

Japanese Modernization and the Imperial Universities, 1876-1920

JAMES R. BARTHOLOMEW

IN the entire body of scholarly writing—Japanese and foreign—on modern Japanese history, perhaps no subject has been treated with less care or greater indifference than the imperial universities. Western scholars, when commenting on the subject, are usually content to note their supposed indebtedness to the universities of nineteenth-century Germany and to emphasize their role in training government officials. Thus Robert Scalapino wrote in 1962:¹ "The government . . . accepted a far-reaching system of education patterned essentially after German concepts. . . ."; he was seconded in this opinion by Ronald P. Dore in 1965.² And of the universities' social functions, Herbert Passin wrote in 1965³ that Tokyo University had been conceived as a "training school for officials"; this was echoed by Chitoshi Yanaga in 1968.⁴

Although writings by scholars in Japan have discussed the relationship of the universities to scientific, technological, and economic development, these writings reflect similar assumptions and are equally negative in tone. Most contend that the contributions of the universities in these areas were gravely compromised by "deficiencies" in the academia-society relationship and within the academic system. Many suggest that government officials were indifferent or even hostile to the universities, that the universities themselves suffered from a rigid organizational structure, and that professors behaved in so "feudalistic" a manner as to gravely impair the development of a native tradition in science.⁵

I shall present a rather different view in this paper. I argue that the extent of German influence on the universities, while not insignificant, has been greatly exag-

James R. Bartholomew is Associate Professor of History at the Ohio State University.

An earlier version of this paper, entitled "Imitation or Adaptation: A Reappraisal of the Westernization of Japan," was delivered on 25 March 1975, at the Association for Asian Studies national meeting, in San Francisco. The research on which it is based was supported, in part, by the Ohio State University Development Fund through its Faculty Summer Fellowship Program. I wish to also thank Professors Andreas Dorpalen (Ohio State), Byron Marshall (Minnesota), Benjamin Schwartz (Harvard), Bernard Silberman (Chicago), and Ann Waswo (Geneva) for their valuable comments and criticisms.

¹ *Democracy and the Party Movement in Prewar Japan* (Berkeley: Univ. of California Press), p.

296.

² "Education: Japan" in Robert E. Ward & Dankwart A. Rustow (eds.), *Political Modernization in Japan and Turkey* (Princeton: Princeton Univ. Press), p. 181.

³ *Society and Education in Japan* (New York: Teachers College Columbia Univ., Bureau of Publications), p. 129.

⁴ *Big Business in Japanese Politics* (New Haven: Yale Univ. Press), p. 21.

⁵ For criticisms of the universities, see Sakurai Jōji, *Omoide no kazukazu* (Herald Sha, 1940), pp. 19-20 et passim; also Ōtsuki Shōichirō, Nojima Tokukichi, & Maki Jirō, "Nihon ni okeru kagaku, gijutsu" in Sakata Shōichi (ed.), *Kagaku, gijutsu to gendai* (Iwanami Shoten, 1963), p. 283 et passim.

generated. I suggest that the universities were absolutely essential to Japan's entire modernization process, however one defines it; and I further contend that the universities were far better equipped to support the formation of science in Japan than earlier commentators have recognized. After surveying the body of received opinion, I shall discuss some of the reasons why misinformation about and misperceptions of the universities have persisted so long, noting in this connection the influence in Japanese studies of the "political values" or "political modernization" paradigm, the growth-accounting approach to economic development, and certain assumptions found in the work of Japanese scholars commenting on their own society. I shall conclude by discussing possible implications of this different view; in particular, I shall urge the desirability of taking the social expansion of scientific knowledge, together with the imperial university system, as significant foci of scholarly attention in explaining various aspects of change in modern Japan.

Received Views of the Prewar Universities

One influential opinion about the universities stresses their indebtedness, in the realm of ideology, to German models. The universities are said to have imported from Germany and diffused within Japan a nationalistic philosophy that enhanced official prerogatives against those of private citizens, and favored collective submission over personal freedom. One indication of this influence, it is said, was the popularity of the philosophies of Hegel and Kant, introduced by Ernest Fenellosa and Charles Cooper in 1879;⁶ another, the dominance of German legal positivism, especially its concept of the state, espoused by Hozumi Yatsuka, Uesugi Shinkichi, and other prominent members of Tokyo Imperial University's Faculty of Law.⁷

German influence is also alleged to have influenced official conceptions of how the universities should serve society; that is, the universities allegedly concentrated on producing officials for the state bureaucracy. Chitoshi Yanaga and Herbert Passin are among those who advance this argument, particularly in reference to Tokyo Imperial University—Passin⁸ arguing that, prior to 1915, most Tokyo students came from the Faculty of Law and following graduation usually entered government service rather than private employment. Similarly, German influence allegedly furnished concepts of official service which the universities introduced to the bureaucracy through the legal faculties where government officials were usually trained. Reportedly, future officials were taught, in imitation of the German model, to serve the state without regard to partisan or private interests, and to ceaselessly uphold the prestige of the Throne.⁹

Many writers allege that the German and Japanese universities had similar systems of formal organization, internal and external. It is pointed out that, rather than having American-style departments, the Japanese institutions were divided like the German universities into faculties of law, medicine, science, and so on; this, it is said, gave the principal academic decision-making powers to the heads of these units rather than to lower-level units based on disciplinary boundaries. Also like the German universities, the Japanese institutions had the chair system, in which a full pro-

⁶ Ivan Hall, *Mori Arinori* (Cambridge: Harvard Univ. Press, 1973), p. 464.

⁷ Frank O. Miller, *Minobe Tatsukichi: Interpreter of Constitutionalism in Japan* (Berkeley: Univ. of California Press, 1965), pp. 11-12.

⁸ (Note 3 above), p. 130.

⁹ Robert M. Spaulding, Jr., *Imperial Japan's Higher Civil Service Examinations* (Princeton: Princeton Univ. Press, 1967), pp. 111-15, 323.

essor presided over an academic unit consisting of—in addition to himself—an associate professor, two or more lecturer-assistants, and several graduate students. Because operating funds were allocated to the chairs, the full professor is assumed not only to have supervised younger associates professionally but virtually to have controlled their existence.¹⁰ Providing balance to these controls, however, was a system of external supervision, supposedly differing very little between Germany and Japan: in the former, universities were responsible to a Ministry of Education at the state level; in the latter, the comparable agency exercised authority on a national scale. More significant, according to these writers, was the fact that in both countries institutions of higher education operated in a conservative, authoritarian environment which demanded a constant adjustment of academic requirements to official demands.¹¹

Pedagogy or informal organization was a fourth characteristic reportedly shared by the two university systems. German and Japanese universities supposedly shared a certain emphasis on the moral aspects of learning, stressing the formation of an enlightened will competent to distinguish right from wrong. The central figure in this aspect of pedagogy is said to have been Johan Friedrich Herbart (1776-1841), whose ideas were introduced to Tokyo Imperial University in the late 1880s by Professor Emil Hausknecht.¹² There is a further implication in some of the literature that German influence contributed to the growth of professorial authoritarianism both through powers accorded to full professors by the chair system and through personal contacts between academics of the two countries. Japanese professors in medicine and law especially are thought to have employed the authoritarian techniques of imparting knowledge allegedly characteristic of the Germans, thereby suppressing free discussion within their groups and inhibiting the operational processes of scholarship in general.¹³

Ideological Orientation of the Universities

Perhaps because of the strength of intellectual history in Japanese studies, scholarly writing on the ideological climate at the universities has been more penetrating, balanced, and accurate than that on most other topics. Tokyo Imperial University's Faculty of Law in particular was pervaded by a nationalistic, bureaucratic elitism which the philosophy of Hegel and the legal positivists must surely have reinforced—if not necessarily created. However, most of what is called statist, elitist, authoritarian, nationalistic, or bureaucratic in Japanese political or academic culture derives more from native than from German sources, as Richard Minear¹⁴ has shown. Moreover, these aspects of the prewar universities have at the very least been exaggerated. Tokyo Imperial University was, after all, a major contributor to radical movements like the *Shinjinkai* (Society of new men) and to the Japan Communist Party.¹⁵ Given the scope the imperial universities permitted to dissenting ideologies, it seems inappropriate to view them as nothing but the seedbed of stat-

¹⁰ Tetsu Hiroshige, "Social Conditions for the Researches of Nuclear Physics in Pre-War Japan," *Japanese Studies in the History of Science*, No. 2 (1963), pp. 83-84.

¹¹ See Miller (n. 7 above), pp. 10-18 and Fritz K. Ringer, *The Decline of the German Mandarins* (Cambridge: Harvard Univ. Press, 1969), pp. 23-24.

¹² Hall (n. 6 above), p. 144.

¹³ Sakata Shōichi, "Kenkyu to soshiki," *Shizen*, Sept 1947, pp. 8-10.

¹⁴ *Japanese Tradition and Western Law* (Cambridge: Harvard Univ. Press, 1970), pp. 176-85.

¹⁵ Henry Dewitt Smith II, *Japan's First Student Radicals* (Cambridge: Harvard Univ. Press, 1972), pp. 61, 213.

ism, legalism, or authoritarianism. Finally, one must ask whether certain authoritarian tendencies in some sense common to both German and Japanese society were equally important as determinants of social change. Certainly they were, if one believes that changes in political structures or values ultimately determine everything else.¹⁶ For instance, the shift toward greater authoritarianism, which occurred in both countries during the 1930s, channeled economic growth and social development in directions radically opposed to those previously in evidence. In Germany, it also interfered greatly with the conceptual development of scientific knowledge; authoritarianism under the National Socialists led not only to persecution of individual scientists but to outright proscription of some scientific ideas (Einstein's relativity theory being the most notable example).

Significantly, however, nothing like that occurred in Japan. As the outbreak of war came to seem ever more probable, German and Japanese scientists both found money and facilities for research more readily obtainable than before, but Japanese scientists escaped most of the direct official meddling to which German scientists were subjected. Unlike German officials, Japanese officials made no attempt to develop pseudo-scientific theories in competition with those of the scientific community. From this fact, it seems that if other things had been equal, Japan's potential for scientific growth at that time might actually have been greater than that of Germany. And if expansion of scientific knowledge is a more basic cause of change than political values, authoritarianism or "fascism" would seem to have had less potential for change in Japan than it did in Germany—an observation once made by Maruyama Masao.¹⁷

Social Functions of the Universities

While the established view of the universities' ideological climate is merely unbalanced (or in some degree irrelevant), influential interpretations of their social functions are factually inaccurate. It is true that the role of the Japanese official was defined in a manner similar to that of the German official. Government functionaries in each country were supposed to be aloof from the political process, strictly "objective" in their handling of complex issues, loyal to the monarchy, and so forth. On the other hand, the production of officials was not the main function of Tokyo Imperial University or of other universities in either Japan or Germany. Most political leaders of the Meiji and early Taisho period were more concerned with producing applied scientists—engineers, physicians, argicultural experts—than they were people with legal training as such. As Prime Minister, Itō Hirobumi told the graduating class at Tokyo Imperial University in 1886:

The only way to maintain the nation's strength and to guarantee the welfare of our people in perpetuity is through the results of science. . . . Nations will only prosper by applying science. . . . If we wish to place our country on a secure foundation, insure its future prosperity, and make it the equal of the advanced nations, the best way to do it is to increase our knowledge and to waste no time in developing scientific research.¹⁸

¹⁶ For details see John Whitney Hall's report on the 1960 Hakone Conference, "Changing Conceptions of the Modernization of Japan" in Marius B. Jansen (ed.), *Changing Japanese Attitudes toward Modernization* (Princeton: Princeton Univ. Press, 1965), pp. 23-24.

¹⁷ *Thought and Behavior in Modern Japanese Poli-*

tics (London: Oxford Univ. Press, 1963); see especially his essay "Fascism—Some Problems: A Consideration of Its Political Dynamics," pp. 157-76.

¹⁸ Itō Hirobumi, "Daigaku sotsugyō shōsho juyōshiki," *Tōkyō Iji Shinsbi* [hereafter *TIS*], No. 433 (1886), p. 971.

And in 1890, Education Minister Yoshikawa Akimasa declared that "flourishing or decline of a country has much to do with the flourishing or decline of its science."¹⁹ Most other high officials of the period, including virtually all the successive Ministers of Education, agreed with Yoshikawa and with Inoue Kowashi, who in 1893-94 created both the university chair system and a network of higher technical schools.²⁰ According to Inoue,

The national strength and wealth of all countries in the world are growing year after year. This is simply because, in these countries, scientific study is encouraged, new inventions are applied to practical purposes and the production is greatly increased by their insistent effort in improving technical schools. . . . Under these circumstances, it is earnestly desired that for national prosperity we should establish the scientific and technical education which is most necessary for the industrial development of Japan.²¹

The pattern of institutional expansion that took place within the imperial university system between 1886 and 1920 also suggests that producing officials with legal training was not considered as urgent a matter as increasing the number of people with applied science training. During those years, four institutions (Kyoto, Tohoku, Kyushu, and Hokkaido) were added to the original foundation at Tokyo, but only one (Kyoto) had a law faculty. The others developed around faculties of engineering and science, medicine, and agriculture respectively—all dedicated to the production of applied scientists. And even at Kyoto, the first academic unit to be established was the Faculty of Science and Engineering.²²

The expansion of new university chairs is even more illuminating. In 1896, one year prior to the founding of Kyoto Imperial University, Tokyo had 127 professorial chairs: 18 in science, 24 in engineering, 23 in medicine, 20 in agriculture, 20 in letters, and 22 in the Faculty of Law. Applied science was thus represented by 67% of all academic units, legal studies by 17%. Despite minor fluctuations, this pattern did not change greatly during the Meiji and early Taisho years, either at Tokyo specifically or in the system as a whole. In 1920, when the entire system had expanded to a total of 479 chairs, law and economics had 16% of all imperial university chairs, letters had slightly over 11%, science and agriculture 13% each, engineering 25%, and medicine 22%.²³

Moreover, establishing and maintaining chairs in applied science was considerably more expensive than creating chairs in either the Tokyo or Kyoto Faculties of Law, which suggests that government officials considered applied science especially important. In 1898, for example, a chair in agriculture cost nearly twice the amount required for a chair in law; a chair in medicine, nearly four times as much.²⁴ In the

¹⁹ Yoshikawa Akimasa, "Sotsugyōsho juyōshiki no enzetsu," *TIS*, No. 643 (1890), p. 36.

²⁰ This statement is based on an analysis of the graduation addresses and other public remarks of 25 of the 34 men who served as Education Minister between 1880 and 1920. Sources consulted include the *TIS*, *Ikai Jibō* [hereafter *IJ*], and proceedings of the Imperial Diet.

²¹ Quoted in Joseph Pittau, "Inoue Kowashi (1843-1895) and the Meiji Educational System," *Monumenta Nipponica*, XX (1965), pp. 270-82.

²² Shigeru Nakayama, "The Role Played by Universities in Scientific and Technological Development in Japan," *Cahiers d'Histoire Mondiale*, IX (1965), pp. 347-48.

²³ The data presented here were compiled by using the following official histories of the imperial universities: *Tōkyō Teikoku Daigaku gojū nen shi*, 2 vols. (Tōkyō Teikoku Daigaku, 1932) [hereafter *TTDGNs*]; *Kyōtō Teikoku Daigaku shi* (Kyōtō Teikoku Daigaku, 1943); *Kyōtō Daigaku nanajū nen shi* (Kyōtō Daigaku, 1967); *Tōhoku Daigaku gojū nen shi*, 2 vols. (Tōhoku Daigaku, 1960); *Kyūshū Daigaku gojū nen shi*, 3 vols. (Kyūshū Daigaku, 1967); *Hokkaidō Daigaku sōki hachijū nen shi* (Hokkaidō Daigaku, 1965).

²⁴ W. H. Sharp, *The Educational System of Japan* (Bombay: Government Central Press, 1906), p. 176. Using information given him by the Ministry of Education, he calculated that for every £7,600

same year, 23 chairs of medicine effectively cost the government 302,500 yen (35.5% of the entire budget for the imperial universities); 20 chairs in agriculture cost about 135,486 yen; 20 chairs in letters cost 108,218 yen; 66 chairs in science and engineering cost 227,514 yen; and 23 chairs in law required an expenditure of about 78,395 yen, a mere 9.2% of the budget for the two imperial universities then in existence.²⁵ If members of the Japanese government were really so concerned with turning out officials during these years, it is difficult to explain why so large a percentage of the universities' budget was spent on applied science and so little on legal education.

Analysis of the academic majors selected by graduates of Tokyo Imperial University and other institutions in the system provides additional evidence that legal training and the production of officials did not constitute the universities' principal *raison d'être*. Contrary to what has been reported, most university graduates did not come from the law faculties of Tokyo and Kyoto. In 1908, a fairly typical year, 35.9% of Tokyo's graduates finished in law, 50.1% in applied science. The cumulative figures for Tokyo Imperial University for the years 1876-1914 show that 35.5% of all graduates had come from the Faculty of Law, 5.1% from the Faculty of Science, 22.4% from the Faculty of Engineering, 12.0% from the Faculty of Letters, 15.5% from the Faculty of Medicine, and 9.5% from the Faculty of Agriculture.²⁶ During the period 1876-1920, the percentage of graduates by faculty for the imperial university system as a whole diverged from this pattern only slightly: 36.0% graduated in law, 4.7% in science, 22.0% in engineering, 9.0% in letters, 17.7% in medicine, 0.66% in economics, and 9.7% in agriculture.²⁷ Particularly striking is the fact that graduates in law increased both absolutely and as a percentage of the total during precisely the period when Passin has said their predominance was declining. Between 1914 and 1918, the percentage of all Tokyo graduates coming from the Faculty of Law varied between 42.6% and 61.9%, a density for legal studies in the total student population of the imperial universities never attained in the years prior to World War I.²⁸

It is true that most graduates of the imperial universities did become public employees—in that narrow sense, "officials." But analysis of their actual job descriptions does not support the view that Japan's elite in this period consisted mainly of individuals with a restricted, "German-type" legal training. As of early 1914, of the 13,724 living imperial university graduates whose occupations were known, some 8,601 (63%) were serving as public employees in one capacity or another. However, some 7,900 of those (58% of all graduates²⁹) actually held positions such as

spent on the Faculty of Law, £13,400 had to be spent on the Faculty of Agriculture and £29,900 on the Faculty of Medicine to sustain a staff of equivalent size.

²⁵ These calculations are based on Sharp's data (note 24 above) and on Sato Kenzō's figures for the total budget of the imperial universities (see Sato, *Kokuritsu daigaku zaisei seido shikō*, Dai'ichi Hōki Shuppan, 1965, p. 183). As an official in the Education Ministry, Sato had access to all official records from the period; however, financial information for the universities was given only for such categories as salaries, maintenance, facilities, depreciation, student aid, etc., and was not available by faculty units. My figures for academic unit expenditures were therefore obtained by dividing the total amount expended on the universities (as

reported by Sato) by the product of the number of chairs in a given faculty and the relative cost of supporting one chair in that faculty (as reported by Sharp).

²⁶ Calculated from information given in *TTDGNS*, vol. II, on a fold-out chart located between pp. 1256 and 1257.

²⁷ Compiled from information contained in the official histories of the imperial universities cited in note 23, together with (for Kyoto Imperial University) Yoshinobu Takenobu, ed., *The Japan Year Book: 1916* (Tokyo: The Japan Year Book Office, 1916), p. 253.

²⁸ See *TTDGNS* chart cited in note 26 above. See also Passin (n. 3 above), p. 93.

²⁹ Calculated from information in *The Japan Year Book: 1916*, pp. 254-55.

hospital director, chemist, consulting engineer, medical practitioner, and the like; it would be more accurate to regard them as applied scientists. The percentage of Tokyo graduates working in applied science was lower than that for any of the other imperial universities; yet a special survey completed in September 1916 showed that 6,458 (49% of the total) of Tokyo University's 13,129 living graduates of known occupation held jobs in applied science, and only 14% (1,876 individuals) were officials with legal training.³⁰

Claims that legal training or the production of officials constituted the principal social function of the imperial universities are therefore in error. From both a contemporary and an historical point of view, these institutions of higher education existed primarily to turn out applied scientists and to increase Japan's store of scientific knowledge. From a developmental perspective, their contribution to economic growth also must have been considerable (even if presently impossible to measure with precision). One piece of evidence supporting this assertion is the high job-turnover rate that existed among professors in Tokyo's Faculty of Engineering. Whereas up through 1920 the Engineering Faculty had about the same number of chairs as the Medical Faculty, it seems to have had about five times the number of actual faculty members because so many resigned after a few years of service to assume positions in private industry or in technical branches of the government.³¹ Some of these men later resumed university teaching, but even casual scrutiny of the dates of their appointments and resignations shows the difficulty of retaining their services when private industry would pay five to ten times a professor's salary. A reliable appraisal of the contribution made to Japan's industrial growth by this circulation of engineers would require, inter alia, a rigorous examination of their career paths; but there is surely justification for saying that the economic consequences were substantial.

As noted above, legal training and the production of officials were not the principal social function of the German universities either. Neither space nor time allows a detailed refutation of this argument regarding Germany, but two brief points may be made. First of all, no more there than in Japan did most university students study law. In 1914, just prior to the outbreak of World War I, the 64,657 students enrolled in the German universities and *Technische Hochschulen* (their equivalent for engineering), were distributed as follows: 13.9% in science, 24.1% in engineering and agriculture, 26.3% in medicine, 21.2% in the humanities or letters, and only 14.5% in law.³² Secondly, it is worth repeating what contemporary observers and present-day scholars have both pointed out so often: that Germany was able to continue its participation in World War I against enormous military opposition for so long only because of its highly developed system of scientific education and research.³³ In short, applied science should be considered the principal concern of both university systems.

Similarities aside, the functions of the two university systems during this period were different. The German institutions were substantially more concerned with humanistic studies and with the expansion of basic scientific knowledge through

³⁰ Calculated from information presented by Yuasa Mitsutomio in *Kagaku shi* (Tōyō Keizai Shimpō Sha, 1961), p. 161.

³¹ Iseki Kurō (ed.), *Dai Nihon bakushi roku* (Hattensha, 1930), vol. V, pp. 1-338.

³² Calculated from data given in Joseph Ben-David, *Fundamental Research and the Universities:*

Some Comments on International Differences (Paris: Organization for Economic Cooperation and Development, 1968), p. 40.

³³ John D. Bernal, *The Social Function of Science* (London: Routledge & Kegan Paul, 1939), pp. 172-73.

research than were the Japanese universities. To begin with, the two systems were based on markedly different concepts of higher education. A strategic component of the German system was the academic ideal of *Wissenschaft*, whose promotion most intellectuals and even significant numbers of officials considered the universities' principal objective.³⁴ Wilhelm von Humboldt defined the concept, about 1810, in explaining why he had helped to establish the University of Berlin:

[Education] is not a matter of ensuring that this or that should be learnt, but that in the process of learning, the memory . . . be exercised, the intellect sharpened, the faculty of judgment corrected, the moral feeling refined. Only thus will the skill, the freedom, the power be attained, which are necessary to take up any profession from free inclination and for its own sake.³⁵

The conception of a university then dominant in Japan could hardly have departed further from this German rationale. At the level of higher education, Meiji and early Taisho leaders were much more concerned with simply increasing the store of practical scientific knowledge as rapidly as possible. Mori Arinori, as Education Minister in the late 1880s, spoke incessantly about the importance of *ōyō gakumon* (applied science). Inoue Kowashi, holding the same office in 1894, devoted most of his efforts to creating a network of higher technical schools (*semmon gakkō*) to supply industry with technicians. And Hachisuka Shigeakira, a successor to Mori and Inoue, summarized, in a graduation speech at Tokyo Imperial University in 1897, two generations of Japanese leaders' thinking about applied science:

Tokyo Imperial University is a place where people study basic principles and increase their knowledge in response to the needs of the state. . . . They are then supposed to apply what they have learned, diligently and sincerely, making the utility of science and technology apparent.³⁶

Comparisons of formal organization also suggest important differences in the social functions performed by the two university systems. For instance, engineering, excluded from the German universities because its practical character was thought incompatible with the *Wissenschaft* ideal of personal cultivation, required separate institutionalization in the *Technische Hochschulen*.³⁷ But in Japan, engineering formed a major part of the university from early Meiji on. Initially based in the Kōgakuryō or Kōbu Daigakkō of the onetime Ministry of Industry, engineering became part of Tokyo Imperial University when the graduate school was established in 1886; by 1920, it was taught at all the imperial universities (except for Hokkaido, which was not founded until 1918).³⁸

Medical faculties in the Japanese universities followed the German pattern more closely than did other fields; but there, too, differences in social function reveal themselves in different types of formal organization. Among the significant features of German academic medicine was the sharp differentiation of roles maintained between general medical practitioners and academic medical scientists. German professors of basic medicine (anatomy, pathology, hygiene, etc.) were not allowed to treat patients. Clinicians in general practice were not permitted to use research facilities in university hospitals, and clinicians and scientists rarely if ever belonged to

³⁴ Ringer (n. 11 above), pp. 102-11.

³⁵ D. F. S. Scott, *Wilhelm von Humboldt and the Idea of a University* (Durham, England: Univ. of Durham, 1960), p. 15.

³⁶ Hachisuka Shigeakira, "Tōkyō Teikoku Daigaku sotsugyō shōsho juyōshiki," *TIS*, No. 1006

(1897), p. 33.

³⁷ Friedrich Paulsen (F. Thilly and W. Elwang trans.), *The German Universities and University Study* (London: Longmans, Green & Co., 1906), p. 112.

³⁸ Nakayama (n. 22 above), p. 345.

the same professional organizations.³⁹ These conditions resulted from the professionalization of medicine that began in Germany about 1850 and later spread to the rest of the world. Japan did not escape its effects: for instance, professors of basic medicine in the imperial universities were forbidden, as in Germany, to treat patients. But Japanese medical practices were conspicuously different in other respects. General practitioners in Japan were allowed access to research facilities in university hospitals (if they had the proper clique affiliations), and the same professional organizations served clinicians and professors of basic medicine.⁴⁰ Perhaps the most notable difference was the remarkable degree to which Japanese professors of clinical medicine engaged in private practice outside the academic framework. German clinical professors also had outside practices—but only as a supplement to their academic incomes, not as a primary means of earning a living.⁴¹ Such practices in Japan, said to be unavoidable at the time, also indicate a lower level of social development vis-à-vis more advanced nations.⁴²

Patterns in the distribution of German and Japanese students by academic major also reveal important cross-national differences in the universities' social functions. The percentages of students in the applied sciences of engineering, agriculture, and medicine were virtually identical—50.4% in Germany, 51.6% in Japan. But the differences in the figures for basic science and the humanities (or letters) are striking. The year World War I began, 13% of German university students were enrolled in basic science, but only 4.4% of Japanese university graduates had chosen a science major; similarly, the humanities had attracted 21.2% of the German students, only 8.5% of the Japanese students.⁴³

Formal Organization in the Universities

Japan's imperial universities diverged even more sharply from the German model in formal organization than they did in social function. The Japanese system did follow the German pattern of organization by faculties and did have a chair system, but differences were substantial and more significant than similarities. Three structural features that stimulated competition in the universities of Germany were entirely lacking in those of Japan: the rank of *Privatdozent* in the teaching staff, the imposition of lecture fees on students, and the latter's right of free migration. On the other hand, some competition was encouraged in the Japanese universities by the provision allowing more than one chair per field, whereas the German universities adhered rigidly to the one-chair rule.

Joseph Ben-David and Awraham Zloczower⁴⁴ have described the structure of the nineteenth-century German university system as follows: Each German state

³⁹ J. Ben-David, "Roles and Innovations in Medicine," *American Journal of Sociology*, LXV (1960), p. 562; Theodor Billroth (W. H. Welch, trans.), *The Medical Sciences in the German Universities* (New York: Macmillan, 1924), p. 179; and the report on *Medical Education* (New York: Commission on Medical Education, 1932), p. 344.

⁴⁰ "Ikai dantai undō shi," Parts 12, 15, and 16, *IJ* (1917): No. 1211, p. 1608; Nos. 1215–1216, pp. 1757, 1801.

⁴¹ Abraham Flexner: *Medical Education in Europe* (Boston: D. B. Updike, 1912), p. 148 and *Medical Education* (New York: Macmillan, 1925), p. 40.

⁴² See, for instance, remarks to the Diet by the Vice Minister of Education, Matsuura Shinjirō, in *Teikoku Gikai Shūgiin iinkai giroku* (Shūgiin Jimukyoku, 1920), vol. 42. Cf. "Daigaku tokubetsu kaikei hōan hoka ikken," House of Representatives Budget Committee, First Session, 42nd Diet, 12 Feb 1920, p. 2.

⁴³ See Ben-David (n. 32 above), p. 40 and the university histories cited in note 23 above.

⁴⁴ "Universities and Academic Systems in Modern Societies," *Archives Européennes de Sociologie*, III (1962), p. 45–84.

had at least one university; larger states like Prussia and Bavaria had two or more. Junior faculty and students were both free to move at will from one university to another and back again. The former were called *Privatdozent*, indicating their right to offer lectures on any subject of their choosing. *Privatdozenten* had no tenure and received no salaries; most held outside occupations while teaching, but lecture fees from students also provided an important part of their income. During the nineteenth century and up through 1920, acquisition of the right to serve as *Privatdozent* customarily marked the beginning of an academic career. After proving ability at scholarship through publication and at teaching as *Privatdozent*, one could eventually expect an appointment as professor. Professors were paid a regular salary; but even at that level of the academic hierarchy, a significant part of a faculty member's income often came from lecture fees.

For most of the nineteenth century, structural arrangements of this kind produced considerable competition in the German university system. Universities competed for students and professors; *Privatdozenten* competed with full professors for income from lecture fees. Innovations emerged regularly and were diffused rapidly throughout the system. Continued adherence to the one-chair rule, however, effectively stifled competition once horizontal expansion of the system reached a certain point. Because the establishment of chairs followed the medieval practice of representing a field of knowledge by one professor, there were only two ways new chairs could be established: creating new universities or dividing an existing field. Both procedures were followed but neither proved adequate to the growth of higher education during the nineteenth century. Prior to World War I, the last university created was Strassburg, in 1874. Division of fields did occur to some extent thereafter; for example, bacteriology's separation from hygiene and pathology, in the 1880s. Nevertheless, the younger academics' demands for employment opportunities continued to exceed the number of available positions. According to Ben-David and Zloczower, this situation produced a major change in the behavior patterns of academics. Senior professors had never appreciated the competition of the *Privatdozenten*; they were now able to virtually eliminate it. Younger academics seeking advancement necessarily became clients of the senior men; they often had no choice but to tolerate authoritarian behavior by the latter. This change in behavior thus came to be associated with nepotism in academic appointments, and with the suppression of free-ranging discussion within and a decline in cooperation among research groups.⁴⁵ Moreover, productivity in certain fields of scholarship—e.g., physiology—fell off dramatically because of limited competition and employment opportunities.⁴⁶

The experience of the imperial university system in Japan is a matter of some interest in this connection, since the Japanese system had allegedly copied the German system. It has long been known that interpersonal relations among Japanese academics displayed some of the same patterns, at least superficially, as those that became common among the Germans. The principal issue is whether formal organizational arrangements were primarily responsible for such behavior. Japan did not have *Privatdozenten*, lecture fees, or migration of students from one institution to another; but each measure was seriously considered by Japanese educators at one

⁴⁵ A. Zloczower, "Career Opportunities and the Growth of Scientific Discovery in 19th Century Germany; With Special Reference to Physiology"

(M. A. thesis, Hebrew University of Jerusalem, 1960), pp. 20, 43.

⁴⁶ *Ibid.*, pp. 92–93.

time or another during the Meiji and early Taisho years. In 1900, Dr. Tōyama Masakazu, former President of Tokyo Imperial University and onetime Education Minister, published a book⁴⁷ advocating the *Privatdozent* system as a way of stimulating competition. In 1901, the medical journal *Ikai Jihō* began a campaign to institute a lecture-fee system for paying professors. This plan, as conceived by Education Minister Kikuchi Dairoku, a former academic and university administrator, would have allocated part of the income from student fees (to be introduced for the first time) to a university fund for general disbursement and part to professors with large enrollments. *Ikai Jihō* and some other elements of professional and political opinion thought the Kikuchi plan would encourage competition, innovation, and better teaching.⁴⁸

Whether lecture fees and similar reforms would actually have stimulated greater competition cannot be known; financial constraints invariably prevented their introduction. In 1913, a reporter from the *Ikai Jihō* interviewed Dr. Okuda Gijin, Education Minister in Yamamoto Gombei's cabinet, to discuss these and other educational issues. Reflecting the opinions of Diet members, journalists, and educational reformers,⁴⁹ the reporter asked Okuda whether it might not be appropriate for Japan to introduce lecture fees, create the rank of *Privatdozent*, and allow unrestricted student transfers among the universities. In replying, the Minister said that those who made such proposals "show no understanding of our present circumstances."⁵⁰ In elaborating, he said that Germany could do those things because of the large scale on which its education system operated. He also noted that, compared to Japan, Germany had many people qualified for professorships, a substantial number of universities (28 compared to Japan's 4), and considerably more money for both. Given its absence of these conditions, Okuda said, Japan could not possibly adopt such reforms.⁵¹

On the other hand, the Japanese organizational structure did stimulate competition through the multi-chair system as envisioned by its creator, Inoue Kowashi. Following the French system, which allowed multiple chairs per discipline based on enrollments, Inoue gave three chairs to fields with large clienteles like internal medicine, only one to those like biochemistry with few students. Moreover, professorial salaries under Inoue's reform varied according to individual accomplishments. A professor's salary was divided into two parts. *Shokumuhō* referred to the basic salary, which was calculated by civil service grade and seniority. The other part of the salary, *zai:hokuhō*, was awarded at the Education Minister's discretion according to the number and quality of the recipient's achievements.⁵² That the system worked in some measure to achieve the desired end of competition can be seen from the example of internal medicine and hygiene, where two or more research groups at the same university (Tokyo) would investigate precisely the same subject—each striving for priority, and sharing neither information, facilities, nor personnel.⁵³ In this sense, the Japanese chair system, like the German, did obstruct cooperation across

⁴⁷ *Kyōiku seido ron* (Fuzambō).

⁴⁸ "Daigaku kyōjū zōhō mondai," *IJ*, No. 369 (1901), p. 456.

⁴⁹ For details see Terasaki Masao, "Teikoku daigaku keisei ki no daigaku kan" in Terasaki Masao et al. (eds.), *Gakkō kan no shiteki kenkyū* (Nōma Kyōiku Kenkyū Jō, 1972), pp. 205, 228-29.

⁵⁰ "Okuda Bunshō to kataru," *IJ*, No. 990

(1913), p. 1099.

⁵¹ *Ibid.*, pp. 1098-99.

⁵² Terasaki Masao, "Kōtō kyōiku" in Kaigō Tokiomi (ed.), *Inoue Kowashi no kyōiku seisaku* (Tōkyō Daigaku Shuppan Kai, 1969), p. 366.

⁵³ "Eiseigaku no reimei o kataru," *Nihon Iji Shimpō*, No. 1956 (1961), pp. 30-34.

chair boundaries; but whether this was dysfunctional for science is quite another matter.

From the government's point of view, the imperial university chair system resulted at least as much from a desire to save money as to promote scholarly competition. When Inoue assumed office, Tokyo Imperial University still had a number of foreign professors who had to be paid about three times as much as Japanese. Inoue believed he could reduce the number of foreign professors if more efficient uses were made of the native staff. He seems to have thought the chair system would further this aim, since members of the teaching staff would now offer courses in their specialties rather than teaching any course offered in their faculties. In this sense, the reform succeeded; the government was able to cut higher educational spending by twelve percent while actually increasing the size of the faculty.⁵⁴

Financial considerations also militated against rapid horizontal expansion of the university system. Despite considerable pressures from local interests in Kyushu, Miyagi Prefecture (Sendai), and the Kansai district from the 1890s on, the government proceeded very slowly with the establishment of universities in those areas.⁵⁵ Kyoto Imperial University was established in 1897 mostly because the Diet insisted that Tokyo needed the competition,⁵⁶ and plans for Tohoku Imperial University at Sendai were accepted only when local residents agreed to bear a large percentage of the cost.⁵⁷ The reasons were strictly financial. Because of the newness of its physical plant and the smaller number of students served, a chair of engineering at Kyoto in 1898 effectively cost the government ¥4,445, compared to only ¥3,074 for the same chair at Tokyo.⁵⁸ In fact, compared to Tokyo, the other imperial universities remained under-enrolled and overfunded during the entire period through 1920. So great were pressures from the Finance Ministry to avoid "unnecessary" horizontal expansion of the universities that Education Minister Kikuchi Dairoku felt compelled to deny publicly in November 1901 that the government had any intention of establishing an imperial university in Kyushu,⁵⁹ even though in February 1900 in a speech to the House of Peers he had expressed concern about the small number of applied scientists coming out of Tokyo and Kyoto.⁶⁰

From a purely formalistic or legal point of view, the relationship of Japan's imperial universities to external authority was, as many have claimed, similar to that of the German universities. The concepts of academic freedom and institutional autonomy were alien to Japanese experience at the beginning of the Meiji period, but eventually did come to be accepted. In 1888 a group of twelve junior faculty members at Tokyo, having just returned from Germany, obtained a meeting with the senior statesman Matsukata Masayoshi to discuss the subject of academic freedom. Their conversation was apparently rancorous, fraught with misunderstanding, and—from the professors' point of view—futile. (One of the young academics said that their demands to Matsukata for autonomy and freedom, inspired by their experience of studying in Germany, were like "wind blowing in a horse's ear."⁶¹) But by

⁵⁴ Terasaki (n. 52 above), p. 378.

⁵⁵ Nakayama (n. 22 above), pp. 347–52.

⁵⁶ See *Kyōtō Teikoku Daigaku shi* (n. 23 above), pp. 9–10.

⁵⁷ Nakayama (n. 22 above), pp. 349–50.

⁵⁸ Based on information in Sato (n. 25 above), p. 183 and Sharp (n. 24 above), p. 176.

⁵⁹ "Kikuchi Bunshō no Kyūshū Ika Daigaku dan," *TIS*, No. 1230 (1901), p. 39.

⁶⁰ See *Dai Nihon Teikoku Gikai shi* (Dai Nihon Teikoku Gikai Shi Kankō Kai, 1926–30), vol. 4. Cf. "Gakusei chōsa kai setchi ni kansuru kengi an," House of Peers, 14th Diet, 2 Feb 1900, pp. 119–25.

⁶¹ Uzaki Kumakichi, *Aoyama Tanemichi* (Aoyama Naika Dōsō Kai, 1930), pp. 139–48; quote is from p. 145.

1914 or so, the professors were rapidly achieving most of these objectives. In both countries, the Ministry (or Ministries) of Education reserved the right to establish new chairs and to approve all faculty appointments at the level of full professor; but in Japan as well as in Germany, faculty recommendations pertaining to the curriculum and teaching staff were generally accepted whenever financial constraints did not interfere. And when, as in the 1930s, a retreat from the principles of academic freedom occurred in the one country, it also occurred in the other. In a purely formal sense, the differences between the political constraints under which the two university systems operated do not appear to have been very great. But, as noted in the discussion of ideology, the significance of these similarities remains very much in doubt.

Pedagogy and Informal Organization

The strongest case for direct German influence is in the area of pedagogy and informal organization. Whether significant or not, neither the fact of Herbart's influence nor the predominance of German professors in the Japanese universities before 1900 can be seriously challenged. The Japanese academic community's orientation toward Germany before 1914 can be demonstrated in several ways, one being the percentage of Tokyo's foreign professors who were German. During the Meiji period, of the 120 foreign academics at Tokyo, 46 (38%) were German by origin—the largest single group; by contrast, 30 faculty members were British and 12 were Americans (25% and 10% respectively).⁶² Though perhaps not so overwhelming as sometimes assumed, German influence was significant, and in certain fields substantial. Of 19 foreign professors of medicine, 16 (84%) were German; in agriculture, the Germans were 63% of the total (12 of 19). They were also the largest single bloc in law (7 of 23), and ranked second in letters and engineering (6 of 25, and 3 of 13, respectively). Only in basic science—where the British and Americans dominated—were the Germans poorly represented (2 among 21).⁶³

The frequency of official visits in these years by Japanese academics to Germany also supports the claim of significant German influence. Between 1895 and 1912, for example, the Japanese Ministry of Education sent 623 people abroad under official auspices. (These visits were not undertaken by students so much as by professors attending scholarly meetings, technicians attending exhibitions, and so forth). Of that number, 539 visited Germany, usually along with several other countries. The second most frequently visited country was Britain (252 visits), with the United States (194 visits) and France (165 visits) in third and fourth places.⁶⁴

Tokyo Imperial University's forty-six German professors and the frequency of scholarly visits by Japanese to Germany suggest that German academic role models were widely diffused in Japan. Moreover, these role models were often perceived by the Japanese as authoritarian. Dr. Nagayo Mataro, Professor of Pathology at Tokyo, wrote to his brother, Dr. Nagayo Shokichi, in 1907 saying that many of the German professors he met were haughty and arrogant.⁶⁵ Dr. Kitajima Ta'ichi, a prominent bacteriologist who spent a year with Emil von Behring at Marburg, found the co-

⁶² Compiled from: *Tōkyō Teikoku Daigaku gaku-jutsu taikan: Igakubu, Densemyō Kenkyū Jō, Nōgakubu* (Tōkyō Teikoku Daigaku, 1942); *TTDGNS*; and Yuasa Mitsutomo, *Kagaku gojū nen* (Jiji Tsūshin Sha, 1950), pp. 54–56.

⁶³ Yuasa (n. 62 above), pp. 54–56.

⁶⁴ Compiled from statistics presented in Minoru Watanabe, "Japanese Students Abroad and the Acquisition of Scientific and Technical Knowledge," *Cahiers d'Histoire Mondiale*, 1X (1965), pp. 283–85.

⁶⁵ *Nagayo Matarō den* (Nagayo Hakushi Kinen Kai, 1944), p. 115.

founder of modern immunology "ill-tempered, stern, and always the military man."⁶⁶ And of another eminent German Nobel laureate, Dr. Paul Ehrlich, Dr. Mitamura Tokujiro, professor in Tokyo's Faculty of Medicine, wrote:⁶⁷

Ehrlich would assign research topics to his students and supervise them relentlessly. He made them keep a daily notebook of everything they did to show him. Certainly this is one way of doing things, but in this case the student's work is apt to reflect the professor's way of thinking.

Recalling the degree to which Prime Minister Itō Hirobumi emulated the behavior and personality of Chancellor Otto von Bismarck, it is easy to imagine an imperial university system filled with *Herr Professor* types who daily repressed and frightened graduate students and assistant professors alike.

Actual behavior patterns among Japanese professors and their students, however, seem not to have been very "German" in that sense. In an article discussing interpersonal relations among scientists in three Tokyo Imperial University laboratories,⁶⁸ I have suggested that while one of the five full professors involved was quite authoritarian, the other four were notably liberal and tolerant. Free-ranging discussion, criticism, and a relaxed work environment were deliberately encouraged by professors who shared meals with younger co-workers, discouraged the use of status language in the laboratory, and—most importantly—regularly went drinking with younger members of the research group. As one young scientist described it, "Distinctions between professors and students were cast aside on such occasions."⁶⁹ Nor is it likely that such behavior was confined to the Faculty of Medicine. Dr. Tanakadate Aikitsu, a pioneer physicist at Tokyo, also shared food, liquor, and humorous stories with younger co-workers. One wrote of him: "Dr. Tanakadate always gave the impression he was learning along with us."⁷⁰ And another stated: "Tanakadate never made us think he knew everything and was going to show us exactly how to do our work."⁷¹ Reinhard Bendix specified the crucial difference between German and Japanese ways of conducting such relationships when he wrote:

In Germany . . . interpersonal relations [among people of unequal status] tend to be hierarchic, master-servant relations . . . whereas in Japan hierarchy is softened by kinship simulations, and status equals have an elaborate ritual of collaboration which, so far as I am aware, is altogether missing in Germany.⁷²

Finally, to the extent that academic appointments in the Japanese universities were based on particularistic criteria rather than "merit," they *may* have resembled nepotistic patterns in German universities and *may* have yielded similarly dysfunctional results for the progress of knowledge. Yet certain differences in the form such appointments took suggest the need for caution in making such statements. No comprehensive—or even fragmentary—study of nepotism in German university appointments has ever been done, but scattered evidence suggests a relatively com-

⁶⁶ *Kitajima Ta'ichi jiden* (Kitajima Sensei Kinen Jigyō Kai, 1955), pp. 35–36.

⁶⁷ Mitamura Tokujirō, "Tanemichi no sekai dōtoku" in Kumagai Kenji (ed.), *Omoide no Aoyama Tanemichi Sensei* (Aoyama Sensei Tanjō Hyakunen Sai Jumbi Iinkai, 1959), p. 164.

⁶⁸ "Japanese Culture and the Problem of Modern Science" in Arnold Thackray & Everett Mendelsohn (eds.), *Science and Values* (New York: Humanities Press, 1974), pp. 135–37.

⁶⁹ Yamagiwa Katsusaburō, "Kō Nihon Byōri Gakkai meiyō kaichō Miura Moriharu Sensei

tsuitō no ji" in Nagayo Matarō (ed.), *Tōkyō Teikoku Daigaku Byōrigaku Kyōshitsu gojū nen shi* (Tōkyō Teikoku Daigaku, 1939), 1, p. 208.

⁷⁰ Quoted in Nakamura Seiji, *Tanakadate Aikitsu Sensei* (Ōbun Shorin, 1943), p. 227.

⁷¹ *Ibid.*, p. 230.

⁷² "Preconditions of Development: A Comparison of Japan and Germany" in Ronald P. Dore (ed.), *Aspects of Social Change in Modern Japan* (Princeton: Princeton Univ. Press, 1967), pp. 53–54.

mon pattern was for a son or grandson to succeed a professor to a particular chair. (By this means, the chair of anatomy at Wurzburg remained in the hands of the von Siebold family for a century and a half.)⁷³ But in the pre-1920 Japanese universities, nepotism worked quite differently. In 1920, there were 51 men on the staff of Tokyo's Faculty of Medicine who had already achieved the status of full professor at Tokyo or would eventually do so. As might be expected, 24 had a relative in the medical profession; but only 13 of these were professors in, or closely connected to, the Faculty of Medicine. Moreover, all but one of these relatives was a father-in-law rather than a blood relative. And most significantly, the father-in-law had accepted the younger man as son-in-law and heir only after the latter had proven himself by graduating first, second, or third in his class.⁷⁴ To the extent that such practices existed in other fields of scholarship, one would have to conclude that a formally particularistic appointment process was substantially universalistic in content.

Summary and Conclusions

According to the literature, Japan's imperial universities were heavily influenced by German universities in their ideological orientation, social function, formal organization, pedagogy, and informal organization. But the extent of this influence has surely been exaggerated. Neither the Japanese nor the German universities concentrated on training officials, and a majority of students prior to 1920 graduated in fields other than law. While most Japanese students did enter public service, most of their positions were in applied science. In fact, expansion of scientific knowledge—though effected and applied in somewhat different ways—was the main social function of both university systems. The Japanese institutions began with a different philosophy of education; they were more concerned with turning out engineers to run factories or doctors to treat patients, significantly less involved in creating scientific knowledge or diffusing humanistic values than were the German universities. Such differences naturally reflected differing structural and financial constraints in the two countries.

Nor are similarities very notable in formal and informal organization or pedagogy. Japan lacked the institutions of *Privatdozent*, lecture fees, and unobstructed student migration. Its chair system avoided the rigidities of the German model, permitting multiple chairs per field. And despite the frequency of their visits to Germany and contacts with Germans in Japan, Japanese professors do not seem to have been very authoritarian. Only in their ideological orientation and in their institutional relationship to external political authority did the Japanese universities closely resemble the German institutions, and there are serious reasons to question how significant these similarities were.

That contrary evaluations of the universities have persisted for so long is both notable and deserving of comment. Why have we been told, since the late nineteenth century, that the imperial universities were modeled after the German institutions? One possible explanation is that historians and social scientists, both Japanese and Western, have too often uncritically accepted historical actors' descriptions or characterizations. One can cite statements from the period claiming that Japan's universities *were* greatly indebted to those of Germany. In 1915, for instance, the

⁷³ Billroth (n. 39 above), pp. 216–43, discusses this and similar cases at other German universities.

⁷⁴ Compiled from information in *Tōkyō Daigaku*

Igakubu hyakunen shi (Tōkyō Daigaku Shuppan Kai, 1967), pp. 135–36. See also my article cited in n. 68 above, pp. 134–35.

Ikai Jihō declared in a editorial: "The Japanese educational system follows the German pattern in nearly every respect. The manner of teaching, organization, structure and order are all in the German mold."⁷⁵ One can also find historical actors saying that political or nationalistic objectives were exceedingly important and that everything else must be subordinated to them. Mori Arinori's dictum that "Both pure and applied science are to be strictly subordinated to the national need" is merely one of the best-known remarks of this kind. It seems likely, in fact, that the presence of so many such assertions by historical actors in the sources used by historians led many to conclude that political structures and values really do ultimately determine everything else that happens.

One may freely concede, in fact, that so far as the Meiji-Taisho leadership was concerned, expansion of national power was the overriding goal of the modernization process. However, the expansion of national power necessarily expressed itself through channels other than civil administration or political reform. My argument here is therefore threefold. First of all, I strongly suspect that most leaders at the time regarded the expansion of scientific knowledge as the principal means of achieving national power; secondly, I suspect they arrived at this view mostly because Japan experienced a considerable expansion of scientific knowledge during the Tokugawa period; and thirdly, I would suggest that even if one found evidence in official remarks of a belief in the priority of legal over applied science training—which I consider unlikely—such assertions cannot be seen as forming the basis for an adequate theoretical explanation of social change in modern Japanese history. We must avoid committing the common logical fallacy of confusing the historical actor's viewpoint with that of the present-day observer.

A second, equally common (and closely related to that just mentioned) fallacy often implicit in prior discussions of the imperial universities is the tendency to confuse secondary with primary functions in the determination of long-term historical significance based, in this case, on the universities' role in the process of social change. For instance, it might be true—though again, I suspect not—that Tokyo Imperial University was seen at the time by government officials and by the Japanese public as primarily an agency for training bureaucrats. However, that does not necessarily establish such perceptions or descriptions as fact from the historian's perspective. Even if it were true that the universities were established for such reasons, the historian or present-day social scientist surely ought to conclude that their most important long-term function was the acquisition, or creation and application, of scientific knowledge, accomplished by training applied scientists who could then either import such knowledge from outside or produce it at home.

A third reason for the persistence of misinformation about the universities may be the tendency in so much of the modernization literature to exaggerate the importance of political values and the role of the public sector in the process of change. It may even be that a majority of scholars in Japanese studies believe structural and value changes in the political realm determine—or at least must analytically precede—changes in the economy, culture, or social structure. For instance, John C. Pelzel once wrote:

⁷⁵ "Ika daigaku genjō dahanō gi," *U*, No. 1076 (1915), pp. 268–69. The editorial specifically stated: "This description applies to portions of To-

kyo Imperial University besides the Faculty of Medicine."

The economy served [my emphasis] state policy . . . faithfully . . . because the Japanese shared in a remarkable consensus with the bureaucrats and oligarchs the conviction that state power and national welfare are indeed overriding goods.⁷⁶

And, in 1965, William W. Lockwood stated:

The drive toward industrialization required vigorous and pragmatic initiatives . . . to pioneer new modes of technology and mobilize increasing resources for the tasks of development. . . . Political initiatives dominated . . . as the Meiji reformers set about to consolidate the authority of the new regime at home and to fend off threats from abroad. From the outset . . . the *means* [my emphasis] to political strength were seen to be economic in considerable degree.⁷⁷

Given the dominance in Japanese studies of the view represented here, we can readily agree with Robert Ward's observation that an interest in and concern for political modernization "may well have been . . . pressed further in the case of Japan than in that of any other modern society."⁷⁸

The effect of this paradigm on our view of the universities has been not only substantial but almost entirely negative. Relative to such matters as the role of scientific and technological innovation in Japanese society, we are, if anything, overly informed about such contributions to modernization of the Meiji government as its stabilization of politics or mobilization of capital. If we believe such political changes to be the only—or at least most important—factor in whether modernization "succeeds" or "fails," it is appropriate to perceive the universities as little more than training schools for officials. But if we consider the modernization process as resulting from the expansion of scientific knowledge in society, our perception of the universities' role in the social change process necessarily shifts radically.

It could be argued that in some respects the rather recent emergence, in the work of certain economists, of a second modernization paradigm represents a significant advance toward understanding scientific or technological factors in change. For example, Henry Rosovsky and Kazushi Ohkawa's important study of Japanese economic growth, published in 1973, relies on an analysis of "private investment spurts, technological progress and trend acceleration" to explain development, and specifically eschews the emphasis placed by earlier investigators on political changes and political initiatives.⁷⁹ But even there, the contributions of education or scientific knowledge to economic growth are given little specific consideration. The authors' silence on this subject leaves the impression that scientific knowledge and education were important for development only in terms of their contribution to raising or lowering the productivity and wages of the labor force. At least, that is the only contribution of education to economic development they mention specifically.⁸⁰

⁷⁶ "The Small Industrialist in Japan," *Explorations in Entrepreneurial History*, VII (1954), p. 81.

⁷⁷ "Prospectus and Summary" in William W. Lockwood (ed.), *The State and Economic Enterprise in Japan* (Princeton: Princeton Univ. Press, 1968), pp. 3-4.

⁷⁸ "Introduction" in Robert E. Ward (ed.), *Political Development in Modern Japan* (Princeton: Princeton Univ. Press, 1968), pp. 3-4.

⁷⁹ *Japanese Economic Growth: Trend Acceleration in the Twentieth Century* (Stanford: Stanford Univ. Press, 1973), p. 217.

⁸⁰ *Ibid.*, pp. 48-69. Daniel Bell has noted the

inability of contemporary economic theory to account adequately for the contribution of scientific knowledge to economic development; see *The Coming of Post-Industrial Society* (New York: Basic Books, 1976), pp. xiv-xv, et passim. Readers interested in this problem may also wish to consult two papers cited by Bell: Kenneth Arrow, "Limited Knowledge and Economic Analysis," *American Economic Review*, LXIV (March 1974), pp. 1-10 and Michael A. Spence, "An Economist's View of Information," *Annual Review of Information Science and Technology*, 9 (Washington, D.C.: American Society for Information Science, 1974).

There is in this newer modernization literature no explicit, or even implicit, recognition that economic development could not have occurred at all had the higher education system not provided a supply of scientists and engineers capable of importing scientific knowledge from the West and adding to it through research at home.

So inadequate a treatment appears to result from the dominance in these studies of the growth-accounting paradigm, which assigns educational and technological factors to a category termed "residuals." Rosovsky and Ohkawa explain that, apart from the usual factor inputs of capital and labor, this category exists because "productivity or output growth frequently exceeds additions of inputs, giving rise to an unexplained increment, the so-called residual."⁸¹ The residual can result from variations in the rates of capital and labor mobilization or quality improvements in either, from changes in the location or size of factor inputs, or from changes in the scale of production. Even when virtually all these elements are taken into account, it is said, economists working under the influence of this model necessarily confront a series of so-called "unknown factors" or "residuals" which Rosovsky and Ohkawa accurately label a "measure of our ignorance."⁸²

Prospects for a shift in our view of the universities and their contribution to Japan's modernization may also have been inhibited by a series of related beliefs most commonly found in writings by Japanese scholars but shared in part, in degree, or both by some Western scholars. These beliefs can be summarized as follows: The cultural milieu of Tokugawa Japan was pervaded by a wide range of irrational tendencies, and a fundamental indifference or hostility toward rational explanations of nature. These irrational tendencies persisted into the modern period, thwarted the development of "scientific" thought, and obstructed greater support for research and higher education. Related to these tendencies was an inclination to imitate or copy uncritically what more advanced societies had achieved in science, technology, or formal institutions. The combination of these tendencies meant that the most drastic cultural reforms were necessary for "modernization" to "succeed."⁸³

In evaluating these arguments, it is useful to note that the first two rely on historical "facts" and anthropological assumptions for which neither historical scholarship nor modern anthropology provides much support at the present time. In history, Albert Craig's, H. D. Harootunian's, and Tetsuo Najita's important researches into late Tokugawa thought suggest that strategic elements of Neo-Confucian philosophy gave considerable legitimacy to the acquisition of natural knowledge, i.e., science. Moreover, the degree of this validation sufficed—with support from other factors—to create the foundations of a modern scientific culture well before 1868.⁸⁴ From an anthropological standpoint, it may be said that the aforementioned arguments depend heavily on a dichotomization of Japan's intellectual or cultural history into "pre-scientific-scientific"—a kind of analysis once, but no longer, considered

⁸¹ (Note 79 above), p. 44.

⁸² *Ibid.*, p. 48.

⁸³ Representative of such views, in varying degrees, are Nakamura Hajime, *The Ways of Thinking of Eastern Peoples* (Philip Wiener, trans.), Honolulu: East-West Center Press, 1964) and Hideki Yukawa, "Modern Trend of Western Civilization and Cultural Peculiarities in Japan" (in Charles A. Moore [ed.], *The Japanese Mind*, Honolulu: East-West Center Press, 1967, pp. 52-65).

⁸⁴ On the validation of science by Neo-Con-

fucian thought, see Craig, "Science and Confucianism in Tokugawa Japan" in Marius B. Jansen (ed.), *Changing Japanese Attitudes toward Modernization* (Princeton: Princeton Univ. Press, 1965), pp. 149-51. On the emergence of a scientific culture in general, see Harootunian, *Toward Restoration* (Berkeley: Univ. of California Press, 1970), pp. 325-50 and Najita, "Intellectual Change in Early Eighteenth-Century Tokugawa Confucianism," *JAS*, xxiv (1975), pp. 931-44.

valid by anthropologists.⁸⁵ A new anthropological consensus has yet to emerge on how to precisely conceptualize legitimate differences—and important similarities—between the dominant intellectual approaches to nature of, say, Zuni Indians and modern physicists; but few if any ethnographers or theorists in anthropology still believe a major qualitative gap exists between the two.⁸⁶ One may even suspect that only among some non-anthropological Japan specialists does Lucien Levy-Bruhl's older view still enjoy support.

As for the contention that Japanese have been unusually inclined to imitation, such characterizations reflect an absence of historical perspective and are sociologically naive. While imitation by the Japanese of other societies' technology, science, and institutions did occur, it was highly selective, drastically limited—confined, in most instances, to a few very general aims—and had little to do with any inherent *cultural* peculiarities. Instances of significant cultural borrowing by other societies provide a useful perspective from which to examine cultural borrowing by the Japanese. Western Europe, for instance, undertook cultural borrowing from the Arab world from about 1100, and continued this importation of knowledge and skills more-or-less uncritically for about a century and a half. Of this experience, the Belgian historian Pierre Felix de Mandonnet once wrote: "[Before the sixteenth century,] the original elements of the culture of the Middle Ages were still in the background, being hidden or supplanted by foreign elements."⁸⁷

But the Arabs themselves also had a history of comprehensive, large-scale borrowing from other societies, as Fernand van Steenberghen has observed:

The Arab conquest [of the seventh century A.D.] was the starting point for a new civilization in the southern basin of the Mediterranean. Mingling with the peoples they subdued, the Arabs showed an extraordinary power of assimilation; their culture had nothing really original about it, even in religion; but they were able to reap great benefit from the hellenistic civilization.⁸⁸

Such instances of borrowing by two societies so widely removed—both culturally and geographically—from Japan may prompt us to ask whether Japan's relationship to China in the seventh century, or to Europe and the United States in the late nineteenth–early twentieth, really differed qualitatively from that of Western Europe to the Arabs in the thirteenth century or that of the Arabs to the Greeks in the seventh. Might there not, in short, be shared historical experiences, or common structural realities having little to do with inherent cultural proclivities, that explain a particular society's tendency to imitate another?

A large body of sociological literature has claimed as much. The French sociologist Gabriel de Tarde maintained that a given society's tendency to imitate others or

⁸⁵ The classical statement of the "primitive mind" thesis is that of Lucien Levy-Bruhl, *Les Fonctions mentales dans les sociétés inférieures* (Paris: Alcan, 1910).

⁸⁶ Some modern anthropologists would accept Emile Durkheim's thesis that scientific thought resulted from a gradual process of evolutionary development from "primitive" religious thought. More would probably associate themselves with the view of Claude Lévi-Strauss: that one ought to define the problem in terms of "two distinct modes" appropriate to the "two strategic levels at which nature is accessible." On Durkheim's position, see Robin Horton's important essay "Levy-Bruhl, Durkheim and the Scientific Revolution" in

Horton & Ruth Finnegan (eds.), *Modes of Thought: Essays on Thinking in Western and Non-Western Societies* (London: Faber & Faber, 1973), pp. 249–305. For Lévi-Strauss's views, see his *The Savage Mind* [1st pub. 1962] (Chicago: Univ. of Chicago Press, 1966), pp. 1–33.

⁸⁷ *Siger de Brabant et l'Averroïsme latin au XIII^e siècle* (Louvain: Institut Supérieur de Philosophie de l'Université, 1911), p. 2.

⁸⁸ (Leonard Johnston, trans.), *Aristotle in the West: The Origins of Latin Aristotelianism* (Louvain: E. Nauwelaerts, 1955), p. 16. I am indebted to Professor Joseph H. Lynch, my colleague in medieval history at the Ohio State University, for calling my attention to van Steenberghen's book.

innovate for itself, a very much a function of its interaction processes with other societies. Geographical isolation, he said, generally yields less innovation than active involvement with other peoples. Similarly, dense communications and extensive foreign contacts may well produce greater innovation.⁸⁹ Rapid cultural borrowing, on the other hand, may follow from a society's sudden realization that a major technological gap exists between itself and other societies.⁹⁰ Though obviously too simple in this particular form, the idea that interaction favors innovation while isolation inhibits it, or that isolation followed by interaction yields massive cultural borrowing, underscores the importance of *structural* variables in understanding innovation or imitation, as compared with the frequently ill-defined *psychological* or *cultural* variables which deny comparability yet are so often favored by historians.

Some of this literature may also facilitate understanding of the actual imitation or borrowing process. In *Les Lois de l'imitation*, for instance, Tarde set forth the idea that imitation generally proceeds from what he called the "inner to the outer man."⁹¹ By this he meant to suggest that ideas are apt to be borrowed before the institutions that express them, and that the imitation or borrowing of *ends* almost always precedes the imitation or borrowing of *means*. Alfred Schutz, Peter Berger, and Thomas Luckmann have further developed this point of view. Employing a strategy radically different from those generally found in sociological writings on stasis and change, Schutz and his disciples have insisted that, in explaining behavior, cognitive structures—ideas and beliefs of all kinds—be considered primary, their institutional expressions secondary. Put another way, knowledge—defined as whatever people consider true—becomes the independent variable, institutional expressions of it a dependent variable.⁹²

Such theoretical assumptions and historical comparisons may support the view of the universities' contribution to Japan's modernization advocated here. If, following Schutz, we ascertain the Japanese leaders' goals in modernization and the means they chose to reach them, we immediately perceive the truth of earlier characterizations: The Meiji-Taisho leaders saw weakness in Japanese society, and opted for an expansion of national power. They further observed backwardness, and opted for science and economic growth. These responses can be considered a direct imitation of the West, with imperialism stimulating a counter-imperialism. The goal or *end* of modernization was completely straightforward and far from original.

But the means selected to achieve the goal were highly original. The backlog of undigested knowledge was so great that attempts to directly replicate Western experience—specifically that of Germany—would almost certainly have failed. Russia had tried this in the eighteenth century; there, official perception of a technological gap vis-à-vis the West produced a science academy with nothing but foreign members who taught no science and trained no successors, merely did research of no relevance to a backward society.⁹³ Partly because of the timing (the eighteenth

⁸⁹ Terry N. Clark (ed.), *Gabriel Tarde on Communication and Social Influence* (Chicago: Univ. of Chicago Press, 1969), pp. 22–26.

⁹⁰ Alexander Gerschenkron, *Economic Backwardness in Historical Perspective* (Cambridge: Belknap Press of Harvard Univ. Press, 1962), pp. 3–29.

⁹¹ (Elsie C. Parsons, trans.), *The Laws of Imitation* (New York: Henry Holt, 1903), pp. 189–254.

⁹² Schutz, *Collected Papers* (The Hague: Martinus Nijhoff, 1962), I, p. 149; Berger & Luckmann, *The Social Construction of Reality* (Garden City, NY: Doubleday Anchor, 1967), pp. 14–15.

⁹³ Alexander Vucinich, *Science in Russian Culture: A History to 1860* (Stanford: Stanford Univ. Press, 1963), pp. 75–122.

century was still an era of amateur science; advocates of a more intimate relationship between science and society were still few), partly for other reasons, Japan's response was more creative. There, from the start, major emphasis was placed on the universities in which engineering and other applied sciences had a central place. Germany's one-chair rule was set aside; the *Privatdozent* system, lecture fees, and unrestricted student migration were all rejected. Primary emphasis was placed on the systematic importation of existing knowledge, rather than the creation of new knowledge. These decisions were far from a duplication of Germany's experience, where research was always paramount. Instead, they represented a careful calculation of ends and means, and are best considered an innovative response to the problem of technical and scientific backwardness.

Might it not be objected, however, that stating the argument this way makes scientific knowledge and the universities mere adjuncts of political power? And would that not support those who stress the centrality and causal primacy of political values and structures in Japan's modernization? I think not, for this reason: According to Daniel Bell, universities constitute the "axial structures" of any society in which technological innovation is based on scientific knowledge.⁹⁴ While, in his estimation, only the United States of the 1970s has fully achieved this state, Japan's experience in the Meiji-Taisho years was not incommensurable. Government leaders, businessmen, and educators saw the need for massive importations of scientific knowledge; students and professors understood the opportunities its acquisition would give them; and the universities were the marketplace that effected the exchange.

⁹⁴ Bell (n. 80 above), pp. xvi, 25–26.