accurately determined ... Plethysmographs were used to determine changes in circulation; for registering the pulse of the brain a cup of gutta percha was made with an electric connection capable of showing the slightest modification in volume or pulsation. The results were recorded on a kymograph. In general it was found that pulsations took a higher range after a musical note, or a very near repetition of the same note. High notes produced greater changes than tones of lower pitch ... Patrizi is undecided whether the variations in cerebral volume are autonomic neuromuscular functions, or passive reflections of general vasomotor phenomena. He points out, however, that his results diverge from those of Fere [1887] and Tarchanoff [1894], since the substitution of lively for melancholy music did not produce an increase of volume

as these investigators assumed. In a book published several years later [1902. La nuova fisiologia della emozione musicale. Modena: no publisher given], Patrizi enlarges on the observations reported above in the effort to establish a musical esthetics founded on physiological principles." --Diserens (1923). Bracketed material supplied by this compiler.

Vigna, C. 1882. Intorno alle diverse influenze della musica sul fisico e sul morale. Milano: no publisher given. 99 pp.

APPLIED MUSIC PSYCHOLOGY
LATIN

Bach, H.A. 1817. De musicae effectu in homine sano et aegro. Berlin: no publisher given.

Becker, J.C. 1821. De musicae vi salutari. Berlin: no publisher given.

Franck, Friederick Albert. 1835. De musices effectibus in hominem sanum et aegrotum. Berolini: Typis Nietackianis. 44 pp. [Dissertation, Berlin: 1835]

Contains bibliographical footnotes.

APPLIED MUSIC PSYCHOLOGY
SPANISH

Gordon y de Acosta, Antonio Maria. 1898. Indicaciones terapeuticas de la musica. Habana: Establecimiento tipographico. 63 pp.

Held by N.Y. Public Library.

BEHAVIORAL MUSIC PSYCHOLOGY
DUTCH

No documents found.

BEHAVIORAL MUSIC PSYCHOLOGY
ENGLISH

Beaunis, Henri Etienne. 1898. Muscle sense in singing. American Journal of Psychology, I, 205.

Behnke, Emil. 1879. On the mechanism of the human voice. Proceedings of the Musical Association, VI, 1-14.

Bell, A. Melville. 1882. Sounds and their relations. London: no publisher given.

Blackburn, Vernon. 1898. The fringe of an art. Appreciations in music. London: Unicorn Press. New York: Mansfield. 176 pp.

Bourdon, B. 1898. The application of the graphic method of the study of the intensity of the voice. L'Annee Psychol., 5, 369-378.

Brinkerhoff, C. 1892. Color analogy in music. The Echo, 9 (no. 2), 1.

The Echo: published in LaFayette, Indiana.

Cobb, Gerard. 1884. On certain principles of musical exposition considered educationally and with special reference to current systems of musical theory. Part 1 and 2. Proceedings of the Musical Association. 10th Session, 1883-4. Part 1, 125-151. Part 2, 153-184.

Cook, H.O. 1899. Fluctuation of attention to musical tones. American Journal of Psychology, XI, 119-123.

Dixon, H. 1899. Music and medicine considered from a physiological, pathological and therapeutic standpoint (abstract of paper). The Lancet, n/v, 1815.

"Dixon reported the repetition of experiments similar to those of Dogiel [1880] with similar results, i.e., increased blood pressure and cardiac action, and variations in respiration. He does not state his method or the number and nature of his subjects, but mentions several physiological effects of music which are not reported by other experimenters. Among such effects are 'perspiration, desire to micturate, lachrymation, and rarely, laughter.'" --Diserens (1923)

Gates, A.I. 1898. Musical interests of children. Journal of Ped., 2, no pp.

Gilbert, J. Allen. 1893. Experiments on the musical sensitiveness of school children. New Haven: Stud. Yale Psych. Lab., I, 80-87.

Mecklenburg conflicts with Chandler and Barnhart; gives: vol. 2 (1894), 105.

Gilman, Benjamin Ives. 1892-3. Report on an experimental test of musical expressiveness. American Journal of Psychology, 4, 42-73; 5 (1893), 558-576.

Conflict: Mecklenburg says 1891-2 (vol. 4), 558; 1892 (vol. 5), 42. Chandler and Barnhart is confirmed by Schoen, Kreitler and Kreitler.

Haweis, Hugh Reginald. 1888. Music and morals. London 1888, 1896, 1912, 1934: Longmans. 556 pp.

McNaught, William G. 1899. The psychology of sight-singing. Proceedings of the Musical Association, XXVI, 35-55.

Moore, Aubertine Woodwort. 1900. For my musical friends: a series of practical essays on music and music culture. New York: Dodge. vi, 266 pp.

Parr, W. Alfred. 1900. The power and influence of music considered from a psycho-physiological point of view. Florence: Claudian Press. 18 pp.

Rush, Samuel. A discourse on the moral influence of sounds, delivered before the Chester County cabinet of natural science, January 18, 1839. Philadelphia: Chester County Cabinet of Natural Science. 32 pp.

Schmitt, Hans. 1895. The natural laws of musical expression. Eng. trans.: Frances A. van Santford. Chicago: Summy.

Seguin, Edouard. 1866. Idiocy and its treatment by the physiological method. New York: William Wood.

Page 149: "Seguin stressed the functional nature of listening, the anomalies of hearing in the mentally defective: 'the wild boy educated by Itard did not hear the report of a pistol discharged behind his head, but heard the fall of a nut upon the floor.'" --Kraft (1966)

Shuttleworth, H.C. 1899. The place of music in public worship. New York: Scribner. 60 pp.

Smith, W. MacDonald. 1888. The physiology of pianoforte playing, with a practical application of a new theory. Proceedings of the Musical Association, XIV, 43-66.

Smith, W. MacDonald. 1894. From brain to keyboard; new and complete practical solution of all technical difficulties. Proceedings of the Musical Association, XXI, 17-33.

Spencer, H. 1857. On the origin and function of music. Essays. London: no publisher given.

Stearns, R.E.D. 1890. Instances of the effects of musical sounds on animals. American Naturalist, 24, 236-7, 125-7, 238, 26-9.

"[Stearns] notes a pet bird who becomes excited [by] 'Rule Britannica' on flute..." --Shaffer (1971).

Stone, W.H. 1881. The causes of the rise in orchestral pitch. Proceedings of the Musical Association, 7, 99-116.

Stone attributes the rising tendency of orchestral pitch since the time of Handel to aural discrimination problems such as masking and beat tones, along with a lack of standardization pitch generators.

Stratton, Stephen S. 1882-3. Women in relation to musical art. Proceedings of the Musical Association, IX, no pp.

Talbot, E.B., and Darlington, L. 1897-8. Distraction by musical sounds; the effect of pitch upon attention. American Journal of Psychology, 9, 332-343.

"...experimented on the influence of music on the discrimination of lifted weights ... the authors conclude that music facilitates attention, the middle octaves having the greatest influence... in opposition to Fere's results [1887], they find that there is no essential relation between pitch and dynamogenic effect." --Diserens (1923); [ ] mine.

Van Cleve, J.S. 1897-8. Concerning musical memory. Music, XII (1897), 636-644; XIII (1898), 158-166.

Wallaschek, Richard. 1893. Primitive music. London: Longmans, Green, and Co. xi, 326 pp.

Chapter 5: Physical and psychical influence of music. Chapter 6: Heredity and development.

BEHAVIORAL MUSIC PSYCHOLOGY
FRENCH

Anonymous. no date. Psychologie de la musique chinoise. Revue de Psychologie appliquée, XXXIII, 4.

Anonymous. 1843. Du pouvoir social et de l'influence morale de la musique. Bibliotheque Suisse, XLVI, 226; XLVII, 107.

Beauquier, Charles. 1865. La musique et la sensibilité physique. Revue politique et litteraire, II, 791.

Binet, Alfred, and Courtier, Jules. 1895. Recherches graphiques sur la musique. L'Année Psychologie, 2, 201-223. Also: Rev. Scient., 4, 5-15.

"...devoted to the determination of the energy and rapidity of movements made by a pianist; i.e., the mechanical work of the fingers on the keys. The study bears most directly upon the influence of technical difficulties in performance..." --Diserens (1923)

Binet, Alfred, and Courtier, Jules. 1895. Circulation capillaire de la main. Année Psychologie, 2, 87-167.

"In connection with a study of the capillary circulation of the hand, carried out on four subjects by means of the Marey sphygmograph and the plethysmograph, these authors found a diminution of the amplitude of the pulse in response to the sudden sound of a gong." --Diserens (1923)

Courtier, Jules. 1897. Communication sur la mémoire musicale. 3er Internationale Kongress fuer Psychologie, 238-341.

Couty, L., and Charpentier, A. 1874. Effets cardio-vasculaires des excitations des sons. Arch. de Physiol., 4, 525-583.

"The earliest well controlled experiments on response to auditory stimuli...the auditory stimuli employed were in part mere noises, but since whistling was also used, the results have some bearing on response to musical elements. The experiments were carried out on dogs... sudden stimuli...generally produced increased cardiac tension and acceleration of pulse ranging from ten to one hundred per cent... kymographic records were taken of the cardiovascular effects..." --Diserens (1923)

Dauriac, Lionel. 1892. De l'oreille musicale, essai sur la psychologie du musicien. Orleans: Girardot.

Dauriac, Lionel. 1897. Psychologie dans l'Opéra français. Paris: "(Auber-Rossini-Meyerbeer); cours libre professé à la Sorbonne par Lionel Dauriac." xxiii, 164 pp.

Destouches, L. 1899. La musique et quelques uns de ses effets sensoriels. These. Paris (1899). 2me edition Paris 1900: Editions scientifiques. 82 pp.

Fere, C. 1900. Travail et Plaisir. Paris: no publisher given.

See especially chapter 11.

Herault, A. 1882. La mémoire de l'intonation. Rev. Philos., XIV, 310-312.

Rochas D'Aiglun, E.A.A. 1900. Les sentiments, la musique, et le geste. Grenoble: H. Falque et F. Perrin. iii, 279 pp. Also: Nouvelle Rev., 114, 384-389, 587-602.

"[Rochas D'Aiglun conducted an] investigation ... on the influence of music on behavior during hypnosis. According to De Rochas, isolated tones provoke a trembling extending to all parts of the body, the character of the reaction varying with the pitch and intensity of the notes. Very high tones evoked the expression of pain, very low tones that of anguish or terror. Chords excite the same reaction as simple tones, and dissonances at any part of the scale produce an expression of suffering ... the author concludes that the phenomena observed are pure reflexes, set off by auditory stimuli, without the intervention of the will..." --Diserens (1923)

Seguin, Edouard. 1846. Traitement moral, hygiène, et éducation des idiots et des autres enfants arriérés ou retardés dans leur développement, agités de mouvements involontaires, débiles, muets non-sourds, bègues, etc. Paris: J.B. Bailliere.

Pages 385-392: "Seguin devoted many rhapsodic passages to music and even to noise, 'wrongly said to be without worth, since it has no place in an orchestra.' He provided a fairly elaborate description of the various conditions of listening and hearing, the classes of sounds, and the physiological aspects of audition. ...[Seguin] pointed out, above all, that education in music for the idiot has as its primary object bringing the child to the threshold of speech in those cases where speech is very defective." --Kraft (1963).

Tarchanow, J. 1894. L'influence de la musique sur l'homme et les animaux. Archives Italiens de la Biologie, XXI, 313-317.

Author's name shown by some sources as "Tarchanoff." "As early as 1888 Tarchanoff noted variations in the electric conductivity of subjects subjected to the stimulus of an electric bell ... In an interesting communication to the International Congress of Rome in 1895, Professor Tarchanoff presented results obtained by means of the Mosso ergograph, which resemble those of Fere's [1887] experiments. He notes that music exercises a powerful influence on the muscular activity of man, increasing or diminishing it according to the nature of the melodic stimuli. When a subject is completely fatigued by working on the ergograph and can no longer raise the weight, gay music of rapid movement causes the fatigue to vanish for a variable time, and the subjects are able to raise the weight once more; i.e., do additional work. Sad, slow music in the minor key [sic] produces the opposite effect... A third series of experiments on human beings showed that the electric currents determined by the skin of the hand and registered by Wiedemann's galvanometer are modified by the influence of music. Since these cutaneous currents were then regarded as due to increase of secretory activity, Tarchanoff concluded that music influences the activity of the cutaneous glands... [Tarchanoff] reported that decapitated animals respond to sound stimuli by violent struggling, although Professor Henri [V. Henri (1894)] was unable to confirm these results, in a similar experiment of his own ... a second series of experiments was made on dogs and guinea pigs in order to determine the quantity of oxygen consumed and the quantity of carbon dioxide gas eliminated in 24 hours under varying conditions of rest and auditory stimulation by means of an electric bell sounding every five seconds. During these 24 hours of persistent stimulation the consumption of oxygen increased 12.01 per cent for dogs and 10.94 per cent for guinea pigs. During the same period the elimination of carbonic acid gas increased 11.64 per cent and 11.11 per cent for the respective animals." --Diserens (1923)

Weber, Johann. 1899. _Les Illusions musicales et la verité sur l'expression_. 2e édition, Paris: Fischbacher. 250 pp.

BEHAVIORAL MUSIC PSYCHOLOGY
GERMAN

Anonymous. 1799-1800. Ueber den Wert der Musik und die Mittel ihn zu Erhoehen. *Allgemeine musikalische Zeitung 1799/1800*, 817, 833, 849.

Anonymous. 1871. *Studien ueber die Tonkunst zur Foerderung richtiger Erkenntnis ihres hohen Zweckes und Benuetzung ihrer Macht*. Wien: Mayer. 102 pp.

Anonymous. 1878. Das Urteilen ueber Musik. *Helvetia, I*, 401.

Arnold, Yourij von. 1867. *Der Einfluss des Zeitgeistes auf die Entwicklung der Tonkunst*. Also: *Neue Allgemeine Zeitschrift fuer Theater und Musik, n/v*, no pp. Leipzig: Lucius. 44 pp.

Berg, H. 1877. *Die Lust an der Musik erklairt. Nebst einem Anhang: Die Lust an den Farben, den Formen und der koerperlichen Schoenheit*. Berlin: no publisher given.

Note: Kreitler and Kreitler conflicts with incomplete Mecklenburg citation given above; K. and K. shows: Berlin: Behr, 1879.

Br..., Alexander. 1836. Parallelen. Politik und Musik. *Neue Zeitschrift fuer Musik, V*, 83.

Brendel, Karl Franz. 1847. Ueber musikalische Recensionen. *Neue Zeitschrift fuer Musik, XXVI* (1847), 102, 106, 114, 153, 163; *XXVII* (1847), 254.

Decher, Adolph. 1875. *Chromographische Darstellung der Tondichtungen*. Munich: T. Ackermann. 6 pp. (5 diagrams).

Dogiel, J. 1880. Ueber den Einfluss der Musik auf den Blutkreislauf. *Archiv fuer der gesammte Physiologie der Menschen und der Thiere, n/v*, 416-428.

Note conflicting sourse from Mecklenburg: *Archiv fuer Anatomie und physiologie, Physiologische Abteilung 1880*, p416. "To Dogiel ... belongs the credit of having carried out the first systematic experiments on the influence of music proper on the organism ... executed

two series of experiments on the influence of music on the circulation of the blood: the first on human circulation, the second on that of animals, chiefly dogs and rabbits. The experiments on human beings were made by means of the plethysmograph; on animals by taking the cardiac pulse on the cartoid artery. The sources of auditory stimuli were Koenig's diapason with resonance boxes, the violin, clarinet, flute, and a metal whistle ... the general conclusions of Dogiel's study are as follows: (1) music exhibits an influence on the circulation of the blood in man as in animals (2) blood pressure sometimes rises and sometimes falls ... (3) the action of the musical sounds and of the whistles on animals and man expresses itself for the most part by the acceleration of the cardiac contractions. The automatic centers of the heart work more energetically (4) the variations of the circulation as a result of musical influence agree with the respiratory changes, although they can be observed independently of the latter (5) the variations of the circulation depend on the pitch, intensity, and timbre of the sound (6) in the variations of the blood pressure, the idiosyncracies of the individual, whether man or animal, are plainly apparent and even the nationality in case of man has some effect." --Diserens (1923)

Dutczynski, A.L. 1894. Beurteilung und Begriffsbildung der Zeit-Intervalle in Sprache, Vers und Musik. Psychophilosophische Studie. Leipzig: no publisher given.

Engel, Gustav. 1889. Ueber den Stimmumfang sechsjaehriger Kinder. Hamburg: no publisher given.

Fink, Gottfried Willhelm. 1836. Ueber den Reiz des Haesslichen auch in der Musik. Allgemeine musikalische Zeitung, 1836, 3.

Frankl, L. von. 1891. Ueber den Verlust des musikalischen Ausdrucksvermoegens. Deutsche Zeitschrift fuer Nervenheilkunde, I, 283.

Friedmann, H. 1901. Ueber kuenstliche Reizung des Ohrlabyrinths. Dissertation: Strassborg. 58 pp.

Gerber, P.H. 1898. Mozarts Ohr. Deutsche medizinische Wochenschrift, XXIV, 351.

Geyer, F. 1848. Die Musik als soziale Kunst. Neue Berliner Musikzeitung 1848, 225, 233.

Geyer, F. 1858. Ueber das Natuerliche in der Kunst. Neue Berliner Musikzeitung 1858, 177, 185, 193.

Goldschmidt, Hugo. 1895. Objektivitaet des kuenstlerischen Urteils und der musikalische Interpret. Allgemeine Musikzeitung 1895, 653, 667.

Guthmann, Friedrich. 1805-6. Vermischte Gedanken psychologischen Inhalts fuer praktische Musiker. Allgemeine musikalische Zeitung, n/v, 81.

Hausegger, Friederich von. 1897. Die kuenstlerische Persoenlichkeit. Wien: Konegen. 312 pp.

Heinse, Wilhelm. 1805. Musikalische Dialoge, oder philosophische Unterredungen beruehmter Gelehrter, Dichter und Tonkunstler ueber den Kunstgeschmack in der Musik. Leipzig: Graeff. 238 pp.

Held, H. 1897. Zur Kenntnis der peripheren Gehoerleitung. Archiv fuer Anatomie und Entwicklungsgeschichte, n/v, 350-360.

Helmholtz, H.L.F. von. 1862. Ueber die arabisch-persich Tonleiter. Verhandlungen des natur-historisch-medicinische Vereins zur Heidelberg, II, 216-217.

Reprinted in: Wissenschaftliche Abhandlungen von Hermann Helmholtz, vol. I. Leipzig: J.A. Barth, 1882, 424-426.

Hermann, ?. 1873. Richard Wagner. Streiflichter aus Dr. Puschmanns psychiatrischer Studie. Munich: no publisher given.

Hiller, Ferdinand von. 1864. Die Musik und das Publicum. Koeln: no publisher given.

Hiller, Ferdinand von. 1880. Wie hoeren wir Musik? Deutsche Rundschau, XXIV, 432ff.

Hirschfeld, Robert. 1883. Staatswissenschaft und Musik. Neue Berliner Musikzeitung, n/v, 265-273.

Hoffmann, E.T.A. 1813. Der Dichter und der Komponist. Allgemeine Musikzeitung 1813, no pp.

Kalischer, Alfred Chr. S.L. 1888. Musik und Moral. Hamburg: Richter.

Katterfeldt, Julius. 1845. Die Musik als Foerderungsmittl der religioesen Erbauung. Kiel: Universitaets-Buchhandlung.

Kausch, Johann Joseph. 1782. Psychologische abhandlung ueber den einfluss der Ton und ins besondere der Musik auf die Seele; nebst einem Anhange ueber den unmittelbaren zwek der schoenen Kunste. Breslau: Bei J.F. Korn, dem aelteren. xvi, 200 pp.

Mentz, P. 1895. Die Wirkung akustischer Sinnesreize auf Puls und Athmung. Wundt Philosophischen Studien [Leipzig], XI, 61-124, 371-392, 563-602.

Note: Chandler and Barnhart conflicts with Diserens (above), shows volume as X. "Mentz conducted experiments on the influence of auditory stimuli on the movements of circulation and respiration under the varying conditions of attention. The apparatus used consisted of the Marey sphygmograph and pneumograph. He found that auditory stimuli, noises as well as simple sounds, produce a retardation of the pulse, and a retardation or acceleration of the respiration, correlated with the duration of the stimulus and the presence or absence of voluntary attention ... if [a listener] does not pay particular attention or does not attempt to analyze the selection a retardation of the pulse ensues; if he analyzes the music acceleration appears. In an examination of the pulse during the musical selection, Mentz found that a marked variation in intensity produced retardation. Disagreeable dissonances are accompanied by acceleration; agreeable consonance by retardation." --Diserens (1923)

Meyer, Max F. 1899. Ueber Beurtheilung zusammengesetzter Klaenge. Zeitschrift fuer Psychologie und Physiologie der Sinnesorgane, XX, 13-33.

See: annotation to Meyer (1898) "Nachtrag ..." entry.

Molldur (Kieninger), Karl. 1880. Die Kunst und Wissenschaft der Musik. I: Die Musik in ihrem Verhaeltnis zur Religion. Lorch (1880), 2. Aufl. Lorch 1903: Rohm. II: Musik als Medium zur Krankenheilung. Lorch 1903: Rohm. II: Musik als Farben-Komposition zur Unterstuetzung der Tonmusik bei der seelischen Heilung (Heilung aller Seelen?). Lorch 1903: Rohm. IV: Musik als Geisterdemonstration Entsprechungswissenschaft - nebst geistigem "Darwinismus" als verklaerten Sphaeren. Lorch 1903: Rohm (insgesamt 296 pp).

Mueller, Georg Elias. 1873. Zur Theorie der sinnlichen Aufmerksamleit. Leipzig: Druck von A. Edelmann. 136 pp.

Naumann, Emil. 1869-70. Die Tonkunst in der Culturgeschichte. 2 Baende. Berlin: no publisher given. 772 pp.

Oesterley, Hermann. 1885. Beobachtungen ueber die Wirkungsweise der Musik. Deutsche Revue, IV, 66.

Pudor, Heinrich. 1891. Das Heroentum in der deutschen Musik. 2. Auflage, Dresden: Damm. 30 pp.

Reissmann, A. 1884. Die social Lage der Musiker. Part I. Breslau: no publisher given.

Ritter, H. 1892. Studien und Skizzen aus Musik- und Kulturgeschichte, sowie Musikaesthetik. 2. Auflage, Dresden: Hertz. 186 pp.

Schaul, Johann Baptist. 1809. Briefe ueber den Geschmack in der Musik. Karlsruhe: no publisher given.

Schumann, F. 1890. Ueber das Gedaechtniss fuer Komplexe gleicher Schalleindruecke. Zeitschrift fuer Psychologie, I, 75-80.

Simmel, Georg. 1882. Psychologische und ethnologische Studien ueber Musik. _Zeitschrift fuer Voelker-Psychologie und Sprachwissenschaft, XIII_, 261.

Sommer, Hans. 1898. _Die Wertschaetzung der Musik_. Muenchen: Kastner und Lossen. Also: _Abdruck aus 'Kunstwart', XI_, 13-15.

Sorge, G.A. 1745. _Vorgemach der musicalischen composition_. Lobenstein: Verlag des Autoris.

Thimus, Albert (Freiherr) von. 1868-76. _Die harmonikale Symbolik des Alterthums_. Koeln: M. Du Mont-Schauberg. 2 volumes.

Volume _I_: "Die esoterische zahlen lehre und harmonik der Pythagoreer in ihren bezeihungen zu aelteren griecheschen und morgenlaendischen quellen, insbesondere zur altsemitisch-hebraeisch ueberlieferung." Volume _II_: "Der technisch-harmonikale und theosophisch-kosmographische inhalt der Kabbalistischen buchstaben-symbole des althebraeischen buechlein's Jezirah. Die Pythagorisch-platonische lehre vom werden des hebraeischen wie chamitisch-altaegyptischen weisheitslehre und zur heiligen ueberlieferung die urzeit." --New York Public Library Music Index catalogue card annotation; confirmed by Mecklenburg.

Urbantschitsch, V. 1888. Ueber den Einfluss einer Sinneserregung auf die uebrigen Sinnesempfindungen. _Pfluegers Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 42_, 3-4.

"...[Urbantschitsch] investigated the influence of auditory stimuli on the sense impressions, particularly on normally minimal visual stimuli. He found that patches of color observed at a distance at which the color could scarcely be recognized were brought clearly into the sensory field, by sounding a tuning fork. In short, the threshold of color perception is lowered by tonal stimuli. Tuning forks of high pitch, applied to both ears, were most effective. The influence [of sound upon threshold perceptibility of] the different colors is variable. Barely legible print was often read when a tone accompanied the effort. Tastes,

odors, and touch are similarly affected by sound, and pain is increased by jarring noises. Finally Urbantschitsch claims to have produced photisms, or phenomena of colored audition, by having the subject observe a grey disk on white paper, or an undulating white surface, and describe the colors perceived while different tuning forks were sounded. The experiments, if valid, indicate that the subjects of audition coloree are merely striking examples of the normal psychological influence of one sense upon the other." --Diserens (1923)

Wagener, G. 1876. Bemerkungen ueber die Theorie der chinesischen Musik und ihrem Zusammenhang mit der Philosophie. Zeitschrift der ostasiatischen Gesellschaft, 1876; Mitteilungen der Deutschen Gesellschaft fuer Natur- und Voelkerkunde Ostasiens, II (1877), 42ff.

Wendt, A. 1808-1809. Einfluss der Musik auf den Charakter. Allgemeine musikalische Zeitung 1808/1809, 81, 97.

Widmann, P. 1874. Gehoer- und Stimmbildung. Leipzig: no publisher given.

Wolfe, H.K. 1886. Untersuchungen ueber das Tongedaechtniss. Philosophischen Studien, III, 534-571. Dissertation: Leipzig, 1886.

BEHAVIORAL MUSIC PSYCHOLOGY
ITALIAN

Bernardini, C., and Ferrari, Guilio C. 1896. Richerche sperimental sull memoria musicale nei frenastensici. Riv. sper. Freniatria., 22, 315-323.

Cappuccio, Guiseppe. 1895. L'Arte della Musica e la Sociologia. Siracuse: Tamburo.

Dall'Olio, Cesare. 1898. La musica e la civilta. Bologna: Cenerelli. 24 pp.

Ferrari, Guilio C. 1895. La Liberte e la Regolarita nella Arti belle e nella Musica. Rivista Italiana di Filosofia, n/v, no pp.

Ferrari, Guilio C. 1897. Richerche sperimentali sulla natura dell'emozione musicale. Rivista musicale Ital., 4, 328-329.

"...repeated the experiments of Patrizi [1896] on normal, feebleminded, and idiotic individuals. ... concludes that there are vasomotor activities after a musical emotion only when the individual is in a state of psychological inferiority; when the superior psychic functions have vanished; and when mental coordination ceases to inhibit emotion. In short, the effect appears when an organic disorder exists." --Diserens (1923) Trivial problem: there is some disagreement as to Ferrari's middle initial. Mecklenburg says "M", Diserens says "E", and all other sources agree on "C".

Perrod, Giovanni. 1896. La Sensibilita meteorica in R. Wagner. Rivista Musicale Italiana, n/v, 562-576.

Sergi, G. 1893. Dolore e Piacere. Milano: no publisher given.

"...gives a critical resume of the experiments of Dogiel on reactions to music. Sergi interprets these results in terms of the James-Lange theory of emotion and concludes that musical emotions entirely lack intellectual character." --Diserens (1923).

Sernagiotto, C. 1897. L'Arte dei Suoni de'suoi Rapporti colla Vita sociale. Conferenza Venezia: "Aurora" (L. Merlo). 56 pp.

Tanzi, E. 1891. Cenni ed esperimenti sulla psicologia dell-udito. Riv. di Filos. Scient., n/v, no pp.

"...published an account of experiments on the reaction time for major and minor chords. The keys of a pianoforte, the reagent's key and a chronoscope were connected in a single circuit ... The conclusion is that minor chords produce more rapid reaction than do the major chords, a fact that may have some relation to the prevalence of minor chords in primitive music." —Diserens (1923).

Vigna, C. 1882. Intorno alle diverse influenze della musica sul fisico e sul morale. Milano: no publisher given. 99 pp.

BEHAVIORAL MUSIC PSYCHOLOGY
LATIN

Hansen, J.N. 1833. De musicae in corpus humanum vi. Berlin: no publisher given. [Dissertation].

Hausen, Hans Niels. 1833. De musicae in corpus humanum vi. Dissertatio inauguralis psychologico-medica quam ... die XX. m. Augusti a. MDCCCXXXIII ... publice defendet, scriptor Joannes Nicolaus Hansen. Berolini [Dissertation, Berlin]: Typis Nietackianis. 37pp.

Compare with entry from Mecklenburg: Hansen, J.N. 1833.

BEHAVIORAL MUSIC PSYCHOLOGY
SPANISH

No documents found.

TESTING
DUTCH

No documents found.

TESTING
ENGLISH

No documents found.

TESTING
FRENCH

Maillard, C. 1880. L'audiomètre et ses applications. Nancy: no publisher given.

TESTING
GERMAN

No documents found.

TESTING
ITALIAN

No documents found.

TESTING
LATIN

No documents found.

TESTING
SPANISH

No documents found.

GENERAL SURVEYS AND TEXTS
DUTCH

No documents found.

GENERAL SURVEYS AND TEXTS
ENGLISH

Allen, Grant. 1877. Physiological aesthetics. London: no publisher given.

Bain, A. 1855. The senses and the intellect. No city, no publisher given.

Bosanquet, R.H.M. 1879. On the present state of experimental acoustics, with suggestions for the arrangement of an acoustic laboratory and a sketch of research. Philosophy Magazine, 8, 290-305.

Breakspeare, Eustace J. 1880. Musical aesthetics; with especial reference to Dr. Ed. Hanslick's essay, 'Vom musikalische Schoenen.' Proceedings of the Musical Association, VI, 59-79.

Davidson, T. 1882. Perception. Mind, VII, 496-513.

Day, H. 1889. The philosophy of perception. Biblioth. sacra, XLVI, 671-700.

Gaskell, J. 1854. Sense and sound. Philadelphia: no publisher given.

Goddard, Joseph. 1894. Colour compared with music and painting. Musical Opinion, 18, 777-778. [London].

Gurney, Edmund. 1880. The power of sound. London: Smith, Elder, and Co. Introductory essay by Edward T. Cone.

Schoen (1940) cites: "Power, E. Elements of the beautiful in music. In: Op.cit., 319.

Helmholtz, H.L.F. von. 1863. On the sensations of tone as a physiological basis for the theory of music. Translated and revised by Alexander T. Ellis. London, 1895: Longmans, Green. 2nd english edition: New York: Dover, 1954.

The original German publication: 1863. Die Lehre von den Tonempfindungen als physiologische Grundlage fuer die Theorie der Musik. Braunschweig, Germany:

Friederick Vieweg und Sohn.

James, William. 1890. *Principles of psychology*. No city or publisher given.

Volume *1* (533-549) contains James' evaluation of Fechner and of psychophysics. --Boring (1942). Howes (1927): "A systematic psychology of the emotions; the earliest specimen, followed by Ribot, McDougall." -pp 50, 51.

Maclean, Charles. 1897-8. On modern sensationalism. *Proceedings of the Musical Association*, *XXIV*, no pp.

Mach, Ernst. 1886. *Contributions to the analysis of the sensations*. Jena: no publisher given [Fischer?]. English translation: Chicago, 1895: no publisher given.

"A fuller treatment of the problems of this lecture will be found in my *Contributions to the analysis of the sensations* (Jena, 1886), English translation, Chicago, 1895. J.P. Soret, *Sur la perception du beau* (Geneva, 1892) also regards repetition as a principle of aesthetics. His discussions of the *aesthetical* side of the subject are much more detailed than mine. But with respect to the psychological and physiological foundation of the principle, I am convinced that the *Contribution to the analysis of the sensations* go deeper. --Mach (1894)" --Ernst Mach, introductory footnote to lecture "On symmetry" from: *Popular scientific lectures* (1898), 89f.

Mach, Ernst. 1897. *Analysis of the sensations*. [*The analysis of the sensations and the relation of the physical to the psychical*]. Eng. trans. of: *Die Analyse der Empfindungen und das verhaeltniss des physischen zum psychischen*. Eng. trans. Chicago and New York: Open Court Publishing Co., 1902. 120 pp.

Mach, Ernst. 1898. Popular scientific lectures. Eng. trans. by Thomas J. McCormack. "Third edition, revised and enlarged." 59 cuts, diagrams. Chicago: Open Court Publishing Co. [Copyrights: pp. 1-258, 338-374: 1894; pp. 259-281: 1896; 282-308: 1897; 309-337: 1898]. viii, 385 pp.

Pages 32-47 ('On the causes of harmony'): "Now that we have made ourselves acquainted with overtones and beats, we may proceed to the answer of our main question, Why do certain relations of pitch produce pleasant sounds, consonances, others unpleasant sounds, dissonances? It will readily be seen that all the unpleasant effects of simultaneous sound-combinations are the result of beats produced by those combinations (42) ... Only such sounds are consonant as possess in common some portion of their partial tones ... Consonance is the coalescence of sounds without appreciable beats!" (44) Pages 89-106 ('On symmetry'): 99-104 deal explicitly with musical symmetry and its perception. ["Delivered before the German Casino of Prague, in the winter of 1871"]. Appendix I ('A contribution to the history of acoustics'): "This article, which appeared in the Proceedings of the German Mathematical Society of Prague for the year 1892, is printed as a supplement to the article of 'The causes of harmony,' at page 32." Ibid., 375.

Maudsley, H. 1867. The physiology and pathology of mind. No city or publisher given.

Maudsley, H. 1876. Physiology of mind. No city or publisher given.

Mayer, A.M. 1894. Researches in acoustics. American Journal of Science, XLVII, 1-28, 283-5. Also: Lond. Edinb. Dubl. Phil. Mag., 37 (ser. 5), 259-288.

"...Mayer (1894) found that a tone could be rendered inaudible by another tone of lower frequency, but not readily by one of higher frequency."
--Jeffress (1971): Masking ... (In: Foundations of modern auditory theory).

Mill, James. 1829. Analysis of the phenomena of the human mind. Edited with additional notes by John Stuart Mill. London: Longmans, Green, Reader and Dyer, 1869.

Miller, J. 1870. Metaphysics or the science of perception. New York: no publisher given.

Noel, Roden. 1872. The philosophy of perception. Contemporary Review, XX, 72-103.

Reid, Thomas. 1785. Essays on the intellectual powers of man; Essay II, Chapter 5. No city or publisher given.

"An excellent discussion of the older theories of perception ante 1785." --Boring (1942, p. 47).

Riemann, Hugo. 1895. Catechism of Aesthetics. London: Augener. "(Engl. Uebersetzung vor. No)."

Sparmann, H.M. 1891. Attempt at an analysis of music. Cincinnati: no publisher given. 61 pp.

Spencer, H. 1855. Principles of psychology. London: no publisher given.

Spencer, H. 1857. On the origin and function of music. Essays. London: no publisher given.

Spencer, H. 1862. First principles. No city or publisher given.

Strutt, J.W. [Lord Rayleigh]. 1894. The theory of sound. New York (1896): Dover Publications, Inc. 2nd edition (revised and enlarged, New York (1945): Dover Publications, Inc. 2 vols.

Taylor, Sedley. 1875. Sound and music. London: no publisher given. 223 pp. 3rd ed., 1896.

Thompson, Sylvanus P. 1890. Physical foundation of music. London: no publisher given. 31 pp.

Titchener, Edward Bradford. 1892. The Leipzig school of experimental psychology. Mind, XVII, 206-234.

Truetler, W.J. 1899. Music in relation to man and animals. Proceedings of the Musical Association, XXV, 71-91.

Tyndall, J. 1867. Sound. London: no publisher given. 464 pp. 2nd ed., 1893. German translation by A. von Helmholtz and Cl. Wiedemann; Braunschw.: 548 pp.

Wallaschek, Richard. 1893. Primitive music. London: Longmans, Green, and Co. xi, 326 pp.

Chapter 5: Physical and psychical influence of music. Chapter 6: Heredity and development.

Witse, Sara E. 1888. Hearing. American Journal of Psychology, I, 702-5.

Zahn, J.A. 1892. Sound and music. Chicago: no publisher given. 452 pp.

GENERAL SURVEYS AND TEXTS
FRENCH

Beauquier, Charles. 1865. _Philosophie de la musique_. Paris: Germer Baillier. New York: Baillier Brothers. viii, 204 pp.

Bellaigue, Camille. 1893. _Psychologie musicale_. Paris: C. Delagrave. xxii, 282 pp.

Binet, Alfred. 1888. _Etudes de Psychologie Expérimentale_. Paris: no publisher given. 306 pp.

Binet, Alfred, and Philippe, J. 1892. Etude sur l'audition colorée. _Rev. Philos._, _XXXIII_, 461-4.

Binet, Alfred. 1894. _Introduction à la Psychologie expérimentale_. Paris: no publisher given. 146 pp.

Blaserna, P. 1877. _Le son et la musique_. Paris: no publisher given.

Bonnier, P. 1896. Les derniers théories de l'audition. _Arch. Int. de Laryngologie_, _IX_, 218-241.

Bonnier, P. 1898. _L'oreille: anatomie, physiologie, symptomatologie, pathologie_. Paris: no publisher given. 5 vols.

Bruneau, Alfred. 1900. _La psychologie du musicien_. Paris: Edition Artistique.

Chladni, Ernst Florens Friederich. 1809. _Traité d'acoustique_. Paris: Chez Courcier. xxvii, 375 pp.

Translated from _Die Akustik_ by the author.

Combarieu, Jules. 1894. _Les rapports de la musique et de la poésie, considerées au point de vue de l'expression_. Thesis: Paris. Paris, 1894: Alcan.

Dauriac, Lionel. 1892. _De l'oreille musicale, essai sur la psychologie du musicien_. Orleans: Girardot.

Dauriac, Lionel. 1893. Essai sur la psychologie de musicien. Rev. Philos., 35, 449-470, 595-617.

Note: O.S.U. Center for Experimental Research in the Arts hedge file entry also shows: 39 (1895), 31-56. Mecklenburg (entry 622) shows: Psychologie du musicien. Revue Philosophique, XXXV (XVIII?) 1893/1, 449-470, 595-617.

Dauriac, Lionel. 1895. La Psychologie de musicien. Paris: Alcan. Also: Revue Philosophique, XLI (1895), no pp.

Dauriac, Lionel. 1896. Etudes sur la psychologie du musicien. VI: Le plaisir et l'émotion musicale. In: Revue Philosophique, XLII (2), 1-154.

Dauriac, Lionel. 1897. Psychologie dans l'Opéra français. Paris: "(Auber-Rossini-Meyerbeer); cours libre professé à la Sorbonne par Lionel Dauriac." xxiii, 164 pp.

Ferrand, ?. 1895. Essais physiologiques sur la musique. Bulletin de l'Académie de Médecine de Paris, XXXIV (IIIe Serie), 226, 276.

Fétis, Francois Joseph. 1830. Curiosities historiques de la musique, complement nécessaire de la musique misé à la portée de tout le monde. Paris: Janet et Cotelle. vii, 454 pp.

Flourens, P.M.J. 1864. Psychologie comparée. 2nd ed. No city or publisher given.

Gall, F.J., and Spurzheim, G. 1809. Recherches sur le système nerveux. No city or publisher given.

Gelle, M.E. 1898. L'audition et ses organes. Paris: no publisher given. 326 pp.

Guyot, E. 1897. La boussole de l'harmonie universelle. Esthétique applicable aux arts des sons, de la couleur et de la forme. Paris: Fischbacher.

Hanslick, Eduard. 1894. De beau dans la musique. Edité par Charles Bannelier. 2e édition Paris: Macquet.

Helmholtz, H.L.F. von. 1868-74. Théorie physiologique de la musique. Trad. franc. par A. Gueroult. Paris: Masson. 2 vols.

Henri, Victor. 1894. Review of W. Wundt Experiences acoustiques sur un Pigeon sans labyrinthe (Phil. Stud., IX). Année Psychol., I, 337-339.

Henri, Victor. 1896. Sensations auditives. Année Psychol., 3, 390-401.

"...critical summary of the method and results of [the experiments of P. Mentz (1895)]..." --Diserens (1923)

Maubel, Henry. 1895. Psychologie de la musique. Société nouvelle, (Année) XI, tome 2, 37-49.

Note: Fortescu entry conflicts with the Chandler and Barnhart entry (above); shows: "Maybel, H. 1895. Psychologie de la musique ... Brussells: Société Nouvelle. 49 pp.

Savart, F. 1840. Analyses de cours scientifiques; Cours de Physique expérimentale, professé au Collège de France pendant l'année scolaire 1838-1839, par M.F. Savart, professeur. L'Institut, Paris, France, 8, 69-71.

Sourian, P. 1883. Les sensations et les perceptions. Rev. Philos., XVI, 58-82, 135-161.

Soury, J. 1891. Histoire des doctrines de Psychologie physiologique. Paris: no publisher given. 464 pp.

Vivier, A.J. 1893. Mémoire sur la désaccord qui existe entre les mathématiciens et les musiciens sur les vrais rapports des sons musicaux. Paris: no publisher given. 23 pp.

Wundt, Wilhelm. 1886. Elements de Psychologie Physiologique. Paris: no publisher given. 2 vols.

GENERAL SURVEYS AND TEXTS
GERMAN

Bagge, Selmar. 1860. Gedanken und Ansichten ueber Musik. Wien: no publisher given.

Bagge, Selmar. 1882. Das Musikalische-Schoene, Vortrag. Basel: no publisher given.

Batka, Richard. 1899. Musikaesthetische Streifzuege. Herausgegeben von Carl Stumpf. Leipzig: Diederichs. 288 pp.

Beckmann, ? 1898. Zur Theorie des Hoerens. Verh. a. Deutsch. Otol. Gesell., V, (Vers. in Wuerzb.), 27-28. Mai 1898.

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., n/v, 79-106. (Also, Berlin, 1896, no publisher given).

"...presents...notes on the influence of music on the organism. Most of the paper is devoted to the physiological and motor affects of rhythm." --Diserens (1923).

Billroth, Th. 1894. Wer ist Musikalisch? Deutscher Rundschau., 81, 84.

Note: Diserens (1923) gives same journal, but gives volume LXXXC, which must be a typographical error, and gives pages 79-106. "...Most of the paper is devoted to the physiological and motor affects of rhythm, but several observations on tonal affects on man and animals are recorded. The author reports an experiment of his own in which a violent pain appeared in an apparently sound tooth upon hearing a soprano sing a high note (B) at a concert, a quarter tone too high. Examination of the tooth disclosed slight decay. The hyper-irritability of the nerve was thus excited by irradiation of an auditory stimulus. The observation accords with the conclusion of Urbantschitsch [1888: Ueber den Einfluss einer Sinneserregung...] that auditory stimuli lower the sensory threshold. Billroth also mentions seeing a young "great Dane" fall down as if in a faint when a village brass band struck up a (march)." --Diserens (1923)

Billroth, Th. 1894-5. Wer ist Musikalisch? Deutscher Rundschau., LXXI (1894), 79; LXXIV (1895), 385.

Also: Wer ist Musikalisch? Herausgegeben von Eduard Hanslick. Berlin: Stavanger. 2. Auflage 1896, 3. Auflage 1898, 4. Auflage 1912, 5. Auflage Berlin 1946: Paetel. 246 pp. Please note conflict: Max Schoen (1940), p. 235 says 1896, Berlin.

Bindseil, H.E. 1839. Akustik. Verlag der Horvath'schen Buchhandlung, Potsdam.

Held that the timbre of a given tone originates from its harmonics. --Plomp, 1971: Timbre as a multidimensional attribute...

Boecklin, August von. 1811. Fragmente zur hoeheren Musik und fuer aesthetische Tonliebhaber. Freyberg/Konstanz: Herder. 84 pp.

Boehm, J.W. 1830. Analyse de Schoenen in der Musik. Wien: no publisher given.

Boehmer, H. 1863. Die Sinneswahrnehmung. Leipzig: no publisher given.

Chladni, Ernst Florens Friedrich. 1802. Die Akustik, I. Leipzig: B. and H. xxxii, 304 pp.

"Chladni was the great acoustician who discovered how to make sound pictures in dust on vibrating plates; Napolean paid to have the above treatise translated into French." --Boring, 1942: 348.

Chladni, Ernst Florens Friedrich. 1821. E.F.F. Chladni's Beitraege zur praktischen Akustik und zur Lehre von Instrument-bau, enhaltend die Theorie und Anleitung zum Bau des Clavicylinders und damit verwandter Instrumente. Leipzig: B. and H.

Chladni, Ernst Florens Friedrich. 1830. Neue, unveraenderte Ausgabe [of Die Akustik, I]. Leipzig: B. and H. xxxvi, 242 pp.

Csillage, Carl. 1854. Aesthetik der Tonkunst in Verbindung mit einer ausfuehrlichen Grammatik und Poetik der Musiksprache. Pressburg: no publisher given.

Czermak, Joh. 1873. Ueber das Ohr und das Hoeren. Berlin: no publisher given.

Dove, H.W. 1839. Repertorium der Physik. Berlin: Verlag Veit und Comp.

Volume 3: "The use of dichotic experiments to differentiate between peripheral and central effects is not new ... Dove [1839] used dichotically presented partials to prove that Tartini tones (combination tones arising from monaural distortion) are not subjective but objective. He failed to hear a difference tone when two successive partials were presented to different ears through rubber tubes. Similar experiments were performed later by Thompson [1877, 1878, 1881]. Although both investigators noticed the absence of a distortion tone in the dichotic case, they did not notice, or at least did not report, any musical pitch sensation corresponding to the missing fundamental." --Houtsma/Goldstein (1971)

Dreher, Eugen. 1889. Die Physiologie der Tonkunst. Halle: Salle.

Dreher, Eugen. 1894. Grundzuege der Aesthetik der musikalischen Harmonie auf psycho-physiologischer Grundlage. Bielefeld: Helmich. 26 pp. Also:-Sammlung paedagogischer Vortraege, VII, 1.

Droenewolf, O. 1867. Ueber das Verhaeltnis der Musik zu den anderen Kuensten. Neue Zeitschrift fuer Musik, LXIII, 17, 29, 39.

Eichbaum, Dr. ?. 1888. Ueber subjective Gehoerswahrnehmungen und deren Behandlung. Berlin and Neuwied: no publisher given. 32 pp.

Elsas, A. 1886. Ueber die Psychophysik. Marburg: no publisher given. 76 pp.

Engel, Gustav. 1884. Aesthetik der Tonkunst. Berlin: no publisher given. 421 pp.

Engel, Gustav. 1892. Die Bedeutung der Zahlenverhaltnisse fuer die Tonempfindung. Dresden: no publisher given. 59 pp.

Exner, S. 1875. Experimentelle Untersuchungen der einfachsten psycheschen Processe. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, XI, 403-432.

Fechner, Gustav Theodor. 1860. Elemente der Psychophysik. Leipzig: B. and H. 2 vols. in 1.

Note: a comprehensive bibliography of Fechner's works may be found in the third edition (Leipzig, 1907: B. and H., 2 vols.), and in the second edition (Leipzig, 1889: B. and H.).

Fechner, Gustav Theodor. 1876. Vorschule der Aesthetik. Leipzig: B. and H., 1876. 2nd. ed., 1897-8.

Kreitler and Kreitler, (see notes to Chapter 5, p. 382) mention Fechner's 1876 treatise in reference to "preferences for the Golden Section" and "other proportions of form."

Fechner, Gustav Theodor. 1877. In Sachen der Psychophysik. Leipzig: B. and H. viii, 219 pp.

Fechner, Gustav Theodor. 1882. Revision der Hauptpunkte der Psychophysik. Leipzig: B. and H. xii, 426 pp.

Fechner, Gustav Theodor. 1884. Ueber die Frage des Weber'schen Gesetzes und Periodicitaetsgesetzes im Gebiete des Zeitsinnes. Leipzig: S. Hirzel. iii, 108 pp.

Fiebach, Otto. 1891. Die Physiologie der Tonkunst. Leipzig: Merseberger.

Fink, Gottfried Wilhelm. 1845. Geschichtliche Andeutungen ueber den Einfluss der kirchlichen Musik auf das Gemuet. Zeitschrift fuer historische Theologie, XV (1), 127.

Foehlisch, D.J.F. 1823. *Ueber Menschenbildung durch das Schoene, mit besonderer Ruecksicht auf Ton- und Zeichenkunst, hauptaechlich in den Mittelschulen*. Wertheim: no publisher given.

Fortlage, C. 1855. *System der Psychologie als empirischer Wissenschaft aus der Beobachtung des innern Sinnes*. 2 vols. No city or publisher given.

Free, H. 1896. *Die experimentelle Psychologie*. Leipzig: Jos. Meyer. iii, 31 pp.

Genzmer, A. 1873. *Die Sinneswahrnehmungen der neugeborenen Menschen*. Halle: no publisher given.

Haase, Rudolf. 1882. *Die Bedeutung der Musik als Bildungsmittel und ihre Beziehungen zur Poesie*. Koethen: no publisher given.

Hand, Ferdinand G. 1837. *Aesthetik der Tonkunst*. 2 Baende. Leipzig 1837-41; 2. Auflage, Leipzig 1846: Hockhausen. [2nd edition] iv, 630 pp.

Hanslick, Eduard. 1854. *Vom musikalische-Schoenen*. Leipzig: B. and H. 196 pp. Eng. trans., 1891: no publisher given. 174 pp.

From Mecklenburg entry 1188: *Vom Musikalisch-Schoenen. Ein Beitrag zur Revision der Aesthetik der Tonkunst*. Leipzig 1854, 2. Auflage 1858, 6. Auflage, 1881, 7. Auflage 1885, 8. Auflage-ca. 1891-95, 9. Auflage 1896, 10. Auflage 1902, 11. Auflage 1910, 12. Auflage 1918, 13. -15. Auflage Leipzig 1922: B. and H. (viii, 176 pp.) (Spanish, 1879, Italian, 1884, Norwegian 1885, English 1891, Russian 1895, Japanese 1924). Schoen cites the 1891 English translation.

Hausegger, Friederich von. 1893. *Das Jenseits des Kuenstlers*. Wien: Konegen. 312 pp.

Helmholtz, H.L.F. von. 1852. Ueber die Natur der menschlichen Sinnesempfindungen, Habilitation. [Professorial Inaugural] Lecture, Koenigsberger naturwissenschaftlichen Unterhaltungen, vol. 3, 1-20.

Reprinted in: Wissenschaftliche Abhandlungen von Hermann Helmholtz, vol. 2. Leipzig: J.A. Barth, 1883, 591-609.

Helmholtz, H.L.F. von. 1879. Handbuch der Physiologie. Bd. III, Thl. I, Leipzig: no publisher given.

Hennig, Richard. 1897. Die Charakteristik der Tonarten; historische-kritische, und statistische Untersucht vom psycho-physiologischen und musikalischen standpunkt aus. Berlin: F. Duemmler. vi, 131 pp.

Contrast the following entry from Mecklenburg: "Hennig, Karl. 1897. Die Charakteristik der Tonarten. Historisch, kritisch, und statistisch untersucht vom psychologisch-physiologischen und musikalischen Standpunkt aus. Berlin: Duemmler. vi, 132pp.

Herbart, Johann Friederich. 1811. Psychologische Bemerkungen zur Tonlehre. Goettingen: no publisher given. Also: Gesamtausgabe. 12 volumes. Leipzig, 1850-52.

Herbart, Johann Friederich. 1816. Lehrbuch zur Psychologie. No city or publisher given.

Herbart, Johann Friederich. 1825. Psychologie als Wissenschaft. No city or publisher given.

Herbart, Johann Friederich. no date. Ueber die Tonlehre. Werke, VII, 224ff.

Hering, M.E. 1875. Ueber Fechner's psychophysisches Gesetz. Vienna: no publisher given. 22 pp.

Hirschfeld, Robert. 1885. Das kritische Verfahren Eduard Hanslick's. Wien 1885, 3. Aufl. 1895: Loewit.

Mach, Ernst. 1866. Einleitung in die helmholtz'sche Musiktheorie. Graz: no publisher given.

Mach, Ernst. 1885. Zur Analyse der Tonempfindungen. _Sitzungsbericht der Akademie von Wissenschaft Wiener, 92_, 1283-1289.

Mach, Ernst. 1886. _Analyse der Empfindungen_. Jena: no publisher given. 121 pp.

Cf. Mach 1897 entry, this section.

Mettenleiter, Dom. 1868. Musica. _Archiv fuer Wissenschaft, Geschichte, Aesthetik und Literatur der heiligen und profanen Tonkunst, in zwanglosen Heften herausgegeben_. Brixen: Theologische Verlags-Anstalt (2. Heft: pp. 93-243).

Meyer, Max F. 1898. [The record of Carl Stumpf]. _Zeitschrift fuer Psychologie, 16_, no pp.

Meyer, Max F. 1899. Die Tonpsychologie, ihre bisherige Entwicklung und ihre Bedeutung fuer die musikalische Paedagogik. _Zeitschrift fuer paedagogische Psychologie, I_, 74-85, 180-189, 245-254.

Mecklenburg (entry 2055) conflicts; shows date as 1895/1899, shows volumes as _I_, _II-IV_.

Meyer, Max F. 1899. Ueber die Funktion das Gehoerorgans. _Verhandlungen d. Physikal. Ges. zu. Berlin, 17_ (5), 49-55.

Meyer, Max F. 1899. Zur Theorie des Hoerens. _Pflueger's Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 78_, 346-362.

Meyer, Max F. 1900. E. ter Kuile's Theorie des Hoerens. _Pflueger's Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 81_, 61-75.

Michalis, Alfred. 1895. _Vermischte Aufsaetze ueber Musik belehrenden, unterhaltenden und biographischen inhalts, nebst Grundlagen zu einer musikalischen Physiologie_. Leipzig: R. Kuehn. iii, 142 pp.

Mecklenburg says "Michaelis", shows publisher as "Verlags-Institut. (142 pp)."

Mueller, Georg Elias. 1878. _Zur Grundlegung der Psychophysik_. Berlin: T. Grieben. xvi, 424 pp.

Mueller, Georg Elias. 1882. _Revision der Hauptpunkte der Psychophysik_. No city or publisher given.

Mueller, J. 1892. Die Untersuchungen der akustischen Funktionen des Ohres. _Int. Centralbl. f. Ohrenheilkunde_, _II_, 1-26.

Contains bibliographic material.

Mueller, Johannes. 1838. _Handbuch der Physiologie des Menschen_. Eng. trans.: _Textbook of physiology_, 1842.

Plomp (1967) gives: "Verlag J. Hoelscher, Coblenz, Vol. _2_, 1840." "[The hypothesis that a specific pitch corresponds to each of the numerous nerve fibres in such a way that pitch increases gradually from the basal to the apical end of the organ of Corti] ... can be considered as an extension of Mueller's (1840) doctrine of 'specific energies' of the different senses, which states that stimulating a fibre of the optical nerve always results in a visual sensation, stimulating a fibre of the acoustical nerve in an auditory sensation, etc." --Plomp (1967).

Natanson, ?. 1844. [Expansion of Johannes Mueller's principle of specific nerve energies]. _Arch. physiol. Heilk._, _3_, 515-535.

Bracketed title by this compiler; see Boring (1942, pp. 403-4).

Pastor, Willy. 1889. Harmonik und Psychologie. _Musikalisches Wochenblatt_ _1889_, 36-39.

Pastor, Willy. 1889, 1890, 1893. Aufsaetze zur Aesthetik und Psychologie der Musik. _Musikalisches Wochenblatt_, _n/v_, no pp.

Preyer, Wilhelm. 1876. _Ueber die grenzen der Tonwahrnehmung_. Jena: H. Dufft. vi, 72 pp.

Note: In the Library of Congress index, Preyer is entered as "Preyer, William," and is cross-referenced from "Preyer, Thierry William." See especially: "Die Empfindlichkeit des Intervallensinnes," page 24, and "Die Empfindlichkeit fuer Tonhoehen,", p. 24.

Preyer, Wilhelm. 1879. Akustische untersuchen. Jena: G. Fischer. 66 pp. "mit 2 Tafeln."

Rau, A. 1896. Empfinden und Denken: Ein physiologische Untersuchung. Giessen: no publisher given. 385 pp.

Reissmann, A. 1895. Dichtkunst und Musik in ihrem Verhaeltnis zueinander. Koeln: Ende. 94 pp.

Riemann, Hugo. 1888 oder 1890. Katechismus der Musik-Aesthetik. Wie hoeren wir Musik? Grundlinien der Musikaesthetik. Leipzig 1888 oder 1890, 2. Auflage 1903, 3. Auflage 1911, 4. Auflage 1919, 5. Auflage 1921, 6. Auflage Leipzig 1923: Hesse (Max Hesses illustrierte Katechismen XVII). viii, 100 pp.

Schilling, Gustav. 1838. Versuch einer Philosophie des Schoenen in der Musik, oder Aesthetik der Tonkunst. Mainz: no publisher given.

Mecklenburg gives: "('Warnung' vor dem 'Versuch einer Philosophie des Schoenen in der Musik oder Aesthetik der Tonkunst'). Allgemeine musikalische Zeitung 1838, n/v, 807."

Schultz, Ferdinand. 1883. Die Tonkunst nach Ursprung und Umfang ihrer Wirkung. Berlin: no publisher given.

Schultz, Ferdinand. 1898. Das Wesen der Musik. Jahrbuch der Koeneglichen Akademie gemeinnuetziger Wissenschaften Erfurt 1898, no pp.

Schwalbe, G. 1887. Lehrbuch der Anatomie der Sinnesorgane. Erl., 1887. No city or publisher given.

Seebeck, A. 1849. Akustik. In: Repertorium der Physik, 8 (Berlin: Verlag von Veit und Comp.).

Corroborates Willis' (1830) premise that timbre originates from the harmonics of a complex tone. --Plomp (1971).

Simmel, Georg. 1882. Psychologische und ethnologische Studien ueber Musik. _Zeitschrift fuer Voelker-Psychologie und Sprachwissenschaft_, _XIII_, 261.

Stade, Fritz. 1870. _Vom Musikalisch-Schoenen. Mit Bezug auf Dr. E. Hanslicks gleichnamigen Schrift_. Leipzig, 1870; 2. Auflage Leipzig, 1904: Kahnt. 48 pp.

Steinitzer, Max. 1885. _Psychologische Wirkungen der musikalischen Formen_. Munich: Reidel. ix, 130 pp.

Mecklenburg gives: Ueber die psychologische Wirkungen..."

Stumpf, Carl. 1883-90. _Tonpsychologie_. Leipzig: Verlag von S. Hirzel. 2 vols. in one. Vol. _I_: viii, 427 pp; Vol. _II_: viii, 582 pp. [Druck von Poeschel und Trepte in Leipzig].

Stumpf, Carl. 1885-6. Musikpsychologie in England. _Vierteljahrschrift fuer Musikwissenschaft_ [Leipzig], Jahrg. _1_, 261-349.

Conflicting entries: , New York Public Library Music Index entry (above) shows date as 1885 only, and as Jahrgang _1_; Chandler and Barnhart entry shows date as 1885-6, Jahrgang _2_. Chandler and Barnhart also cites publication of this work as a book: "Leipzig; 89 pp." Mecklenburg (entry 3070) confirms N.Y. Public Library entry; also gives (entry 3069): "Musikpsychologie in England. Betrachtungen ueber die Hereleitung der Musik aus der Sprache und aus dem tierischen Entwicklungsprozess, Ueber Empirismus und Nativismus in der Musiktheorie. _Viert. f. Mus._, _I_, 1885."

Stumpf, Carl. 1897. _Die pseudo-aristotelischen Probleme ueber Musik_. Berlin: Koenigl. Akademie der Wissenschaft, in commission bei G. Reimer. 85 pp.

"Aus den Abhandlungen der Koenigl. Pruess. Akademie der Wissenschaft zu Berlin von jahr 1896." See Mecklenburg for conflicts: "von jahr 1896/3, p. 1." Shows book length as 86 pages.

Stumpf, Carl, ed. 1898. Beitraege zur Akustik und Musikwissenschaft. Leipzig: no publisher given.

Thimus, Albert (Freiherr) von. 1868-76. Die harmonikale Symbolik des Alterthums. Koeln: M. Du Mont-Schauberg. 2 volumes.

Volume I: "Die esoterische zahlen lehre und harmonik der Pythagoreer in ihren bezeihungen zu aelteren griecheschen und morgenlaendischen quellen, insbesondere zur altsemitisch-hebraeisch ueberlieferung." Volume II: "Der technisch-harmonikale und theosophisch-kosmographische inhalt der Kabbalistischen buchstaben-symbole des althebraeischen buechlein's Jezirah. Die Pythagorisch-platonische lehre vom werden des hebraeischen wie chamitisch-altaegyptischen weisheitslehre und zur heiligen ueberlieferung die urzeit." --New York Public Library Music Index catalogue card annotation; confirmed by Mecklenburg.

Urbantschitsch, V. 1881. Zur Lehre von der Schallempfindung. Archiv fuer der gesammte Physiologie der Menschen und der Thiere, 24, 574-595.

Note: Some sources give pageanation as "574-7." Contains bibliographic material.

Walther, Eduard. 1882. Geschichte des Taubsion as "574-7." Cons. Leipzig: no publisher given.

Weber, E.H. 1846. Der Tastsinn und das Gemeingefuehl. No city or publisher given.

Wentscher, M. 1896. Ueber physiche und psychische Kausalitaet. Leipzig: no publisher given.

Wolf, Oskar. 1871. Sprache und Ohr. Braunschw.: no publisher given.

Wolfe, H.K. 1886. Untersuchungen ueber das Tongedaechtniss. Philosophischen Studien, III, 534-571. Dissertation: Leipzig, 1886.

Wundt, Wilhelm. 1858. Beitraege zur Theorie der Sinneswahrnehmung. No city or publisher given.

Wundt, Wilhelm. 1863. Vorlesungen ueber die Menschen- und Thierseele. Leipzig: no publisher given.

Wundt, Wilhelm. 1873. Grundzuege der physiologischen Psychologie. 2 vols. Leipzig: no publisher given. 2nd ed., 1880: Verlag W. Engelmann, Leipzig; 2 vols.

"In the second edition of his work "Grundzuege..." (1880), [Wundt] criticized Helmholtz's assumption that place is correlated with pitch. Accepting that the different locations along the basilar membrane are tuned to different frequencies..., Wundt proposed an alternative...: Tones give rise to synchronous nerve impulses whose rate determines pitch." --Plomp (1967)

Wundt, Wilhelm. 1896. Grundriss der Psychologie. No city or publisher given.

Wundt, Wilhelm. 1902. Grundzuege der physiologischen Psychologie. 5. Aufl.: Leipzig, 1902.

Volume II, pages 63-138, 370-8 concern music, sound perception.

Ziehen, T. 1891. Leitfaden der physiologischen Psychologie. Jena: no publisher given. 176 pp.

GENERAL SURVEYS AND TEXTS
ITALIAN

Casamorata, L.F., and Maglioni, G. 1871-2. Memoria intorno alla soluzione del XVIII queseto accademico. Reglio instituto musicale, (Florence), anno 9, 82-91; anno 10, 45-57.

Mantovani, G. 1896. Psicologia fisiologica. Milan: no publisher given. 165 pp.

Tafani, A. 1885. L'organo dell'udito. Firenze: no publisher given.

GENERAL SURVEYS AND TEXTS
LATIN

Aristedes, Quintillianus. De musica libri III. Hrsg. von Albert Jahn. Berlin, 1882: no publisher given.

Note: Entered in the Mecklenburg subject index under "Symbolism."

Goblot, Edmond. 1898. De musicae apud veteres cum philosophia conjunctione. Thesis. Paris: Alcan. 66 pp.

Haller, Albrecht von. 1747 et seq. Prima linae physiologiae. Eng. trans., 1766 et seq. No publisher given.

Haller, Albrecht von. 1752. De partibus corporis humani sensibilibus et irritabilibus. Comment. Soc. reg. Sci. Gottingensis (Gesellschaft fuer Wissenschaft, Goettingen), II, 114-158.

Haller, Albrecht von. 1757-66. Elemente physiologiae corporis humani. 8 vols. No city or publisher given.

Helmholtz, H.L.F. von. 1842. De Fabrica Systematis nervosi Evertebratorum. Inaugural-Dissertation: Berlin.

Reprinted in: Wissenschaftliche Abhandlungen von Hermann Helmholtz, vol. 2. Leipzig: J.A. Barth, 1883, 663-679.

Weber, E.H. 1834. De Tactu. No city or publisher given.

GENERAL SURVEYS AND TEXTS
SPANISH

Besteiro, J. 1897. La psicofísica. Madrid: no publisher given. 144 pp.

APPENDIX A

SUBJECT CODING LOG

General Topic	Specific Topic	
p		I. CLASSICAL PSYCHOPHYSICS
	s	A. Description of stimulus properties
	f	1. frequency
	d	2. duration
	i	3. intensity
	h	4. harmonics
	b	5. spatial properties
	c	B. Corresponding perceived attributes; physiology of the ear
	p	1. pitch
	l	2. time
	v	3. loudness, volume (voluminosity)
	t	4. timbre
	u	5. auditory localizations: binaural hearing process
	a	6. altered perceptions: interactions of elements when combined
	z	C. Testing
l		II. MUSICAL ELEMENTS AND CONSTRUCTS
	s	A. Musical elements: perceived auditory attributes [musical context]
	i	1. isolated elements
	p	a. pitch (including tuning/temperament)
	t	b. timbre
	d	c. density (texture)
	l	d. loudness, amplitude, volume
	j	e. sound direction (direction of perceived sound source)
	n	2. interactional elements
		pitch/loudness
		pitch/sound source direction (Doppler effect)
	c	harmonics/harmonics (clangs): Consonance and Dissonance
	y	B. Musical Constructs (systems)
	m	1. melody
	h	2. harmony
	r	3. rhythm

o 4. mode
k 5. modulation/key centers
f 6. formal attributes/recurrence/pattern
z C. Testing

m III. MUSICAL PERCEPTION: music and nonmusic association
m A. Musical association
c 1. Cortical level
e a. elemental perception
s b. construct (system) perception
y c. synasthesia, especially chromasthesia
u 2. subcortical level
k a. kinesthetic reactions
r b. emotional and organic responses
n B. Nonmusical association
o 1. Cortical level
t a. emotion, meaning in music; beauty
d 1. mood
f 2. finality effects
w b. mental stimulation, wandering of attention
v c. visual images, daydreams (but not synasthesia)
i d. mere awareness of sound
l e. lapsing of "mere awareness of sound" into margin of consciousness
b 2. subcortical level
a a. alteration of muscular activities
p b. euphoria, organic sensations
z C. Testing

a IV. ABILITY
m A. Musicality: "the musical mind"
p 1. performance
o 2. creativity
l 3. listening ability
g B. General ability vs. musical ability
i 1. IQ vs. musical ability
a 2. art ability vs. musical ability
b 3. "abnormality" vs. musical ability
n a. neurotic, psychotic tendencies vs.
h b. physical abnormalities vs.
s c. "idiot-savant"
c C. Capacity vs. ability

t 1. inheritance
j 2. genius, child prodigies
e 3. absolute pitch, absolute tempo
r 4. race
u 5. cross-cultural relationships
z D. Testing

u V. APPLIED MUSIC PSYCHOLOGY
c A. Clinical
t 1. music therapy
p a. physical; medical uses of music
f b. emotional
s c. psychological
m 2. music combined with other therapeutic devices
d a. drugs
h b. hypnosis
i B. Music in industry
e C. Education
g 1. pedagogy/guidance
v 2. development/music learning
z D. Testing

b VI. BEHAVIORAL MUSIC PSYCHOLOGY
i A. Individual
l 1. listening behavior
p 2. performance behavior
c 3. creative behavior
s B. Social (cultural)
e 1. ehtnomusicology
r 2. racial comparisons
z C. Testing

z VII. TESTING AS A TOPIC (see outlines A, B)
v A. Validity
r B. Standards of rigor
e C. Experimental vs. empirical method

s VIII. GENERAL SURVEYS AND TEXTS
m A. Music psychology
p B. Sensory perception, psychophysics
e C. Experimental esthetics

APPENDIX B

BIBLIOGRAPHY SUBJECT AND LANGUAGE INDEXING PROGRAM

```
               &STLIMIT = 3000000
               &DUMP = 2
               &MAXLENGTH = 24000
               INPUT(.INPUT,'IN')
               OUTPUT(.OUTPUT,'OUT')
               INPUT(.KEY.IN,'KEYCODE')
               DEFINE('FIND.UNDERS()')
               DEFINE('PRINT()')
               UPPERS = 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
               LOWERS = 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
               FORMAT = LEN(5) LEN(70) . DATA
               NTIMES = 4
               PREFIX = "    @"
               FIRST.4.SWITCH =  0
               OUTPUT =  "     1"
               :(GET.KEY)
 START         REWIND("IN")
 ***           READ  FIRST  RECORD
               INPUT  LEN(5) BREAK(' ') . OLD.CODE REM . RESULT
               RESULT = TRIM(RESULT)
 READ
               RECORD = INPUT   :F(ENDING)
               RECORD  FORMAT
               RECORD  =  TRIM(DATA)
               RECORD BREAK(' ') . CODE REM . RECORD
               GT(SIZE(CODE),2)           :S(PRINT.BIB)
 FIRST.ANNOTATION.CHECK
               IDENT(CODE,"4")            :F(FIRST.4.END)
               EQ(FIRST.4.SWITCH,O)       :F(FIRST.4.END)
               FIRST.4.SWITCH = 1
               :(PRINT.ANN)
FIRST.4.END
               RESULT = RESULT RECORD
               :(READ)
PRINT.BIB
               PRINT ( )
               FIRST.4.SWITCH = 0
               NEXT.PREFIX = "    @"
               :(RESET)
```

```
39 PRINT.ANN
40                PRINT ( )
41                NEXT.PREFIX = "      >"
42                :(RESET)
43  PRINT
44                OLD.CODE KEY     :F(PRINT.ENDING)
45                FIND.UNDERS ( )
46                RESULT BREAK(' ') SPAN(' ') REM . RESULT
47                RESULT = PREFIX RESULT
48                LT(SIZE(RESULT),50)    :S(PRINT.LAST)
49  CHOP
50                RESULT LEN(49) . LEFT BREAK(' ') .
      .           MIDDLE SPAN(' ') REM . RESULT  :F(PRINT.LAST)
51                OUTPUT = LEFT MIDDLE
52                :(CHOP)
53 PRINT.LAST
54                IDENT(RESULT,NULL)    :S(RETURN)
55                OUTPUT  =  RESULT
56  PRINT.ENDING
57                :(RETURN)
58  RESET
59                RESULT = RECORD
60                OLD.CODE =   GT(SIZE(CODE),2) CODE
61                PREFIX = NEXT PREFIX
62                LEQ(END.SWITCH,'1')    :S(ENDING.2)
63                :(READ).
64  ENDING
65                END.SWITCH = 1
66                PRINT ( )
67                :(RESET)
68  FIND.UNDERS
69  OP.BR         RESULT "(| " = "[ "   :S(OP.BR)
70  CL.BR         RESULT " |)"  = "]"  :S(CL.BR)
71  AL.BR         RESULT "|" ARB "|"   =  NULL  :S(AL.BR)
72                TLUSER = NULL
73   FU           RESULT BREAK ('_') . LEFT SPAN ('_') .
     .            MIDDLE REM . RESULT   :F(FU.END)
74                MIDDLE = EQ(SIZE (MIDDLE),1) "$"
75                TLUSER = TLUSER LEFT MIDDLE  :(FU)
76  FU.END        RESULT = TLUSER RESULT
77                :(RETURN)
78  GET.KEY       PATTERNS = TRIM(KEY.IN)   :F(END)
79                PATTERNS = REPLACE(PATTERNS,UPPERS,LOWERS)
80                TIMES = 0
81  KEY.LOOP      TIMES = LT(TIMES,NTIMES) TIMES + 1  :F(CHANGE)
```

```
                LINE.1 = KEY.IN
                LINE.1   LEN(70)  . LINE.1
                OUTPUT = "        " LINE.1    :(KEY.LOOP)
CHANGE          DDATA = CODE ('HERE KEY = '  PATTERNS  '
                :(START) ' )   :S(HERE)
ENDING.2        OUTPUT =  "      1"
                END.SWITCH  =  0
                :(GET.KEY)
END
```