

South Dakota State University

Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange

Electronic Theses and Dissertations

1937

A Review of Certain Phases of Cosmetics

Dorothy Nelson

Follow this and additional works at: <https://openprairie.sdstate.edu/etd>

Recommended Citation

Nelson, Dorothy, "A Review of Certain Phases of Cosmetics" (1937). *Electronic Theses and Dissertations*. 1966.

<https://openprairie.sdstate.edu/etd/1966>

This Thesis - Open Access is brought to you for free and open access by Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Electronic Theses and Dissertations by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.

A REVIEW OF CERTAIN
PHASES OF
COSMETICS

BY

DOROTHY NELSON, B.S., 1935

SOUTH DAKOTA
STATE COLLEGE LIBRARY

A THESIS

SUBMITTED TO THE FACULTY

OF

THE SOUTH DAKOTA STATE COLLEGE

OF

AGRICULTURE AND MECHANIC ARTS

JUNE 1937

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF MASTER OF SCIENCE

IN PHARMACY

SOUTH DAKOTA STATE COLLEGE LIBRARY

INTRODUCTION

Since the advent of cosmetics between thirty and forty thousand years ago their preparation, uses and effects have been a matter of frequent and nearly constant discussion and experimentation. In the words of Lillian H. Foster (1) quoted from 'The American Perfumer': "As it (cosmetics) serves as a worthy commodity of commerce and as an adjunct to beauty, a double function combining the useful and the ornamental, should not the make-up box receive its due and be accorded recognition as a valued member of society?"

And even as it has secured a place in society, so has it invaded the world of science. It is but a short time since the first articles pertaining to this subject have appeared in scientific journals. Records of experiments have dealt chiefly with the absorption of vitamins (2), and more recently with the effects of hormones (3). Splendid results in skin therapy are foreseen by these experiments but they must be properly interpreted and applied.

This particular study was formulated to investigate the factors which comprise cosmetic dermatology, from the viewpoints of pharmacology, physiology and chemistry.

Since the pharmacist has become aware that the cosmetic business has slipped away from him to more energetic salesmen, he has been pressed to regain his stand. To do

June 27 - author - 9

this, he must have a greater fund of knowledge to proceed with confidence. This may be accomplished more easily than he hopes, since there is such a direct similarity between cosmetics and his pharmaceutical products.

There is a necessity for the compounder of the original formula, the manufacturer, the pharmacist or other sales agency, the physician or dermatologist, and the customer to correlate the aspects of chemistry, physiology, pathology and pharmacology to cosmetics.

A host of problems for further investigations have been suggested by the material assembled in this paper.

THE ART OF COSMETOLOGY

The cosmetician's art has been practiced upon the human skin, in an attempt to improve its outward appearance or to relieve offensive appearance incident to disease, down through the ages, and is so ancient that its present position of importance is well founded. The term "cosmetic" is derived from the Greek word "Kosmeo" - to decorate (4) and is defined by Webster as "an agent which improves beauty."

Perfumes were known 23,000 years before the Christian era. Ointment vases dated 3500 B. C. are to be found in the British museum. Aromatics prepared with animal fat and balsams found in the tomb of Tutankhamen by Howard Carter were still fragrant in 1926 after 3276 years. (ibid).

The Egyptians used cosmetics for three purposes: as offerings to their deities, for aesthetic purposes during life, and as agents for embalming their dead. They are the inventors of the bath, which was followed by quantities of perfume and fragrant oils. Vermillion and white lead were used by the Greeks to color their faces, and antimony sulfide, called "Kohl" for their eyes. (ibid)

Theophrastus in 370 B. C. wrote a book on raw materials and fixation of perfumes both the compounded and

natural flower. The Ebers Papyrus contains numerous references to the treatment of skin diseases; Hippocrates gave an almost modern description of skin disease. Galen wrote some of the first books on the subject; his basic principle of cold cream is still incorporated in the formula for the preparation today. He used musk, ambergris, civet, and castor oil, and they are still in use.

Cleopatra reached the height of personal adornment in the cosmetic art during her hour. Particularly were the eyes accented with Kohl, and the finger nails with henna. Secluded Oriental women spent much time on facial decoration. The urge spread to the west - to England France and Italy, through the medium of prized gifts brought by the Crusaders. The use of cosmetics flourished so heartily that in 1770 the Parliament of Great Britain passed an act which read as follows: "That all women of whatever rank, age, profession, or degree, whether virgin, or maids or widows, that shall from and after such act impose upon, seduce, and betray into matrimony, any of his Majesty's subjects by the scents, paints, cosmetic washes, artificial teeth, false hair, Spanish wool, iron stays, hoops, high heeled shoes, bolstered hips, shall incur the penalty of the law in force against witchcraft and like misdemeanor, and that the marriage upon convic-

shall stand null and void."

Studying the skin as the science of dermatology was not carefully undertaken until 1750. Lorry, a Frenchman, considered the skin for the first time as an organ and its reflection of digestion, sexual life, mental states, food, air climate, sunlight and habits. Robert Willan (1757-1812), a Yorkshire Quaker, marks the beginning of modern dermatology. (5) He emphasized external and internal cleanliness. The work of Willan and Bateman, his colleague, is the basis of the science today. The work advanced rapidly and at the present time links itself with a new world of Chemistry, Immunology, Clinical diagnosis, Radiology, Bacteriology, Protozoology, and Endocrinology. The biological sciences have been particularly generous in contributions to dermatology, with the subsequent reflection on Cosmetology. Anaphylaxis and allergy have been pronounced responsible for many skin disturbances. The most recent work has been done, and is yet in the experimental stage, in the science of hormones. Estrin, or oestrin, a hormone, active in puberty, which will be discussed later, has been particularly investigated by Dr. Theodore Rosenthal, of Columbia University.

Cosmetics have lasted the years and changed from a frivolous luxury, to become an economic necessity to the

business women and the home makers. The industry has flourished and now ranks with the steel and iron industries in importance financially. One store in New York alone sells cosmetics amounting to three million dollars annually. (6)

PHYSIOLOGY AND ANATOMY

The human skin is physiologically the "integumentum Commune" or common integument, and designed to "maintain wide physical and chemical differences between the internal structures on the one side and the external differences on the other." (7) Its function is primarily protective besides maintaining the temperature of the body, receiving stimuli, secreting sweat and sebum. It possesses limited ability to excrete and absorb.

The outer layer of the skin is the epidermis, with modifications resulting in nail, hair, and glands. Below this is the corium, supplied with blood and lymph vessels. The tela subcutanea lies beneath the corium, connecting the true skin with the body proper.

The coloring of the skin is the general distinctive characteristic of the races, i.e. white (Caucasian), yellow, (Mongolian), brown (Malay), and black (Ethiopian). Exposure to the sunlight varies the amount of pigment slightly, due to melanin in the skin, causing either freckles or tan.

The blood vessels of the skin are usually small, being found abundantly in the corium and tela subcutanea. The lymphatic system also flows freely throughout the two layers.

The skin is well supplied with nerves, more abundantly in some parts than in others, as we know by the difference in sensitivity. All of the skin nerves are sensory excepting those directed to specific glands or vessels. They terminate in what are known as tactile corpuscles and Pacinian corpuscles. Langerhans (8) has seen nerve fibrillae passing between cells of the rete mucosum, communicate with stellate corpuscles, and make a network as in the epithelium of the cornea. The tactile corpuscles consist of an enlargement shaped like a fir cone in the papillae; it is composed of single or superimposed segments, each being a nerve fiber.

In old age the elasticity and thickness of the skin decreases. Much of the fat disappears and the skin becomes wrinkled. Often times it scales, due to dryness and lessened vitality.

The skin is constantly supplied with a fat-like substance, known as sebum. Tiny sebaceous glands at the base of the hair follicles are the secretory organs for its supply; they may also occur elsewhere. They are attached in pairs and enclosed in the superficial layers of the derma. Within this layer are cubical cells which gradually undergo fatty transformation. The glands are surrounded by a network of blood vessels within narrow meshes. The fatty substance within the sebaceous glands, in tiny granules, is essentially fatty acids, in combina-

ation with cholesterol, hence they are really wax particles. It can absorb 100 per cent of water and is highly resistant to most bacterial invasion. (9)

The sudorific glands are termed buds of granulation which sink into the derma and become convoluted tubes. The duct ascends vertically. They secrete sweat, at a rate determined by temperature, humidity of the surrounding air, and activity of the body. These glands play a part in skin lesions and will be mentioned again.

The unbroken skin will not absorb aqueous solutions as a rule, but fatty vehicles carry a limited amount of substance through the cuticle. Mucous membrane or broken skin absorbs material readily.

The physical character of the substance applied is very important to successful absorption. If it does not absorb well, bacterial infection present multiplies and the irritation is increased. Further comment will be made under treatment.

The skin performs in addition to its other functions, a certain amount of respiration, though the lungs are, of course, the principle organ of this function. There is a continuous output of carbon dioxide through the human skin and if it is completely blocked, death may result. At a temperature of 29°C to 33°C (77.6° to 85° F) about .35 Gm. per hour, or 8.4 Gm. of carbon di-

oxide are given off per day (9). The amount increases with temperature as does the secretion of sweat.

Dr. Levin states that it is possible to cause suffocation by closing all the openings of the skin. (10)

The skin is composed of layers, each being slightly different in structure. These layers are noted according to their structure as follows: (11)

1. Epidermis (Epidermis)

1. Horny layer (Stratum corneum)

2. Clear layer (Stratum lucidum)

3. Granular layer (Stratum granulosum)

4. Basal layer (Stratum basale)

2. True Skin (Dermis)

1. Papillary layer of dermis (Stratum papillare)

2. Reticular layer (Stratum reticulare)

Capillaries (Arteries and Veins)

Large capillaries (Arteries and Veins)

Arteries (Arteries)

Veins (Veins)

Lymphatics (Lymphatics)

Sweat glands (Sweat glands)

Sebaceous glands (Sebaceous glands)

2. Dermis (Dermis)

HISTOLOGY OF THE SKIN

The epidermis is composed of epithelial cells. In most parts of the body, the skin is .08 mm. to .10 mm in thickness, .5 mm to .9 mm on the hands, and 1.1 to 1.3 mm on the soles of the feet. (11).

The skin is composed of layers, each being slightly different in structure. These layers are named according to their structure as follows; (12)

A. Epidermis (Epidermis)

1. Horny layer (Stratum corneum)
2. Clear layer (Stratum lucidum)
3. Granular layer (Stratum granulosum)
4. Germinative layer (Stratum germinativum)

B. True Skin (Corium)

1. Papillary layer of corium (Stratum Papillare)
2. Reticular layer (Stratum reticulare)

Capillary network (Rete vasculosum)

Touch corpuscles (Corpusculum tactus)

Arteries (Arteriae)

Veins (Vena)

Lymphatics (vasa lymphatici)

Sebaceous glands (Glandulae sudoriferae)

C. Subcutaneous Tissue (Tela subcutanea)

1. Sweat glands (Glandulae sudoriferae).

2. Lobules of fat (Adiposi)

3. Arteries, veins, lymphatics.

The stratum corneum is the outer layer of the epidermis, the epithelial cells containing keratohyalin, resulting in horny cells. These cells have migrated from below, losing vitality and moisture, and under normal conditions are constantly being sluffed. Immediately below the corneum, the stratum lucidum appears in parts where the epidermis is heaviest, as the palms and soles. The cells are clear, indefinite, and full of eleiden, a semi-fluid derived from keratohyaline particles (the end-product of which is the horny outer layers). The stratum germinativum, the innermost layer of the epidermis consists of stratified squamous epithelium, the deepest portion of which is columnar.

The corium attaching the epidermis to the deeper tissue, is divided into the papillary stratum and reticular stratum. They have similar structure of fibrous, elastic, and connective tissue, but are more compactly arranged in the reticulare.

The tela subcutanea is the fascia which joins the true skin to muscles and organs. It contains fat and allows the skin to move easily to any position.

The muscles which control the skin are principally involuntary. The facial muscles are striated or vol-

untary.

The sebaceous glands in the corium, technically known as glandulae sebaceae, are usually associated with hair follicles but may occur otherwise. They vary in size from .2 to .4 mm in the scalp, and from .5 to .2 mm in the mons pubis, scrotum, ear and nose. (13).

Photomicrographs* of skin tissue illustrating the layers outline above are shown on the following pages.

SOUTH DAKOTA
STATE COLLEGE LIBRARY

*Slides were prepared from human skin tissue obtained through the class in Histology. The section for Plate I was prepared by Phillips Haas, student in Histology. The others were prepared by the writer using formalin as a fixing agent, cutting paraffin sections, and staining with hematoxylin.

SOUTH DAKOTA STATE COLLEGE LIBRARY

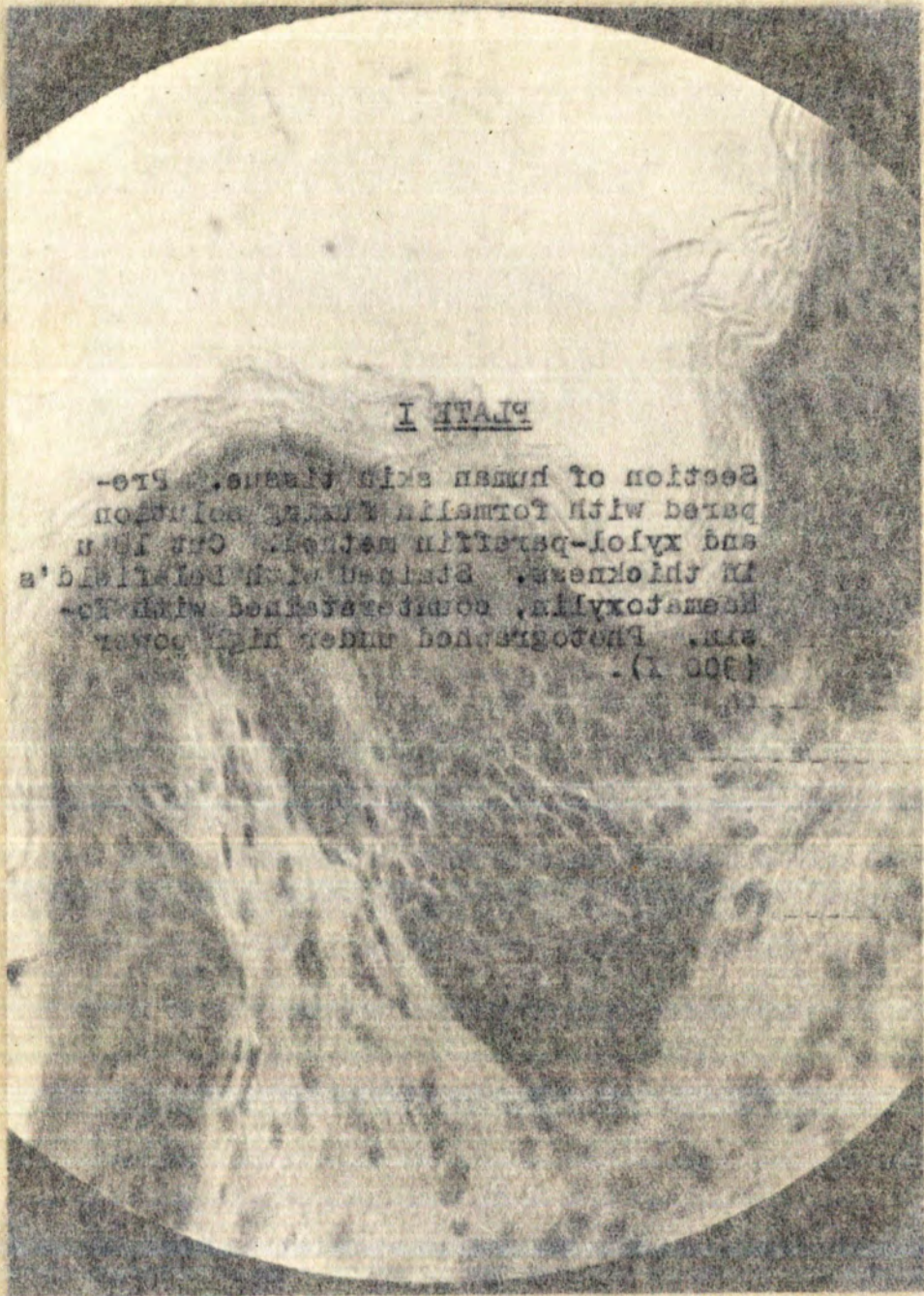


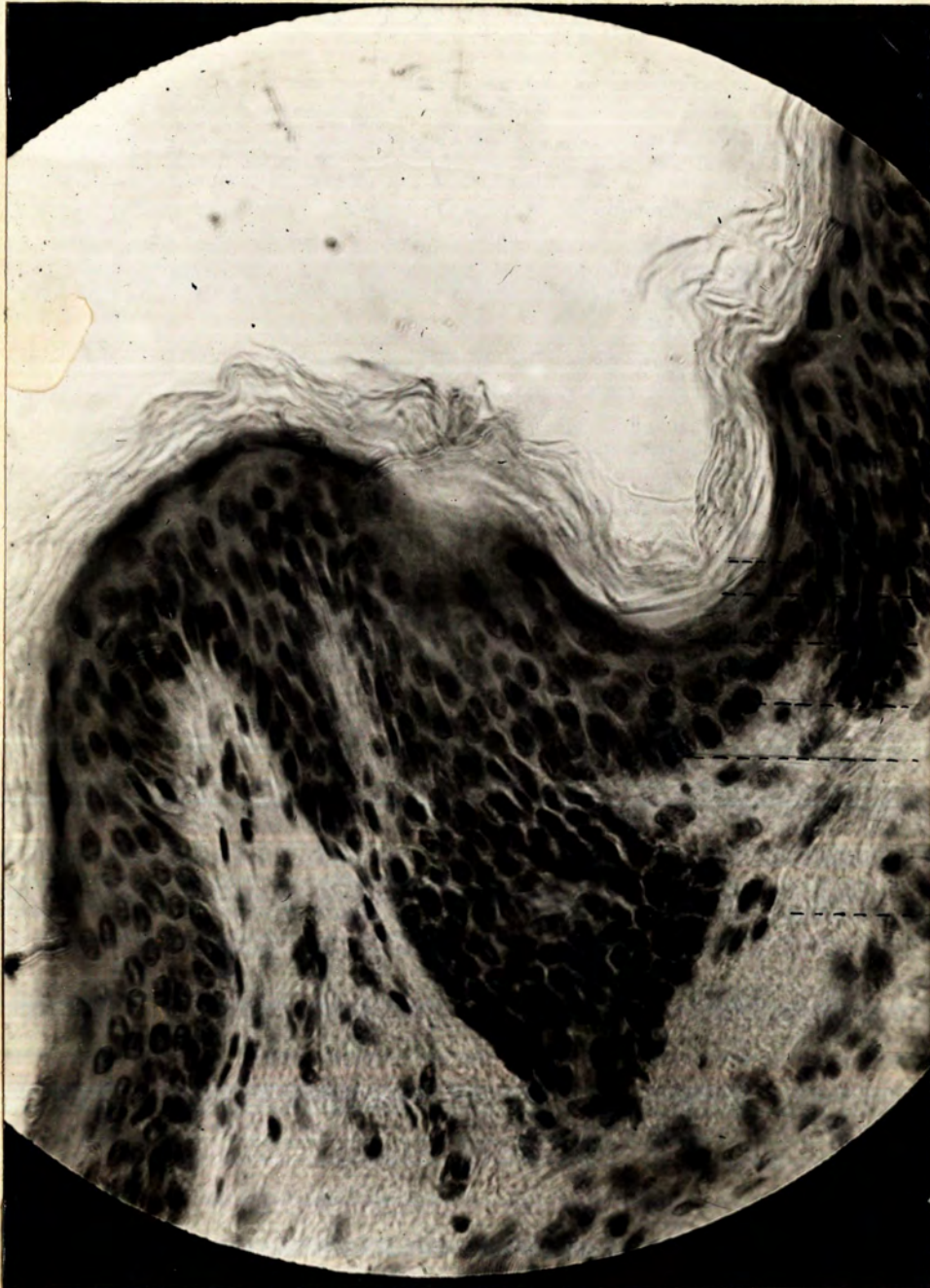
PLATE I

Section of human skin tissue. Pro-
pared with formalin. Fixed, sectioned
and xylol-paraffin method. Cut in
in thickness. Stained with Delafield's
haematoxylin, counterstained with
eosin. Photographed under high power
(300 X).

stratum corneum
stratum lucidum
stratum granulosum
stratum spinosum
stratum papillare
stratum vasculare

PLATE I

Section of human skin tissue. Prepared with formalin fixing solution and xylol-paraffin method. Cut 10 μ in thickness. Stained with Delafield's Haematoxylin, counterstained with Eosin. Photographed under high power (300 X).



- Stratum corneum
- Stratum lucidum
- Stratum granulosum
- Stratum germinativum
- Stratum papillare

- Stratum reticulare

PLATE II

Section of human skin showing the opening of a hair follicle. Formalin, xylol-paraffin method. Cut 10 u in thickness. Stained with Mallory's triple stain. Photographed under high power. (300 X)



-- opening of
hair follicle

-- hair

PLATE III.

Section of human skin tissue showing
a hair follicle and sebaceous gland.
Formalin fixing solution Xylol-paraf-
fin method. Cut 10 u in thickness.
Stained with Delafield's Haematoxylin.
Photographed under low power. (125 X)



epidermis

corium

folliculus pili
(hair follicle)

pilus (hair)

glandulae sebaceae

PATHOLOGY OF THE SKIN

There are a host of diseases common to the skin but most of them are far beyond my knowledge or the scope of this paper. Only acne and related conditions are of interest to the subject of cosmetics.

Dr. R. M. Simon describes acne as "an inflammatory process of the sebaceous glands with the formation of nodules and tubercles" and usually they are accompanied by blackheads or whiteheads and followed by slight scarring. (14).

In 1895, the Annual of the Universal Medical Sciences (15) made the statement that the causes of acne are anemia, dyspepsia, constipation, amenorrhea, and dysmenorrhea. Where the sebaceous glands are too large and too numerous at the age of puberty, physiological excitement causes alterations; the ducts become "blocked, inflammation follows, and if pus cocci are present, pustulation occurs". The belief is put forth in the same article that eruptions on the chin indicate menstrual troubles, on the forehead either the result of a studious or nervous temperament or of habitual constipation.

Dr. L. D. Bulkly (16) states his belief in dietary malfunctions as a definite cause. He favors a vegetarian diet with special stress on amount eaten, mode of

preparation, time and method of consumption.

Dr N. P. Anderson and Dr. Samuel Ayres (17) record unusual cases of dermatoses sensitive to light rays, they presume by influence of sulphur metabolism in the body, but this they connected only with such diseases of the skin as lupus erythemous and pellagra.

Further unusual cases are reported by Dr. Harry L. Baer, a cases of aniline poisoning from green coloring in lime jello, which is an unusual case of skin eruption from an ordinarily unsuspected source. (18) In connection with cosmetics specifically, cases are more rare now than a few years ago, where some ingredient has proven injurious to the skin. New Hampshire instituted legislation against any harmful ingredients in cosmetics and authorized inspection for protection. (19).

Aniline dyes are reported by Doctors Tausig and Miller in 1926 to the American Medical Association as causing poisoning. Thousands of cases of injury from the use of paraphenylene diamine by inhalation and absorption are known, from use of the substance as an effection hair dye. (20)

Dermatitis in four women in Chicago are on the record of Dr. Herbert Rattner (21). One woman used Godfrey's dyes on eyelashes and brows. Her eyes became swollen and red, but local treatment proved effective,

though two months were required for healing. The offending ingredient was not determined. A second patient suffered from red scaly eyelids, which recurred upon returning to a certain hairdresser, and finally the reason was traced to the wave lotion used, the specific offender again not determined. Another case of dermatitis was believed due to face lotion, but finally traced to a brown fur collar. The last case recorded was found to be caused by a perfume in a cold cream, proven by a patch test.

It is particularly interesting to note that Dr. Cleveland White (2) of Chicago states that 32 cases of acne were examined, with the conclusion that roentgen treatment had temporary beneficial effects, and that endocrine studies of thyroid and ovaries were not important.

Carbohydrate tolerance was proven a false offender by Dr. White, since blood sugar, sugar tolerance and metabolism were normal. Dr. E. B. Tauber (23) also sought to disprove the belief in 10 patients who had been bothered from six months to ten years with skin eruptions. They were observed for two weeks in a hospital and for six to fourteen months after they were given treatment consisting of five grams of carbohydrates, one gram of protein, one gram of fat per kilogram, and one thousand cc of 5% dextrose in normal saline. None showed any intolerance by either sugar in the blood or urine above the normal. Five

were definitely improved. One of the others suffered slightly due to a menstrual disorder, and one from eating tomatoes.

Dr. White also tried some elimination diets and proved successful in some instances; viosterol helped a few to raise the threshold to certain foods. Idiosyncrasies of the individual are often responsible for a particular product or class of products. These can be determined either by a process of elimination or by patch tests. Certain foods may be long unsuspected causative factors in skin blemishes.

In a blood chemistry analysis of 500 dermatitis patients, Dr. Herman Goodman (24) observed that as blood sugar went up, blood salt went down. He subsequently treated the pustules by local and intravenous injections with salt solutions. Boils and other types of skin disturbances in athletes were thus effectively treated.

Dr. J. E. Lane and Dr. Straus (25) point out an unusual circumstance in the use of oil of bergamot in eau de cologne. The oil itself is not harmful but in alcohol, particularly upon exposure to sunlight or in the presence of excessive perspiration, it causes dermatitis. In Canada, diethyl phthalate and quinine HCl are used to denature alcohol, and these compounds in toilet water are apt to be a source of trouble.

Possibilities of an offensive ingredient have already been mentioned as in the case of Godfrey's dyes on brows and lashes, a new perfume in creams, the wave lotion, etc. Whether it was the result of an idiosyncrasy or of a compound which would be harmful to all individuals was not determined.

It is striking to note that a few of the older doctors suggest vaguely that there is some connection to endocrines at puberty, others discount it altogether, but their equipment and general knowledge were too limited at the time to make any contributions in that field.

Dr. Theodore Rosenthal has made the most profound investigations in this direction. (26) He estimated that acne patients comprise 8.5% of dermatologic practice. He states the height of appearance in girls at the age of seventeen, and in boys, eighteen with only 3.4% of girls and .6% of boys escaping entirely.

Dr. Rosenthal believes that attempts to define the cause of acne have resulted in failure. Unna described acne bacillus in 1893. Sabouraud stated it to be based on sebaceous infection; Whitfield believed gastro-intestinal disturbances responsible.

The endocrine output of the gonads has been suspected as the etiologic factor, since relapse during the

menstrual period coincides with the appearance of acne at puberty. Dr. Rosenthal states that Cunningham and Luntsford found among college women no relationship of acne to constipation, weight, colds, and little if any to menstrual disorders. Bruno Bloch illustrated by graph that those having reached sexual maturity showed the highest percentage of acne. No definite information on the exact hormone or its effect was available until the recent work of Dr. Rosenthal. The proceedings of the determination are immaterial here but the results are important. The hormone oestrin was measured in rat units, and the amount in the blood and urine was determined. More oestrin was found in a larger number of patients close to the menstrual period, and it was slightly less in patients suffering from acne. Oestrin hormone administered gave favorable results, about 60% showing improvement. Dr. Rosenthal does not claim that this is definite and infallible basis for therapy, for he warns that used indiscriminately, sclerosis of the ovaries may result.

NORMAL CARE OF THE SKIN

Normal care of the skin is the foundation for the prevention of blemishes arising from carelessness. In many ways, its principles are the basis for treatment in cases where further medication is necessary.

Absolute cleanliness is the first prerequisite to any treatment. Plenty of water both inside and outside is indispensable. A bland castile soap is preferable to all others; the more alkaline the soap, the more irritant its action, with no increased antiseptic value. The use of creams exclusively is definitely not recommended unless advised by a physician. The antiseptic value of soap is of the utmost importance. Dr. Diasio (27) concluded from research on the subject, that pure soap surpasses all others in germicidal potency, for general uses. The germicidal action is dependent on:

1. The fatty acid radical present.
2. Saturation state of fatty acid constitution.
3. Temperature of the soap solution
4. Colloidal nature
5. Absence of foreign substance which stalls its action.
6. The soap's ability to diffuse or dialyze.
7. The ability to lower the surface tension."

Since the film covering the skin is of a waxy nature, it is logical that a cold cream will remove the excess fat very effectively. Soap and water will also do it, but it requires more to cut the wax than if a preliminary cleaning with cream is done. The same chemistry applies in cleaning a textile which has been soiled by heavy grease. Butter or lard is applied to loosen the grease then all traces of both removed by soap and water, which can more effectively emulsify the lighter fat.

Joseph Kalish (28) enlightens us further by the information that the dirt which collects on the surface of the skin is held there by a film of oil, either natural skin oils or extraneously supplied. Either a solvent or an emulsifier is effective in the removal. The detergent action of soap is due to its ability to separate the oil globules and reduce their cohesion, i.e. emulsify. Oil, on the other hand, "dissolves the binding oil and the mixture is then mechanically removed with cleansing tissue." A good emollient wax in combination with oil is desirable since it thus preserves flexibility. The skin is thus not completely denuded of the oils necessary to preserve its supple quality.

Whether the individual indulges in one or several soap and water cleansings daily is a matter of personal decision. Dark skin is usually somewhat thicker and more oily, so can easier bear much soap. The light, thin-skinned individual often suffers from lack of oil, so

would more wisely supplement the daily water bath of the face with cream whenever necessary.

It is the writer's opinion, however, that no cold cream can ever entirely replace soft, warm water and a blend castile soap. Dr. Levin (10) states with no uncertainty that the idea that "the skin can't stand much water" is all foolishness. He is a profound believer that the more water the better, and that soap is undeniably the best stimulant and cleanser.

It is true that cold water causes contraction and may be used alone or in conjunction with an astringent. Warm water relaxes the skin, hot water even more so. Application of hot water followed by cold water is an excellent stimulant but the hot water alone may relax the skin too much and cause flabbiness of the muscles.

The use of astringents is a procedure recommended generally for use by persons having "enlarged pores". Dr. Herman Goodman (29) very definitely describes a pore as being "the opening of a sweat duct within the skin, ordinarily hidden from view." Those generally discussed as disfiguring the skin are hair follicles from which as a baby, hair emerged. The opening in infancy was very tiny but they occasionally grow larger when full growth is reached and no small hair fills the opening. "It is made up of concentric layers of the same unyielding material as the nail and the uppermost skin surfaces," and hence

says Dr. Goodman, is not subject to being closed permanently. He explains the effect of astringents, packs, beauty masks as a mild form of edema on a small scale surrounding the opening and thus closing it temporarily. Heat produces the same effect.

Milk has been used as a cleanser for the skin but its application to a warm surface is ridiculous. It is a bathed for further breeding of bacteria.

TREATMENT OF ACNE AND COMMON BLEMISHES

It is obvious that the causes of acne are varied and must be carefully determined before final treatment is undertaken. There are, however, a number of local treatments in general use, applicable within reason to most cases.

Natural treatment and protection from bacteria are supplied the skin by a wax-like substance, sebum, secreted by the sebaceous glands. Sebum is cholesterol, a higher alcohol, and fatty acids, hence is really a wax. It is found to the greatest extent in wool fat or lanolin and in the feather glands of water birds. "It presents many advantages over ordinary fat as a protective salve for the surface of the body. In the first place it can take up 100% of water. In the second place, it is not attacked by micro-organisms, so it does not tend to become rancid or to furnish a nidus for the growth of these organisms on the surface of the body." (3) It is an advantage indeed that this valuable substance is secreted continuously, the amount varying in individuals.

The use of wool fat is doubly beneficial in local application to skin blemishes, both in being an excellent vehicle for absorption of medicinal substance, and for its own value as an antiseptic and protective.

Emollient creams are soothing and restore the fat removed by frequent washing. They contain wool fat, ideal as it contains the same chemical as sebum, found in the skin.

"As to their absorption through the skin, of which so much was made in the past, recent studies point to the conclusion that the vehicle has little if any influence on absorption, excepting a retarding action. A volatile drug, such as methyl salicylate which is absorbable through the skin will be absorbed regardless of the vehicle". Even so, the amount is small. (30).

Although minor eruptions of the skin are often experienced by the adolescent, they should not be ignored nor treated too lightly. If not handled under septic conditions, infection is very apt to develop leading to more serious trouble, even death.

The first thought is to treat locally. In case of a pustule occurring at the mouth of a gland, the pus may be expressed cautiously. The forerunner of these pustules is very frequently blackheads, so they should be guarded against as a preventive. Expression of pustules or blackheads should be followed by a good antiseptic. Fortunately most people believe that alcohol or spirits of camphor serve to "dry up" the pustulant

spot, which is very good, since they also are sufficiently antiseptic.

Doctors urge the application of drugs which are antiseptic, healing or stimulant in nature. Sulphur preparations, camphor-sulphur, Peruvian balsam, and creolin, resorcin-sublimate paste are most important. (15) A prescription by a physician is essential to the wise administration of these medicinal substances, as their selection depends on the condition of the patient.

The systematic correction is almost a routine procedure. Few if any, look further for causes until they are certain that the source of trouble is not constipation, lack of exercise, diet, lack of fresh air, or sleep.

Constipation has taken the blame for acne longer and more constantly than any other one factor. Almost without exception, articles reviewed mention constipation first. Saline and vegetable laxatives were subsequently recommended, and particularly a correction diet consisting of plenty of cellulose and bulky food. Although this has been largely discounted, in more recent articles, or ignored as being ineffective, it is logical that certain cases may be due to acute or chronic constipation. It is common that people who suffer thus have lovely skin, yet internal cleanliness as well as external must be first

established. Habitual derangement of the digestive tract even without constipation may be responsible.

Diet involves idiosyncrasies to certain foods. Warnings are always issued to avoid chocolate, nuts, cheese and fried foods -- these being less easily digested. Elimination diets relieve a patient of the necessity of avoiding an entire class of foods. The hypersensitivity to a particular food may be overcome by administering small amounts at a time.

Too much meat and too little exercise are blamed by Dr. R. M. Simon (14). Dr. Bulkly (16) states that it is a common error to eat long after the appetite has been satisfied. The action of the food may be directly irritating or it may be the toxins accumulated, none being an attempt at such elimination. Dr. Bulkly claims to have cured many patients by a simple diet of rice, bread and butter, and water, crediting the success to the elimination of proteins.

Nervousness causes eruptions; mental influences are observed in those who worry and fret about their duties. Sleep, recreation, fresh air, and exercise are absolutely essential, and particularly regular hours. The writer has personally experienced this, and observed it in others.

Ointments offer special problems as antiseptics.

(30) Adhesion of the base to the skin influences its effectiveness. A heavy base retains any discharge from the skin, increasing the infection. These include "lipotropic bases" desired when the surface of the skin is intact. A base with water affinity, "hydrotropic" in nature, is indicated when the epithelium is destroyed as in "weeping eczema".

From the viewpoint of the doctor, Bernard Fantus (ibid) gives some interesting notes on face creams. Galen prepared Unguentum Aquae Rosae 1800 years ago "by soaking rose buds in olive oil and wax, which, acting as an emulsifying agent, permitted the incorporation of water, a little at a time, until a white creamy ointment was secured." The formula has been modified, but the principle remains.

Dr. Fantus grants that the use of cold cream and its variations in cosmetics greatly outweighs its use as a medicinal ointment. "Vanishing cream", Dr. Fantus describes as an emulsion of stearic acid in water containing soap. An almost invisible layer is deposited on the skin, making a base to which powder adheres. Cleansing cream is referred to as "an extremely superfatted soap possessing maximal cleansing and minimal irritative action."

These formulas cannot be used for soothing as can the official Rose Water Ointment, for at their best, they are slightly irritating.

Emollient creams contain wool fat. They may be hydrotropic bases. Many creams contain glycerin because of its preservative qualities. Hence, Dr. Fantus warns that no physician should suggest that his patient get any cold cream for soothing, because it is impossible to be assured of the proper formula. The official ointment should be prescribed, he believes.

Antiseptic applications should always be made when the skin is to be treated or examined locally. Alcohol, spirits of camphor, and lotions are recommended for drying an oily skin or for use after blackheads or pustules have been expressed, both as an antiseptic and an astringent.

Autogenous bacterins have been used with some success but more particularly when the disease has a known etiology. The degree of success warrants other avenues of approach.

Treatment with X-ray is regarded with less favor than formerly. Some authorities claim cure in a large number of cases, but with frequent relapses. The response is quicker and usually more obvious than others. It requires a trained technician for there is

greater unsightliness otherwise apt to result from over-exposure and burning. The eyes and hair must be covered carefully. Any evidence of erythema is a signal for at least one week's cessation of treatment.

Doctors McKee and Ball (31) treated 606 patients at the post-graduate Medical School and Hospital with a control group of 422. The 606 patients were given X-ray treatment, 50% of them being cured in six weeks to four months, 83% of them recovering in six weeks, with 30% (of total) recurrences. Of the groups of patients, 4% showed permanent cure in from four months to two years, 62% within two years. There were only 13% recurrences in these. The permanent success of X-ray was questionable in adolescence.

Dr. White (22) states that roentgen treatments gave no more than temporary benefits.

Dr. Benjamin H. Sherman (32) writes that "acne vulgaris is purely localized disorder and probably can be explained on the basis of the pores inability to throw out the unwelcome intruder." The type of acne which results in blackheads and comedos, responds to X-ray treatment fairly well. The erythematous acne, characterized by redness, is not so successfully treated. The most difficult is the undurated type, in which there are hardened masses of cystic material under the subcutaneous.

X-ray treatment is effective, and may completely cure, but it takes longer. Mild cases are often most resistant. "--X-ray treatments stop suitable types of acne in from 1/4 to 1/3 the time the disease could possibly be checked any other way". Dr. Sherman (ibid) advises cautious preliminary patch tests for erythema. The Editor of the Yearbook of Radiology, Charles A. Waters, makes a note that the precautions of Dr. Sherman are well worth considering.

The causes and treatment of acne are discussed by Norman Tobias (33). The factors he lists as causes are "seborrhea of the scalp, digestive disturbances, constipation, focal infection, anemia, the endocrine factor plus the presence of hormones in the blood at the time of sex gland development and occupational irritants. The actual factor is a simple mechanical blocking of the "pilosebaceous ducts." Tobias again impresses us that infections on the chin are related to ovarian irregularities.

Norman Tobias (ibid) states definitely that there are but two permanent remedies, nature and roentgen rays. He entirely discounts vaccines, yeast, ultraviolet. Cosmetic creams are to be prohibited. Roentgen rays do not produce immediate benefit in mild cases, but give remarkable relief to those characterized by oiliness, pustulation and deep lesions.

FACTORS WHICH INFLUENCE QUALITIES OF POWDER AND CREAM.

A brief and specific reference to the ingredients contained in the common classes of cosmetics is necessary to understand the variable factors which influence their qualities. The ingredients necessarily change the physiology and pharmacology of the preparation.

The essential qualities of a face powder, as listed by Dr. Goodman (33) are:

1. Coverage.
2. Adhesiveness
3. Slip
4. Odor carrier
5. Color diluent

Usually weight is intended to be the criterion when the terms light, medium and heavy are employed. In technical terminology, light, medium, and heavy refer to coverage, irrespective of comparative weight. However, since the powders which have the slightest coverage, (light) are usually those which are lighter in weight, the synonymous use of the term is sometimes permissible. Since the recent introduction of titanium, a lighter weight metal with greater coverage, the specific meaning intended should be designated.

For coverage, titanium dioxide is becoming more popular since it is credited with three times the covering power of its nearest rival, zinc oxide, formerly the leader. Titanium has but recently been introduced. Osmo-kaolin, a colloidal clay prepared electrolytically from china clay, and barium sulfate are older favorites. The latter is preferred for compact powder as it does not break. (ibid)

To impart adhesiveness the metallic stearates are added to the formula. Zinc stearate is preferred but the American doctors have criticized zinc salts as being poisonous. Though the contention was not proven, the criticism led to the use of magnesium salt. The stearates give a velvety quality besides adhesiveness.

Talc supplies the "slip" necessary to make a thin film spread easily without causing a blotchy effect. An uneven appearance may also be caused by the kind of starch used. Rice starch gives the most "peach-like" finish and is also desirable because of its absorbent power, thus preventing a shiny nose.

The odor carrier is usually calcium or magnesium carbonate. They deserve special consideration in the manufacturers selection of perfume, which is mystic science in itself.

Dr. Goodman (ibid) emphasizes the fact that talc, zinc oxide, etc. described in the United States Pharmacopoeia are not sufficiently refined for such intimate application to the skin. The cosmetician must set higher standards according to his needs.

The mechanical manipulations are important in the preparation of powder as they are in every class of cosmetics. The constituents are mixed and sifted through a No. 120 silk mesh sieve.

Rouge is made on the same principle as the compound which it resembles in physical properties. That is cream rouge and powder or cake rouge are prepared as is a face cream or face powder respectively. Colors must be selected with caution from the list prepared by the United States Department of Agriculture or by European Governments, (34) and with due allowance for idiosyncrasies.

Selection of a powder requires the most exacting judgement for they are so nearly alike in appearance, yet so decisive in their points of difference. Since custom and personal choice demand that this be the covering of our visible skin, the selection must be made as carefully as available materials will permit.

To the producer the preparation of other products requires greater consideration of physical and chemical compatibility, between the ingredients as well as

between the finished product and the human skin. This applies particularly to face creams for they contain inorganic salts, products of the reaction which influence the product and the skin most profoundly.

Cold cream is a fatty emulsion. It has enjoyed popularity since ancient times. The cooling effect is produced by the evaporation of the water contained.

Dr. Goodman (35) lists as the essential ingredients:

1. Solid wax or fat: paraffin, stearic acid, lanolin, lard, liquid petrolatum.
2. Liquid oils, almond oil, olive oil.
3. Water 20 to 30%
4. Binder or emulsifier: borax, sodium hydroxide, KOH.

The formation of the cold cream with the above type of formula is not difficult to achieve on a small scale. Great caution is not necessary to produce a usable product. The trouble arises when a large batch is made at once, when kept for a long period of time, when attempting to prevent rancidity, or add perfume.

An emulsion formed by mechanical means requires greater precautions and thorough mixing with a homogenizer.

Cold cream is still popular for cleansing the dry skin, excepting for the use of special formulas, some including cholestrin, lecithin, lanolin. Cleansing creams generally denote a product which liquifies at body temperature, essentially perfumed cocoa butter. From the writer's observation, they have not been very popular at any time, and less so now than when first introduced.

Vanishing creams are as the name indicates, those which disappear from the surface except a thin film which is intended to hold the powder applied later. They are essentially a partly saponified emulsion of stearic acid. Glycerin is added to many of the commercial creams because of its preservative qualities. It is, however, objectionable to most women as it is hygroscopic and forms globules of water on the surface to which it is applied.

The reactions of the skin to the chemical substances constituting a face cream is a comparatively recent consideration. It raises a question when we see in popular magazines advertisements by a well-known pharmaceutical house, a cleansing cream featuring milk of magnesia to correct "acid skin" -- with no explanation of what such a condition is, or its symptoms. In direct contradiction the statement is put forth in the Givaudanian: (36)

"The reactions of the sebaceous secretions which are weakly acid and of the perspiration which is alkaline because of the ammonia it contains vary according to the physiological and pathological condition of the individual. While the skin of the healthy person is covered with a moist layer of slightly acid reaction, this acidity is destroyed when illness occurs, and changes to a more or less alkaline reaction, depending on the course of the disease."

The article further declares that the acid layer is a protection against bacterial invasion and is otherwise a perfect medium.

With such a contradiction, one or the other is obviously wrong. Nowhere, has the writer been able to substantiate the contentions, either stated or implied, of the firm manufacturing alkaline creams.

FACIAL TREATMENT ON ACNE PATIENTS

Acne is frequently observed on college students, especially during the first two years of their academic life. It is so often the type characterized by oily skin, large blackheads, and pustulation. Systematic examination is necessary, and even then the examiner has the handicap of the yet undeveloped hormone theories.

To determine the benefit to be derived from intensive local treatment, an experiment was conducted in the spring of 1935. The theory is that the practice of extreme cleanliness and stimulation to the circulation will aid in carrying away excess secretions of the sebaceous glands.

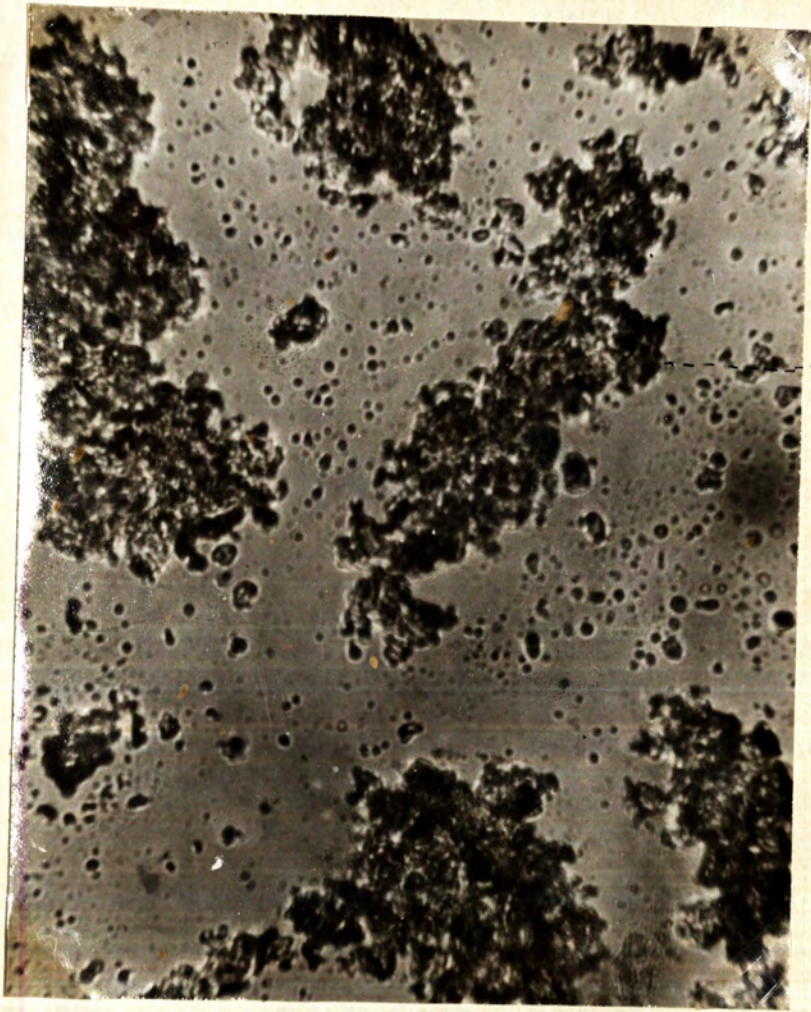
The patient was a girl of 18, a Freshman at State College. She stated that she would gladly submit to any treatment which offered a possibility of recovery either partial or complete. Her skin was marred by a profusion of blackheads, many of them infected. There were particularly hard spots under the skin, sometimes coming to a head but more often festering beneath and re-infecting.

Procedure:

1. Hot wet applications
2. Towels sterilized in the autoclave were used, wet with hot tap water, temperature 40-50 C.

PLATE IV

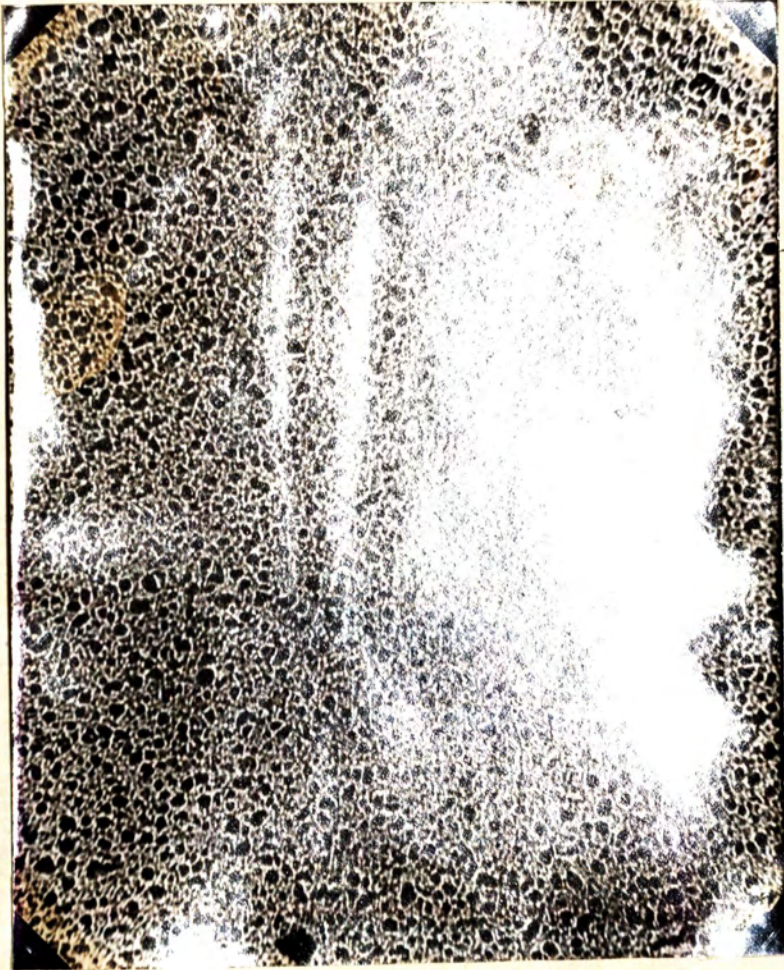
Smear of cream base. Formula I
without cetyl alcohol. Photo-
graphed under low power. (125 X).



----- stearic acid

PLATE V.

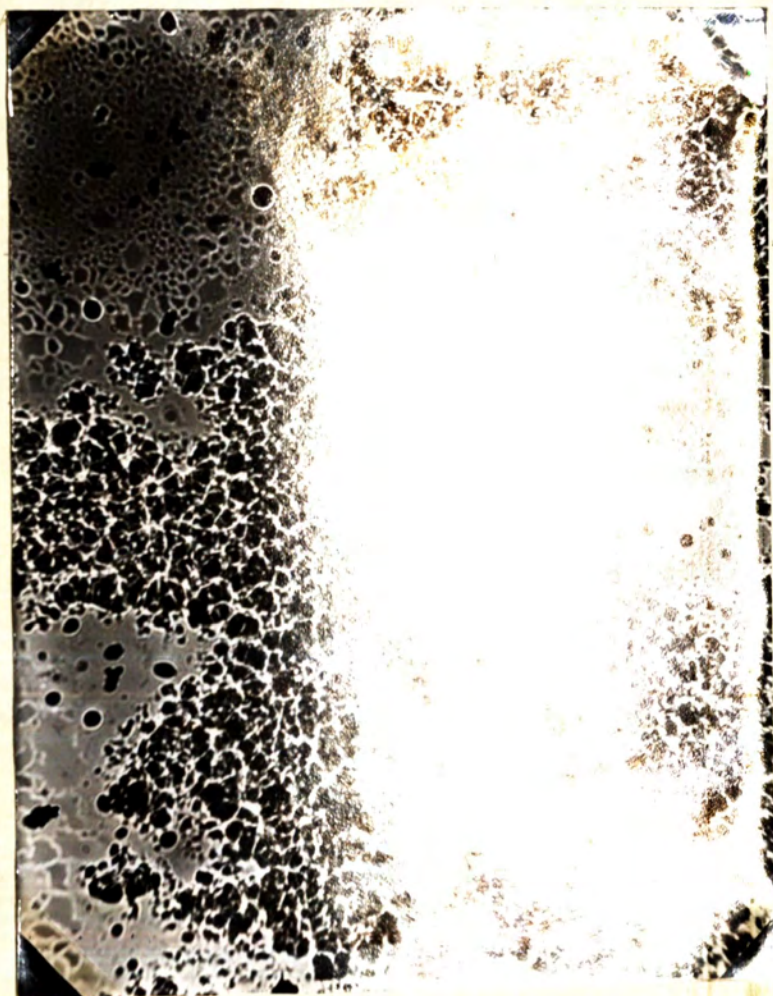
Smear of cream base. Formula V with
Cetyl Alcohol. Photographed under
low power. (125 X).



---stearic acid
particles

PLATE VI.

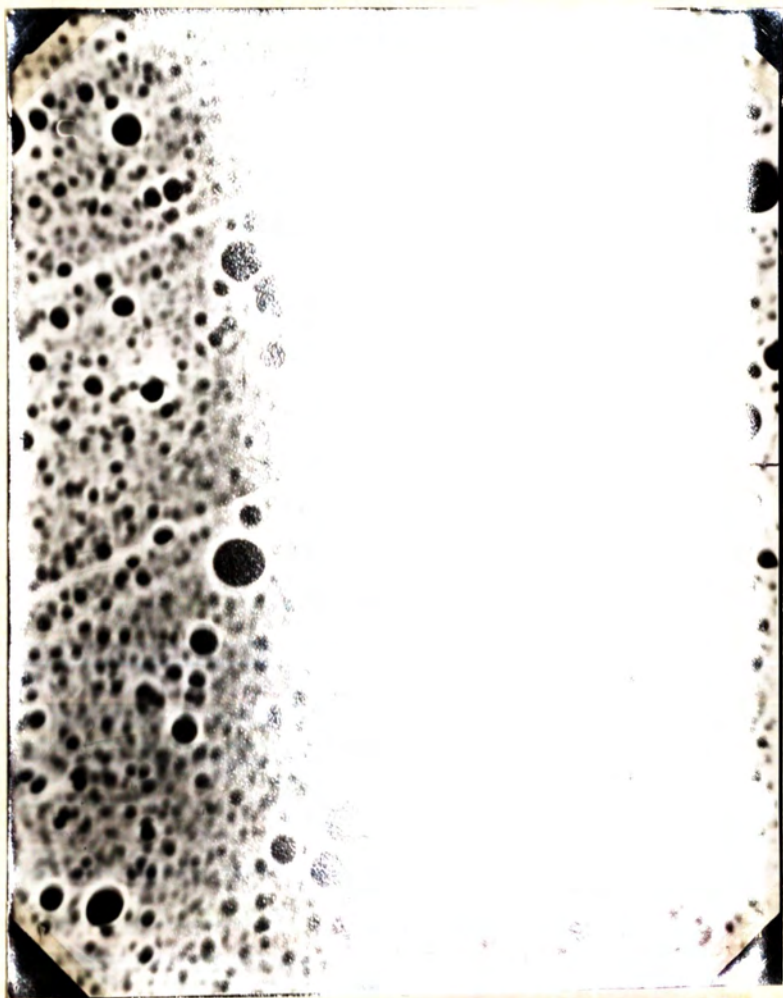
Smear of cream base Formula VI, with glycol. Photographed under low Power. (125 X).



stearic acid

PLATE VII.

Smear of commercial cream, No. 8
cold cream. Photographed under low
power. (125 X).



oil globules

PLATE VIII.

Smear of commercial cream No. 8,
mentho-lemon foundation cream.

Photograph taken under low power
(125 X).



-----stearic acid
particles

PLATE IX.

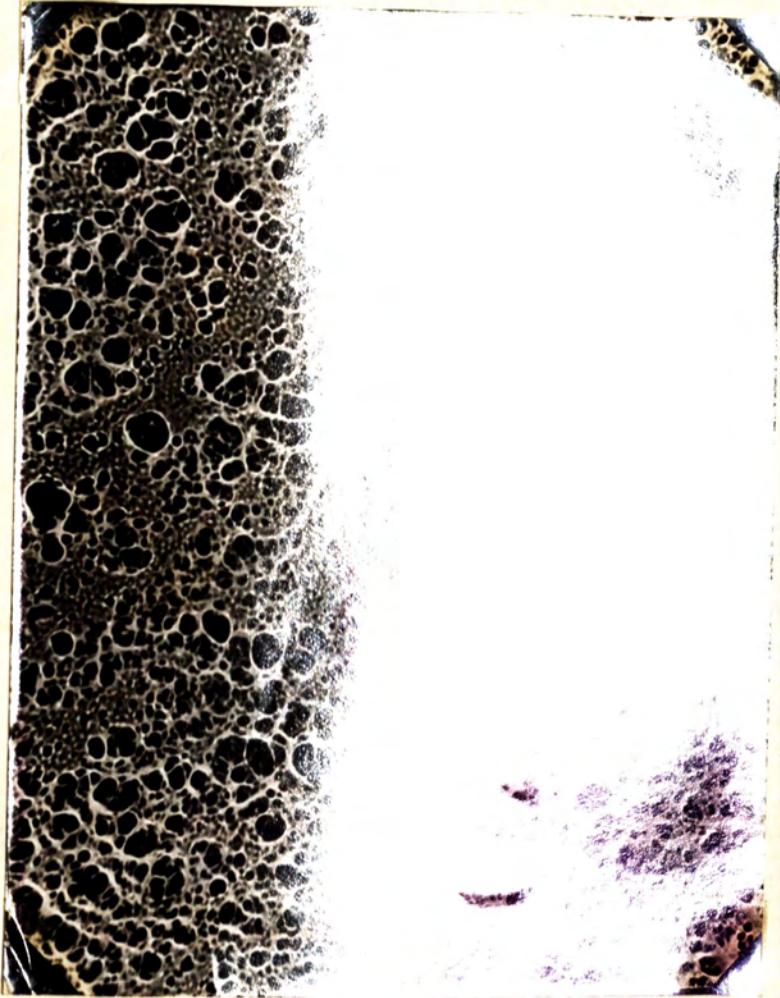
Smear of commercial cream No. 11
vanishing cream. Photograph taken
under low power. (125 X).



stearic acid
particles

PLATE X.

Smear of U. S. P. XI cold cream
prepared in laboratory. Photograph
taken under low power. (125 X).



---oil globules

The hot applications were begun after the patient was relaxed on an x-ray table, and continued for fifteen minutes, then the face was patted dry.

2. Rolling Massage Cream*

The massage cream was then applied generously. It was rubbed into the skin, and massaged vigorously until it reappeared and "rolled" bringing with it the dead cells of the skin.

3. Removal of the cream with towels and warm water. After the cream was removed, the blackheads were expressed and the pustules opened and drained. A sterile gauze pad and a sterile needle were used for this purpose, the opening being treated with 95% alcohol.

*Rolling Massage Cream:

Stearic acid	25.0
Olive Oil	8.0
Borax	3.5
Water	220.0
Tragacanth	6.0

Procedure:

Melt the stearic acid on the water bath. Dissolve the borax in the water and heat. Add the tragacanth to this solution and let it stand until evenly dispersed. Strain through muslin before using. Add the olive oil to the melted stearic acid. Allow it to remain on the water bath for ten minutes with occasional stirring. Add the strained tragacanth solution and stir well. Oil of Rose Geranium was added for perfume and four drops of a solution of red coloring tablet (Lilly) for color. This makes a very smooth cream which rolls well.

4. Towels wet with witch hazel and steamed with hot towels were then applied.

5. Cold applications.

Sterile towels wrung from cold tap water, temperature 20°C were applied for five minutes.

Treatments were given once, sometimes twice a week when time permitted, from January first to March tenth inclusive.

DISCUSSION OF TREATMENT

There was a very definite improvement in the condition of the patient's skin, being most noticeable between January first and February first. Only a small eruption appeared, and that, very infrequently. The scars gradually faded and the entire general texture was much better.

A second case of this nature was observed from October 20 to December 15, 1936. A boy of 18 had many blackheads and pustulation of the infected pores. The same treatment was employed, with even more gratifying results.

This procedure is definitely not claimed or even implied to be beneficial on all types of skin disturbances. The oily skin with a greater burden of work that it can efficiently perform is the ideal receptor. It is purely local in its action.

The improvement does not cease with treatment for the patients have been impressed with the necessity of avoiding every possibility of reinfection by unclean hands, failure to use an antiseptic after expressing the blackheads and pustules, and plenty of soap and water, and stimulation of the cir-

ulation. (Complexion brushes now on the market serve this latter purpose very successfully if the skin is not too sensitive, as it seldom is in oily skins.)

FORMULA FOR CREAM BASE

A formula for a skin cream to be used as a base for anti-mosquito applications was prepared by Orville Peterson in 1934. Though effective in action, the preparation became badly discolored when Butesin was added and was very granular either alone or with Butesin and Oil of Pine Needles added. Water separated and a very unsightly preparation resulted.

The original formula was:

Stearic acid	25 Gm.
Borax	5 Gm.
Olive Oil	8 cc
Water	100 cc.

To this formula was added one per cent each of Butesin, Oil of Pine Needles, Oil of Orange and Camphor-menthol. This preparation was intended for mosquito bites, chapped skin and itching.

The following formulae were prepared as variations to overcome the difficulties mentioned above.

I. October 1, 1936

Stearic acid	20 Gm.
Olive Oil	12 cc.
Borax	3 Gm.
Water	100 cc.

II. October 9, 1936

Stearic acid	8 Gm.
Borax	2 Gm.
Cocoonut Oil	16 cc.
Water	100 cc.

III. October 9, 1936

Stearic acid	10 Gm.
Olive Oil	15 cc.
Borax	2 Gm.
Water	100 cc.

IV. October 20, 1936

Stearic Acid	8 Gm.
Borax	2 Gm.
Cocoonut Oil	16 cc.
Cetyl alcohol	1 Gm.
Water	100 cc

V. November 25, 1936

Stearic acid	8 Gm.
Borax	1.5 Gm.
Cetyl Alcohol	.7 Gm.
Olive oil	18 cc.
Water	70 cc.
Fluid Rose	30 Min.

VI. December 7, 1936

Stearic acid	8 Gm.
Olive Oil	16 cc.
Borax	2 Gm.
Water	100 cc.
Glycol	10 cc.

"Smears" of these creams were prepared using a method similar to that used for blood smears. A small amount of the sample was applied with a wooden applicator to one end of a clean glass slide. A second slide was used to spread the drop in a smooth even film over the surface of the slide. Photomicrographs were taken of these slides

with a Leitz-Eddinger. Magnification: 125X. Commercial creams were prepared similarly for comparison.

was prepared... the skin... should be... used... as... In... on the surface... completely...

DISCUSSION

An examination of the cream or of the formula would suggest that an excess of stearic acid was present causing separation. It left a film on the skin much heavier than necessary. This formula should be adaptable as a "vanishing cream" (or powder base), or as a vehicle for applying such ingredients as Butesin, whose action is desired by penetration. In either case, it should leave only a slight film on the surface of the skin when applied, and remain scarcely visible.

Results:

Formula I: The cream was no better than those previously prepared.

Formula II: A thin cream resulted which did not granulate except upon the addition of butesin.

Formula III: A fair product, but the emulsion began to break at the end of ten days.

Formula IV: With the addition of less than one per cent (.3%) of cetyl alcohol, the emulsion was maintained perfectly for five months (and is still in excellent condition). It did not break upon the addition of Butesin and the volatile oils. A slight creamy color developed within a few days in the sample to which Butesin had been added, but the reaction went no further upon long standing.

Formula V: By far the best of any prepared. The amount of water was decreased to make it of regular cold cream consistency, and the amount of cetyl alcohol correspondingly diminished. It has remained in perfect condition and is used regularly as a stock preparation for chapped skin and itching.

Formula VI: The glycol incorporated in this formula was very objectionable as it is more hygroscopic in nature than glycerin, thus drawing a thin film of moisture to the surface to which it was applied.

The photomicrographs of these formulas illustrate the great improvement effected by the cetyl alcohol. The commercial creams have the advantage of mechanical homogenizers.

It is striking to note the size of the particles as compared to the size of the openings (ducts) in the skin. Unless well cared for, it seems impossible to prevent blackheads.

THE pH VALUE OF FACE CREAMS

The film covering the skin has been determined acid and is a protection against bacterial invasion. The "Givaudanian" (36) ably substantiates this fact and further advises that the alkalinity of soap be counteracted by an acid cream or by stimulation with an astringent.

Because of the interest aroused and criticism of commercial cream, the pH was determined on twenty five commercial products and ten laboratory samples.

A modification of a method suggested by Karl Pffaf (37) was used. .5 Gm. of the cream was weighed and put into a separatory funnel containing 50 cc of alcohol, which was then heated on the steam bath until the cream melted and could be shaken with the alcohol to secure a uniform dispersion. The pH was taken on a color plate using:

Phenolphthalein	pH - 8
Cresol Red	pH - 7 to 8
Brom-thymol Blue	pH - 6 to 7
Brom Cresol Purple	pH - 5.2 to 6.8
Methyl Red	pH - 5
Dimethyl-aminoazo- benzol	pH - 2.8 to 4.2

Results:

1a. Formula I	pH - 8.5 - 9.0
b. Formula I Butesin	pH - 7.0
2. Formula II	pH - 6.5
3a. Formula III	pH - 7.0
b. Formula III Butesin	pH - 5.5
4. Formula IV	pH - 7.0
5a. Formula V	pH - 7.2
b. Formula V Butesin	pH - 6.0
6a. Formula VI	pH - 6.0
b. Formula VI Butesin	pH - 7.0
7a. Commercial Vanishing Cream	pH - 5.5
b. Commercial Cold Cream	pH - 4.0 - 4.5
8a. Commercial Special Cleansing Cream	pH - 5.5
b. Commercial Mentho-Lemon Cream	pH - 6.0 - 6.5
c. Commercial Cold Cream	pH - 6.0
d. Commercial Lemon Cleansing Cream	pH - 4.5
9a. Commercial Special Formula cream	pH - 6.5
b. Commercial Vanishing Founda- tion Cream	pH - 6.5
c. Commercial Cold & Cleansing Cream	pH - 5.5 - 6.0

10a. Commercial Lanolin Cream	pH - 6.0
b. Commercial Cold Cream	pH - 4.0
11a. Commercial Cleansing Cream	pH - 5.0
b. Commercial Vanishing Cream	pH - 6.0
c. Commercial Cold Cream	pH - 5.0
12a. Commercial Foundation Cream	pH - 6.0
b. Commercial Cleansing Cream	pH - 4.0
c. Commercial Cold Cream	pH - 5.5
13a. Commercial Poudre Cream	pH - 6.5
b. Commercial Cold Cream	pH - 6.0
14a. Commercial Cold Cream	pH - 7.0
b. Commercial Vanishing Cream	pH - 8.0
15a. Commercial Skin Cleanser	pH - 5.5
b. Commercial Skin & Tissue Food	pH - 6.0
c. Commercial Ice Astringent	pH - 6.5

DISCUSSION

All of the commercial creams excepting 14 a and b and 15c were safely below the alkaline limit of 7.0. Of those preparations from the laboratory, the formulas which did not have Oil of Pine Needles, Camphor-Menthol, and Eutesin gave an acid value above 6.0.

Upon oxidation of Oil of Pine Needles, pinene (the principal constituent) yields pinonic acid (Schmidt p. 474) Camphor yields camphoric acid, camphonic acid and camphoronic acid. These Chemical reactions undoubtedly account for the shift of the pH to a more nearly neutral reaction. This is the most obvious explanation of the reaction of the commercial products, since they are even more highly scented.

LEAD CONTENT

In order to prove or disprove the statement made by critics that powders quite commonly contained lead, twenty-five samples were tested according to the procedure in the U. S. P. X. (38)

.1 Gm. of the product was placed in a test tube with 5 cc of water and four or five drops of acetic acid; and boiled for several minutes.

"Solutions of lead salts yield with diluted sulphuric acid, a white precipitate which is slightly soluble in diluted hydrochloric or nitric acid, but completely soluble in warm NaOH T.S. With potassium chromate T. S. solutions of lead salts, free or nearly free from mineral acids, yield a yellow precipitate which is insoluble in acetic acid but soluble in NaOH T. S."

DISCUSSION

Twenty-three samples were tested and none gave the slightest indication of lead.

WEIGHT AND FINENESS OF POWDERS

The comparative weight and fineness of a powder are important to the producer and to the consumer. Besides the color, it is the quality about which a customer is most concerned.

The products on hand were measured and weighed. A small 10 cc weighing bottle was filled level, with no shaking or packing, using the same technique for each. The bottle was weighed empty, filled, and weighed again.

The weighed portion was placed in a No. 100 sieve, using a camel's hair brush to pick up every particle. Sifting was effected by shaking by hand for ten minutes. Both the fine portion passing through, and the coarser portion remaining were then weighed in tared weighing bottles. The results are charted below. (The brands have the same number as on the chart on pages 49 and 50)

Results:

Commercial Powders

Shade	Whole Sample In Gm.	Heavy Portion	Fine Portion	Per Cent Fine
7. Brown	11.9357	9.4535	1.6846	14.1
Rachel	8.8425	6.1066	2.6317	29.0
8. Rachel	9.4856	6.8874	2.4006	25.2

Shade	Whole Sample In Gm.	Heavy Portion	Fine Portion	Per Cent Fine
9. Rachel	8.9850	8.1719	.6560	7.6
Rose	10.4705	5.9050	4.4569	44.7
Flesh	9.1380	7.0198	2.0182	23.2
11. Symphonie	10.3762	8.5572	1.3374	12.9
Natural	9.5105	7.7142	1.4985	15.7
Brunette	9.1040	6.2679	3.2204	35.7
12. Natural	9.0562	6.8687	1.9944	22.2
Rachel	8.7274	7.0045	1.3613	15.7
Champagne	9.5556	8.5341	.6036	6.3
13. Brunette	8.3210	5.6726	2.4090	30.0
White	9.1701	7.3973	1.2851	14.1
Flesh	9.7292	7.4448	1.0018	12.8
14. Natural	9.3794	6.3296	2.3657	28.1
Brunette	9.0546	6.9763	1.8021	19.8
15. Cameo	9.7729	6.7290	2.4980	25.9
Rachel	13.4960	12.4680	.9830	7.2
16. Natural	10.8309	6.2525	4.3242	40.5
17. Natural	11.8245	7.0026	4.5647	38.0
18. Brunette	7.4200	5.0925	2.1465	28.8
Natural	8.6229	5.0004	3.4244	39.0
19. Rachel	9.1419	6.9005	2.0687	22.6
Natural	9.8861	6.7490	2.9883	20.0

DISCUSSION

The results do not give the same percentage in the same brand in different shades. It is noticeable that the darker shade is the heavier. This is believed to be due to the heavier nature of the colors used, and because a brunette usually requires a heavier powder.

Handling the powders and noting their texture was an advantage in learning to recognize light or heavy weight products by observation.

SURVEY OF QUALITIES OF COSMETICS

In January, 1935, an experiment was carried on in the Girl's Dormitory to determine their reactions to specified qualities of unknown brands of cosmetics.

Four girls were each given a powder, cold cream and vanishing cream of one brand unlabeled and designated only by number. At the end of one week they filled in a blank form, recording their reaction to the list of characteristics.

The following brands were packaged for trials: Luxor, Krank, Armand, Day Dream, Muriel Astor, Princess Pat, and Seventeen. The decisions as to their qualities were fairly uniform although there was necessarily some difference in the total reaction to its effectiveness. A blonde, a light brunette, a dark brunette, and a red head comprised the group.

An example of the sheet given the girls is given on page 58.

SAMPLE OF
Weekly Report Sheet on Cosmetics

Name _____

Date _____

Product No. _____

To _____

Powder

Covering ability

Adhesiveness

Quantity necessary

Irritation

Dryness

Weight (heavy, medium, light)

Color

Gel and Cleansing Cream

Effective (remove dirt well?)

Quantity necessary

Oily

Smooth

Condition of skin :before
after

Powder Base (vanishing cream)

Consistency (heavy or light)

Greasy

Clog pores or melt in well

Efficiency as a base

Remarks:

DISCUSSION

The results of the survey were enlightening, particularly the influence of advertising. Krank's products secured the highest rating and most inquiries regarding its identity.

The survey was indeed beneficial in illustrating the qualities which must be carefully exemplified in cosmetics by the manufacturer. The results were recorded more carefully by the girls after the first week, when they had become "cosmetic conscious". All but two lines had a vanishing cream which felt moist, due to glycerin. It produced a little irritation because of its hygroscopic nature.

The experiment would have been more successful had the girls been more critical and accustomed to keenly observing actual conditions comparatively.

SUMMARY

1. A brief review of the history of cosmetics is included.
2. The physiology of the skin is given in detail.
3. The histology of the skin is outlined, with accompanying photomicrographs.
4. Common pathological disorder of the skin are discussed particularly in relation to cosmetics.
5. Normal care of healthy skin is discussed in relation to its physiological and chemical functions.
6. Care of the skin suffering from acne and pustular eruptions common in adolescents is considered.
7. The principle ingredients of face powders, cleansing and vanishing creams are set forth, with their specific purposes.
8. A method of treatment is proposed for simple acne (wherein extensive pathology is not a factor). It is essentially a detailed and careful enlargement on the home method usually attempted without sufficient consideration of asepsis. A special cream prepared in the laboratory was a material factor in cleansing the skin tissue.
9. A satisfactory, stable cream base was prepared upon the addition of .8% cetyl alcohol to the formula developed by Orville Peterson in 1934. Photomicrographs

of commercial samples.

10. The pH value of 25 commercial and 10 laboratory creams, both cleansing and vanishing types, was determined. All but 3 commercial preparations were below the alkaline limits of 7.0. Of the 10 laboratory samples, only 3 were of a pH of 6.0 or below. These 3 contained Oil of Pine Needles and Camphor-menthol and Butesin. It is probably that the pH of commercial products depends partially upon the aromatic oils.
11. No lead content was found in any of the 25 samples of commercial powders according to the method given in U. S. P. XI.
12. Weight and fineness of powder was determined by a method devised by the writer. A great variation, from 7.4200 Gm. to 13.4960 Gm. for the same volume of powder serves to illustrate the great difference in products.
13. A survey of cosmetics conducted in the dormitory gave results too widely varied in such a small group to be of any great significance, except as an observation of qualities by which the customer selects a product.

ACKNOWLEDGEMENT

I wish to express my sincere gratitude to Dean E. R. Series, of the Division of Pharmacy, South Dakota State College who suggested this problem.

His inspiration, constant understanding and patience have made this work possible

BIBLIOGRAPHY

- | | |
|----------------------------|---|
| 1. Foster, Lillian H. | American Perfumer 346,
October (1922) Through
Poucher, W. A. Perfumes,
Cosmetics and Soaps, 2:25 |
| 2. Sperti, Dr. George | Drug Topics, January 4,
(1937). |
| 3. Rosenthal, Dr. Theodore | Aene and Its Relation to
the Endocrines, Reprinted
from the Journal-Lancet
56:496, September (1936). |
| 4. Poucher, W. A. | Perfumes, Cosmetics and
Soaps 3, (1923). |
| 4. Ibid | |
| 4. Ibid | |
| 5. Pusey, Wm. A. | History of Dermatology
59-65 (1933) |
| 6. Griffith, Iver | Cosmetic Urge. Am. J. Pharm
236, May, (1929). |
| 7. Morris | Human Anatomy, 76th Revi-
sion, Edited by Dr. C. M.
Jackson, 59 (1923). |
| 8. Ranvier, L. and Cornil | Pathological Histology of
the Skin Sec. 5:716-748. |
| 9. Sterling, Ernest H. | Human Physiology, 1003
(1926). |
| 9. Ibid | |
| 10. Levin, O. L. | Care of Face (1927) |
| 11. Morris | Human Anatomy, 60, 76th Re-
vision, Edited by Dr. C. M.
Jackson, (1933). |
| 12. Williams, J. F. | Atlas of Human Anatomy, 60
(1936) |

13. Morris Human Anatomy, 72, 76th Revision, Edited by Dr. C. M. Jackson. (1923).
14. Simon, R. M. Acne Simplex, Wood's Medical and Surgical Monographs 1:155, (1889)
15. Annual of Universal Medical Sciences Acne, Sec. A. 4 (1805).
16. Bulkly, L. D. Diet and Hygiene in Diseases of the Skin 12, 88-90, (1913).
17. Anderson, N. P. and Ayers, Samuel Light Sensitive Dermatoses J. A. M. A. 103, October No. 17 (1934).
18. Baer, H. L. Dermatitis Due to Aniline Dyes in Foods, J. A. M. A. July 7, (1934).
19. Health Department of New Hampshire A. J. Pha. 305, May (1929).
20. Tausig and Miller Bootleg in Cosmetics, A. J. Pha., 305, February (1926).
21. Rattner, Herbert, Dermatitis of the Eyelids, J. A. M. A., January 7, (1935).
22. White, Cleveland Acneform Eruptions of the Face, Etiologic Importance of Food. J. A. M. A., October 27. (1934).
23. Tauber, E. B. Acne and Carbohydrates. Hyperglycemia in Diseases of the Skin. Arch. of Dermat. and Syphil. 27:198, February (1933), through J. A. M. A. 107:11, September 12. (1936).
24. Goodman, Herman Comments on Analyses of Blood Chemistry of Circa 500 patients with Common Skin Diseases. J. Lab. and Clin. Med. 20-10 1048-1052 July (1935) Through Modern Medicine 42, Sept. (1935)

25. Lane, J. E. Straus Toilet Water and Dermatitis, *Am. J. Pharm.* 103: 105, (1931).
26. Rosenthal, Theodore Acne and Its Relation to the Endocrines. Reprinted from the *Journal-Lancet*, 51:9:496 Sept. (1936).
27. Diasio, F. A. The Germicidal Value of Pure Soap. *The Medical Review of Reviews* 40:8:420-431 (1934) Through *Modern Medicine*, Oct. 1934.
28. Kalish, Joseph Tested Formulas for Cleansing Creams. *Drug and Cosmetic Industry* 40:1:66-67. Jan. (1937).
29. Goodman, Herman *Cosmetic Dermatology* 218-219 (1936).
30. Fantus, Bernard The Choice of Ointment Vehicles in Dermatology. Reprinted from *J.A.M.A.*, 107: 861+863. Sept. 12, (1935).
30. Ibid
30. Ibid.
31. McKee and Ball *Modern Medicine*, Nov. 2 (1934).
32. Sherman, B. H. *Yearbook of Radiology*. Wetters and Kaplan, 377 (1934).
32. Ibid
33. Tobias, Norman *J. Missouri M. A.* Jan. (1933). Through *Yearbook of Radiology* 561, (1933)
33. Ibid
34. U. S. Dept. of Agriculture and European Governments *Cosmetic Dermatology*, Goodman, Appendix 561.
35. Goodman, Herman *Cosmetic Dermatology* 286, 352. (1936).

35. Ibid
35. Ibid
36. Givaudanien Givaudan-Delawanna Inc.
4-7, Dec. (1936).
37. Pfaff, Karl Hydrogen Ion Concentration
in Cosmetic Manufacture,
Reichstaff Ind. 9:211-215,
Through Chem. Abst. 29:2300
(1935).
38. United States Pharma- 10:451.
copoeia XI

INDEX

	page
Introduction	1
The Art of Cosmetology	3
Physiology and Anatomy	7
Histology of the Skin	11
Pathology of the Skin	14
Normal Care of the Skin	20
Treatment of Acne and Common Blemishes	24
Factors Which Influence Qualities of Powder and Cream	32
Facial Treatment of Acne Patients	38
Formula for Cream Base	43
The pH Value of Face Creams	48
Lead Content	52
Weight and Fineness of Powders	54
Survey of Qualities of Cosmetics	57
Summary	60
Acknowledgement	62
Bibliography	63
Index	66