SCIENCE

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"THE PHYSICIAN OF TO-MORROW"[1]

MEDICINE now justly claims an important place with the other sciences. Phenomenal advance in the physical and biological sciences has revolutionized it and given it a definiteness hitherto lacking. In fact, it may be said that medicine has been born, or at least reborn, in the last quarter century. As a consequence, the new science is not yet oriented to those other forces in human environment and relationship which activate social and economic development.

Further, too, it is impossible to foretell with certainty the place of the medicine of to-morrow. Yet institutions charged with the responsibility of preparing medical practitioners, teachers and administrators for their duties in public medicine and in practise, fail in their obligations even when they furnish their graduates with all the necessary tools, if they neglect to provide proper perspective and to develop adequate capacity for the discriminating test of new methods and the proof of new truths which they will be called upon to adapt to their life work as it unfolds. Above all, these physicians of to-morrow must know humanity as well as human anatomy and physiology. They must be trained in the pathology of social conditions as well as in disease processes. They must be as expert in human relationships as in the habits of man's microscopic foes.

Whilst we recognize our limitations as prophets in forecasting the exact status of public and private medicine a generation

[1] Address delivered by F. F. Wesbrook, M.A., M.D., C.M., LL.D., before the Pacific Division, American Association for the Advancement of Science, San Diego, Calif., August 11, 1916.

in advance, we can feel confident that the evolution will be gradual and logical. The task of preparing our successors is difficult but not hopeless. We have opportunity to observe the trend of our own times and should seek to avoid for the next generation those faults and deficiencies so apparent in our own preparation.

It would seem that the first duty of every national government in respect to medical education and licensure is the collection and publication of accurate comparative statistics of the staffs, facilities, equipments and graduates of all its own institutions as a basis for comparison with each other and with those of other countries.

In the absence of such official information, the Carnegie Foundation for the Advancement of Teaching, a private and unofficial organization, in order to meet its own needs, undertook an international study of these matters and published a report on Medical Education in the United States and Canada in 1910 and a report on Medical Education in Europe in 1912. These reports furnish the first accurate information which permits comparison of the medical institutions in America with each other and with those of Europe.

So far as the United States is concerned, this involuntary and quite unofficial stock-taking has inspired official correction of conditions which it was first necessary for the public to know in order to cure under this democratic system of government.

Fortunately, these reports which were begun in the United States and Canada, have brought together the very material needed by all countries in planning for the future and we may be encouraged by the words of Mr. Flexner with which he begins his first chapter of the Report on Medical Education in Europe, when he says:

> Medical education has only of late deliberately set out to overtake medical practise.

If as a result of his thoroughgoing studies he is able to give us this assurance, we can be satisfied that we are already well on the way.

It is only a few years since the profession of medicine prided itself on the thoroughness with which it had reduced "minding its own business" to a science and the cultivation of aloofness to a fine art. Medicine was "holy ground." We have progressed so far, however, that we are now quite ready to agree with Dr. Pritchett's remarks on the occasion of the dedication of the hospital of the State University of Indiana,[2] June, 1914, when he advanced three main reasons why medical education is a matter upon which the layman has a right to be heard.

Firstly, he holds that medical education is primarily a matter of education and not a matter of medicine, in that it involves premedical as well as medical and graduate instruction and in fact the whole national training system.

Secondly, he cites the layman's own interest, since it is he who is made or marred by the medical profession and he therefore naturally wants to know how the members of the profession are trained. He furthermore has a right to public reports upon the ideals, standards, equipment, teachers and graduates of the various teaching institutions in order to exercise discrimination in the selection of his own physician.

Thirdly, he maintains that the layman is interested in medical education on account of his responsibility in matters of public administration. These involve not only public health work, with the control, suppression and eradication of disease, but the formulation and administration of laws relating to standards of medical education, graduation and licensure.

The protection of the general public as

[2] *Journal of the American Medical Association*, August 22, 1914, p. 648.

well as of physicians against overcrowding in the profession is urged on grounds of economy and efficiency by disinterested experts of education, sociology and public affairs, themselves not members of the medical profession.

Time will not permit us more than a glance at the state of affairs which is set forth in accurate detail in the reports mentioned.

The educational systems, primary, secondary, university and professional of Germany, Austria, France, England, Scotland, the United States and Canada have been carefully studied by Mr. Flexner. Attempt was made by him to measure all countries by the same standards and to analyze the conditions found.

Since the outbreak of this world war it is impossible to get accurate statistics, nor if available would it be possible under present abnormal conditions to judge from them as to the efficiency of the existing training mechanisms nor of the probable adequacy or otherwise of the available supply of physicians throughout the world to meet the demand as it was before the war, or as it will be at the conclusion of the war.

All of our standards have disappeared. Old things have passed away.

It seemed sufficient, therefore, for purposes of this discussion, to take those statistics which were available before the war, realizing, however, that *post bellum* evolution will probably be more accelerated than in *ante bellum* times. The following figures were taken largely from Flexner's reports and from the publications of the American Medical Association's Council on Medical Education.

GERMANY

Germany has only the one agency for the training of physicians, her state universities. Twenty-one universities have been in operation for almost a century. Her training system for all her citizens is continuous. There are no gaps and the state provides that training for each which appears most needed for each.

In an exhaustive article on "Continuation Schools in England and Germany," which appeared in the *Fortnightly Review* of February, 1914, Mr. J. Saxon Mills, a well-known British writer, calls attention to the superiority of the German system over the British system. He asks the pertinent question, "Wherein lies Britain's advantage in maintaining a two-ship power while she permits Germany to maintain a two-school power?" Her complete articulation of teaching and investigation with economic and military development has made her the power she is.

The German child goes to school from the time he is six until he is ten. He then enters the gymnasium, where he remains until he is eighteen. The gymnasium combines our school and university work and gives the old-time classical and humanistic training. Of recent years, the realschule and the realgymnasia have been established, in which the basic sciences are given and the classical and humanistic training correspondingly reduced. An increasing number of prospective medical and technical students are now choosing these latter courses instead of the gymnasium. Roughly speaking, graduation from the gymnasium, realschule or realgymnasium is about equivalent to the completion of our second year in a good American university.

Graduates of these three intermediate institutions are now ready to enter the five-year course in medicine afforded by the universities.

Flexner, who is himself an educationist trained in the humanistic school, realizes the rapid increase in the sum total of essential human knowledge and the consequent need for prolongation of the training

period. He discusses at considerable length the importance of early scientific training at the expense of the classics, and refers to several recent important conferences held in Germany in regard to the matter of a premedical education more scientific and less humanistic.

Five years of medicine and a sixth or hospital year permits the student to graduate at the average age of twenty-four years in Germany and his license is issued after a special examination.

All of the various teaching institutions are governmental and related. Graduation from the gymnasium, the realschule or the realgymnasium, where the examinations are conducted by the officers of those institutions, entitles the student to entrance into the university. Students are permitted to register in the university for classes which they may attend or not. When they have been registered in a particular subject for the requisite length of time, they may appear before the professor for examination. If successful, they are given credit for the subject, which is good at any one of the twenty-one universities.

A seeming weakness in the system is the lack of attention paid to sequence of subjects. A source of real strength, when properly controlled, is the migration of students from institution to institution whereby particular attractions in teachers, equipment, clinical or other opportunities are available to a student with some definite object in mind. The special attention paid to research work has enabled Germany to add her share to the world's medical and scientific knowledge, and in fact, had constituted her the Mecca for graduate work in medicine for the rest of the world. However, certain dangers arise from the undue stressing of research work, in that the undergraduate may come to be regarded by the professor as a necessary evil and only useful when he aids in the researches of the staff. This may be at the expense of his general medical training; in fact, the best medical schools of the United States and Canada were undoubtedly not surpassed in their undergraduate work by the German institutions.

Germany's special excellence was the uniformity of her training and the bringing of the whole profession up to a minimum level, which was for some time above that of any other country.

Some few figures in regard to Germany's supply of available physicians may be of interest. In 1885 Germany's population was 45,458,000. She had at that time 15,674 licensed physicians, or a ratio of 1 to 3,000. Her ratio before the war was about 1 to 1,912, varying from 1 to 637 in Munich to a ratio of 1 to 7,718 in Ortelsburg and other thinly populated districts.

Germany's work in the universities seemed entirely adequate to produce thoroughly equipped physicians of fairly uniform training faster than her population increases. The problem of adding new universities is one which is approached in Germany with great deliberation and careful study of population needs and of the universities already existent.

The facilities of German universities for medical teaching and research are familiar to most of us. Undue optimism, particularly in the United States, in regard to opportunities for medical study in Germany and Austria, had arisen on account of the special opportunities afforded visiting physicians. In many instances, instruction was given in English. Abundant material and opportunity were placed at the disposal of the visitor for a monetary consideration which seemed slight to the man in a hurry. On his return when he cited the opportunities which he had been given as showing the superiority of the German or Austrian medical school it usually suf-

ficed to restore his perspective when he was asked whether the German undergraduate students had shared the same opportunities or not. At once he readjusted his ideas when he realized that these graduate courses were often given at the expense of undergraduate training.

AUSTRIA

In Austria the state dominated in education as in Germany, although the mechanism was not so well developed. Conditions were complicated by the bi-lingual situation which demanded at times duplication of effort and expense without commensurate gain in efficiency.

The output of medical practitioners came from the five medical faculties of those universities where instruction is conducted in German. These did not seem to be sufficient for the work. Vienna particularly was overcrowded and the average enrollment in each of the five medical faculties was 736. Austria's population of 28,000,000 demanded the service of 13,202 physicians, a general ratio of 1 to 2,120. Since 1905 the population had increased about 4 per cent. and the practitioners about 6 per cent. Olmütz had a ratio of 1 to 390, whilst the other extreme was 1 to 5,081 in Carniola.

FRANCE

In France the universities under state administration set the standard of medical education and graduation, although medical schools of three different types were found. There were firstly, the eight university faculties, secondly, the schools "de plein exercise" attached to the hospitals in three cities which lack universities, and thirdly, preparatory schools attached to hospitals in 12 non-university towns. These schools offered courses to cover the first two years of the curriculum. In all three, as in Germany, the government appointed the professors, but from the German point of view, not even the French university faculties were built quite on university lines. The two types of accessory schools mentioned were isolated and lacked support, the state financing the universities and the municipality financing the schools.

The total enrollment of 8,850 medical students in January, 1911, consisted of 7,652 students in university faculties, 557 in schools "de plein exercise" and 570 in the preparatory schools. Paris alone had a registration of 4,101. The French student, like his German brother, was systematically trained, with his object clearly before him, so that his education was systematic and continuous. The medical student must have become a baccalaureat, which is the termination of the Lysée, an intermediate or secondary school comparable to the German gymnasium. He was then compelled to pass a year in the university science faculty in the study of preliminary sciences, which in Germany, Great Britain and Canada are illogically included as a part of the medical curriculum. The baccalaureate course and the certificate covering the study of physics, chemistry and biology issued by the university faculty of science, afforded the credential basis of the medical student in France. The average age of graduation in that country was twenty-three years, inclusive of hospital training.

France seemed to be in advance of other countries in insisting that the basis of medical education should be high and uniform and in addition that it be supplemented by thorough courses in those subjects required in the study of modern medicine.

Between 1881 and 1909 an increase of 30 per cent. occurred in the number of physicians, whilst the population of France increased only 10 per cent. Paris had one physician to 1,126 inhabitants in 1894 and 1 to 767 in 1908. The general statement

may be made that the profession in France, as in all other countries, was overcrowded in the city and undersupplied in the thinly peopled districts, because they failed to offer the inducement of a livelihood. Outside Paris the ratio was 1 to 2,360; in Lozerre it was 1 to 3,221.

ENGLAND AND SCOTLAND

In England premedical and medical education are very different from the German system. The following paragraph from the Carnegie report is of interest:

> In striking contrast with organized and systematized Germany are the conditions surrounding secondary education in England.

Mr. Flexner apparently had not the time at his disposal to enable him to become so thoroughly familiar with the complicated English individualistic plan as with the German systematic scheme, with its central and, from the administrative viewpoint, simpler control. He does not discuss the Scotch system of education, which for the average boy has long been much more easily accessible and systematic than in England. One who knows something of the British system can easily sympathize with the dilemma in which Mr. Flexner, an outsider, found himself. Perhaps one of the most striking examples of complexity is afforded by the relations and inter-relations of the various constituent colleges and departments of Cambridge or Oxford, where traditions, centuries old, often constitute the basis of procedure, private and public. Flexner mentions one instance to show the lack of uniformity of standards when he directs attention to a school whose sixth form admits to Oxford whilst it announces publicly that its fifth form prepares for Birmingham or Durham Universities. He could not understand how universities, even those situated in large cities, compete with secondary schools by conducting elementary classes for matriculation.

England and Scotland have twenty-seven medical schools, which is 29 per cent. more than in Germany, although the population is 40 per cent. less than that of Germany.

Considerable space in the report is devoted to the differences in British standards of admission, graduation and licensure, and the adequacy in general of the British examinations is commended. Mr. Flexner says: "Examination is a national industry; getting examined a national habit." I myself think the British examination is probably the main corrective against the lack of uniformity in standards and methods of premedical and medical teaching. The examination system brings many weaknesses and hardships. The English teacher, through fear of written external examination dare not train his boys, in the words of Sir William Ramsay, "to do something instead of know something."

The variation in the requirements for entrance into medicine in Great Britain is tremendous. The student may begin the study of medicine as a graduate in arts or science, or with mere university matriculation, or even on a level distinctly below that which would be demanded by a university for admission. And yet students from these differing educational levels are to be found side by side in all the London medical schools.

It is unnecessary to go into the details of organization and operation of the various medical teaching mechanisms of the universities, colleges, halls and other such institutions, or into the methods of examination employed by various universities, colleges and other bodies, many of which have not taught the students they examine.

Doubtless it seemed strange to Mr. Flexner to find graduates in arts of the Universities of Cambridge and Oxford, most of whom take their clinical work in the London hospital medical schools, re-

ceiving the same clinical instruction and working with the same ends in view, side by side with students whose premedical equipment, according to his opinion, would not have been too much to expect of an average fifteen-year-old boy. It has seemed strange to all of us, I am sure, why if in the opinion of the British authorities twenty-five years ago, it required a five-year training in medicine to prepare the students for the responsibilities of practise, it should not now require considerably longer time, on account of the tremendous increase in our knowledge of the basic and medical sciences and the clinical branches.

In 1891, there were 29,555 registered physicians in Great Britain, whose population at that time was 38,105,975, or a ratio of 1 to 1,289. In 1907 the ratio had become 1 to 1,107. Edinburgh showed a ratio of 1 to 489; the Yorkshire ratio was 1 to 2,057, if we omit thirty-nine towns of a population of 10,000 or upwards. Of recent years the average annual registration of licensed practitioners showed a decline in an attempt to adjust supply to demand. Had the medical profession realized earlier that medicine was not a thing apart, but only one of society's implements for its own betterment, on its own initiative it would have prepared in advance a scheme for its social and economic adjustment and the revolution of medicine precipitated some time ago by Lloyd George would have come as an evolution under the direction of medical statesmen.

In summary, Flexner discusses professional overcrowding in Europe in the following words:

> The foregoing discussion appears to warrant the following conclusions: overcrowding of the profession takes place in Germany and Austria on a high, university basis, in England and Scotland on a low, proprietary basis.

UNITED STATES

In 1910 the equipments, faculties and facilities for instruction and courses given were reported by the Carnegie Foundation in detail for 148 colleges, with 3,395 professors, 4,637 other instructors and 22,208 students. The Council on Medical Education of the American Medical Association had already been striving for several years by publicity to make known to the people the conditions within the profession, in order to furnish the basis for correction. Naturally, the general public in the United States, as in other countries, had not interested itself very much in medical matters, from which it had been excluded through mistaken policy on the part of the profession. At the time of the beginning of the council's work there were 164 medical colleges in the United States and 178 in all the other countries of the world. In August, 1914, the total number of medical colleges in the United States had been reduced to 107, through the pressure of publicity, whereas the number of medical students had been reduced from the maximum number in 1904 of 28,142 to 16,502. It was high time that this important work was undertaken, since even yet the number of physicians in the United States seemed to be increasing. The number of registered physicians in 1914 was reported as 142,332 and the population as 99,451,000, a ratio of 1 to 693.

At the time the Carnegie Report for the United States and Canada was published, I am convinced that the best undergraduate medical schools in the world were to be found in the United States, as also the worst. Dr. Pritchett, president of the Carnegie Foundation, in one of his comments says:

> Faults of one sort or another may indeed be found in the medical schools of England, Scotland,

France, Germany and Austria, but scandals in medical education exist in America alone.

He also said:

If the lowest terms upon which a medical school can exist abroad were applied to America, three fourths of our existing schools would be closed at once. And, let me add, the remaining fourth would be easily and entirely adequate to our need.

The Carnegie Report was unsparing in its denunciation of dishonesty and disparaged incompetence. Whilst frank in criticism of the best institutions, it did not fail to encourage good features whenever and wherever presented. The very criticism was constructive.

The publication of annual reports by the Council on Medical Education of the American Medical Association, grading the medical schools into several classes, has had a far-reaching effect.

But it is seen that action was not initiated by the national or state official or governmental machinery, but followed all too slowly on the heels of the tremendous effort at professional house-cleaning begun by the American Medical Association. This movement was extended by the Association of American Medical Colleges and internationalized on an economic and social basis by the Carnegie Foundation, all three organizations cooperating to bring about the much-needed reforms.

The Council on Medical Education of the American Medical Association reports annually the result of all the license examinations conducted in each state by the state boards in tabular form so that the percentage mortality from each medical college is shown. This Council and the Association of American Medical Colleges cooperate in the inspection of all colleges, particularly the doubtful ones and both by private helpful suggestion and by public criticism are putting the moribund institutions to a painless end and encouraging those for which there is hope as well as need. Their work could be done far more efficiently, however, by an official federal board.

There is an increasing tendency in the middle and western states towards strengthening state universities which seems inevitable if education is to be regarded as a state function at all. Medicine as a quasi-public profession, which is becoming every day more important in the social-service machinery of the state, must look to the state for its training, which is now so costly.

CANADA

Canada, too, has had and still has her problems in medical education. The Carnegie Report being American born, has not dealt as fully with Canada as with the United States, nor has it ventured so far into criticism, constructive or destructive, as in the case of American institutions.

The Carnegie Report shows that in 1910 there were 6,736 licensed physicians in Canada, her population being 6,945,228, the ratio being 1 to 1,030. The statistics for Canada and Newfoundland for 1912 show a registration of 7,278 physicians, which in 1914 was reported as 7,577, the increase being much greater than the population requirement.

The congestion promised to be even greater before the war. To the eight medical schools a ninth has been added in Alberta. In 1914 there were 2,001 medical students registered in Canada, whilst in the United States there were 16,502, or only eight times as many, although the population was more than thirteen times as great.

It is surely time for the public to know what the profession has long felt, namely, that we do not need *more* but *better* doctors. If Flexner, after careful study of conditions within and without the profession, regarded it as highly overcrowded in

Germany where there was an average of 1 physician to each 1,900 of population, he certainly was justified in believing that the United States had reached an unstable condition of affairs, since her ratio is 1 to 693, showing nearly three times as much overcrowding as in Germany and nearly twice as much as in Great Britain. Canada, before the war, was more overcrowded than any other country except the United States, her ratio being 1 to 984. As judged by the overwhelmingly large number of registered medical students, she bade fair in the near future to outstrip our neighbor.

Probably, however, the vast spaces of Canada require and will continue to require more medical men per unit of population than the older countries, particularly if she is to cure herself of that world-wide infection whose pathognomonic sign is "let the other man produce," and whose final stages are rural atrophy and urban hypertrophy.

In adapting supply to demand, the medical profession must not only continue to heal and prevent, to practise and to preach, but will be compelled to understand and to help solve those problems which are born of poverty and crime as a consequence of their relations with disease.

Specialization will be increasingly necessary to enable the individual physician to keep up with advance in knowledge. Postgraduate study in a system of continuation schools will be imperative and each state or provincial university will be shirking its duty if it does not cooperate with every other existing local agency in fostering and developing all available facilities.

With specialization comes inevitable demand for cooperation of the specialists and the group system may be expected to replace individualism. The splendid plan evolved by the Mayos, adapted to various environmental requirements, shorn of weaknesses and moulded on an increasingly public and decreasingly corporational basis, will spread. Contract work of groups on a public-service basis seems inevitable if the health and well-being of individuals is to be, as it must be, a matter of public concern and fundamental to national efficiency. The rural and sparsely settled districts need the best, not the worst, medical services and can not be ignored. This means increased importance of public medicine and expenditure of the funds of the wealthier districts through governmental administrative channels for their protection against the neglect or disabilities of the poorer districts, just as is now the case in educational expenditures. We must level up and not down, for we are indeed our brothers' keepers.

In the great influx of foreign population which may be expected on the cessation of the war, it is presumed that foreign physicians will also be amongst the newcomers. Rapid transit, ease of communication and all other annihilators of space conspire to make medicine, like commerce, international.

For these reasons and also because of the lessons to be learned I have ventured to direct your attention to a few of the conditions surrounding medical education in certain European countries.

In the Canadianizing and Americanizing of the millions of people whom we expect to come to us, we must have definite standards and we ourselves must expect changes in our existing standards and ideals, if we are to profit by the best which the newcomers bring us, eliminating our own worst features and placing a prohibitive tariff on theirs.

Of design, I have stressed the consideration of American conditions. The United States had at one time perhaps the worst medical training in the world and also the

best undergraduate medical teaching in its institutions. So she represented the two extremes.

As a result of publicity, the best schools have seized the psychological moment to improve themselves. The very worst schools are no longer existent. The United States availed itself of short cuts impossible to the older countries. It is therefore the part of wisdom for Canada to learn what can be gleaned from your recent wholesale changes, which are nation wide.

Our new country can save herself scores of years, and the pain and mutilation of those capital operations required in the older countries may be avoided by the exercise of care and foresight in this stage of her development.

A recent statement by Professor Adami, of McGill University, on the occasion of the inauguration of the president of Manitoba University, was startling, coming as it did from one who was born and trained in Great Britain and who has become the medical Nestor of Canada and the medical philosopher of this continent. In his address on medical research he called attention in detail to the advance of medical investigation and research throughout the world and laid emphasis upon recent developments in America, and perhaps on account of his innate modesty, particularly in the United States. He said:

> The center of medical research and education is moving rapidly westward and is now on this side of the Atlantic Ocean.

In view of our free hand and the twentieth-century tools available, we shall be wise to approach our task with care. That task can not be undertaken from a purely medical standpoint. There is no such thing. It must comprise a general educational betterment, a national, in fact a world program. We must adjust our public educational institutions so that the boys and girls are trained for practical affairs without loss of cultural and esthetic values. It is, after all, the manner of the teaching and the study as also the character and timber of the teacher and pupil which make for culture and efficiency. Knowledge is none the less scientific because of its possible application nor less cultural if useful. Our primary schools must be continuous with the high schools. Industrial schools must be established and the demands of agriculture can not be evaded. All of these must articulate with each other and with the university, so that at whatever point the pupil may be required to go out into his life's work, he may be as fit as he can be made in the time spent in fitting.

Continuation schools which cooperate with the public school system on the one hand and with the line of industry, commerce or professional work chosen by the pupil on the other must be provided, so that education becomes continuous for life and not a passing phase.

Systematic graduate work is just as necessary in order to keep medicine, law, theology, agriculture, commerce, journalism and the other professions in touch with the newer developments as is undergraduate training. University extension work which enters into all the activities of the people is growing in Great Britain and has been organized in many of the states of the union. Dr. Pritchett's statement is pertinent. He says:

> Education in any nation is one thing, not a series of separate and unrelated things.

Suitable exits from the educational system must be provided into the walks of life as well as into university courses and industrial schools. Studies in language on the whole should be begun earlier and continued longer, so that the student may be in a position to get some reward from his struggles with the dictionary and grammar

through an insight into literature and history. At the same time this would free the boys for studies in the basic sciences and the girls for similar studies and work in household economics and home-making and such other practical work as begins to appeal to them in the last years of high school.

In medicine the basic sciences begun in the high school should be continued in the university and constitute the chief object of the first two years' university training, which should be required for entrance into medicine. The studies should probably include, judging by your own observations on modern trends, physics, chemistry, biology and a reading knowledge of German or French, whilst advantage should be taken of the elective system to choose work in economics, sociology and human relationships, including the obligation as well as the rights of the ordinary citizen. Psychology should be available either here or as an elective in medicine after the foundation has been laid in the anatomy, physiology and pathology of the nervous system.

Considerable discussion has arisen over the demand of some American universities of the bachelor's degree in arts or science as a prerequisite for medicine. Harvard and Hopkins were the leaders and certain other universities have followed. However desirable it might be to medical students to take a previous arts or science degree, we must not forget that the rapid accumulation of knowledge concerning the science and art of medicine calls for a lengthening rather than a shortening of the medical course itself. Even with the increase in longevity which we fondly expect, we have to recognize that there is a limit to the formal training period. We must be practical and can not expect to spend longer time in training than the prospective doctor expects to spend in practise.

There is some sentiment for the inclusion of the so-called medical sciences, anatomy, physiology, pathology and bacteriology, with the arts or sciences in the university rather than in the medical college. This view is debatable. In any event, on the conclusion of the two years of work in the university preliminary to entering into medicine, plus the two years' work in anatomy, physiology, biology, chemistry, bacteriology, pathology, etc., the student is deserving of a bachelor's degree in science. Even should he discontinue his medical studies at this point, he has completed a course which fits him for work in many other directions and which has as great cultural and scientific value as many others which he might select for a science or arts degree.

Certain of the Canadian universities and some of the American, such as Minnesota, grant the B.A. degree to those who have completed three years in arts, inclusive of the sciences, modern language, etc., when the students have completed the first year's work in anatomy, physiology, bacteriology, etc. Such a course is to be recommended for the young man or woman who has the time or inclination for it.

In passing from one year to the next, certain students, deficient through illness, lack of application or other causes, may be saved the loss of a whole year by providing summer or vacation courses. These are very useful too, for migrants from other colleges, whose curricula are not identical with that of the new institution. On the whole, the best and most economic plan has been devised at the University of Chicago with the four-quarter plan, whereby the university is in continuous session. Modern economic efficiency demands that expensive plant and equipment be used to their fullest capacity. The human element, *i. e.*, staff and students, alone require rest.

In regard to the training of the clinical

years, the present trend is toward full-time clinicians, as it has been toward full-time laboratory men for the medical sciences, thus placing the whole university mechanism on a university footing. Johns Hopkins University has been the leader in this as in many other phases of medical teaching. Medicine, surgery and pediatrics have been placed on a full-time basis and the professors are not allowed to engage in private practise. Pay patients may be treated by them in Johns Hopkins Hospital, the fees going to the support of the hospital, the professors being entirely dependent upon their salaries or private incomes. This is the most drastic step taken by any university in the world, not excluding Germany. Meanwhile the world looks on and if it is wise, reserves judgment.

Dr. S. J. Meltzer, of the Rockefeller Institute, in Science for October 30, 1914, has a most interesting and important article on "Headship and Organization of Medical Departments of First Class Medicl Schools." He proposes to attain the ideal not by revolutionary steps because he says "Accelerated evolution gives better and safer results than revolution." For the clinical chair he proposes:

1. A head for this position, for whom the position should be his main occupation;

2. Two, three or more paid scientific assistants, for whom this position should also be their chief occupation;

3. Several professors and associate professors, etc., for whom these positions will be secondary occupations, their chief occupation being their private consultation or family practise. Some of these may receive moderate salaries;

4. An unlimited amount of unpaid volunteer assistants.

He thinks that all these positions should be appointments limited to varying periods of years.

He thinks the head should give about eight hours a day to his main calling and that they should be his fresh hours, say from 8 A.M. to 4 P.M. After these hours he may do with his time as he pleases. "But he should have no private patients in the hospital in the department of which he is the head."

Proper clinical teaching is only possible if teaching institutions own or completely control hospitals which are ready to discharge their double function. This double function involves the care of the patients of to-day and, not less important, the better care of the patients of to-morrow through teaching and research. Hospitals should not be simply boarding houses for the sick but institutions for research, study and teaching. Fortunately both these ends, viz., care of patient and teaching, are best served by the same plan.

The best results are obtained where the university owns its own hospital which is conducted primarily as a teaching and research institution. This safeguards at the same time the best interests of the patient. By arrangement with municipal and other public bodies, university medical schools may assume sole responsibility for the professional conduct of municipal or semi-private hospitals, guaranteeing the best possible service, but such hospitals can not easily be made integral parts of the teaching plant of a university. They should be accessory. Provinces and states will find the truest financial economy in coordinating their state universities with state hospitals and other state institutions of all kinds. Around the state university may be grouped the state hospital for the care of medical, surgical, obstetrical and special cases; one or more of the state institutions for the cure of tuberculosis and the care of the incurable, and a state receiving department for the observation and classification

of acute mental cases preliminary to assignment to the state institutions for the insane. All of these institutions, including correctional and charitable organizations as well, should be mutually related to each other and to the university, so that the experts of each may be available for all.

The governmental public-health mechanism should take advantage of the university experts in investigational and research work for legislative and administrative control. This is applicable also to other departments of the government. The university activities should be limited, however, to teaching, investigation and research and should stop short of legislation, administration and police control.

It seems certain that we can not compress the training of the physician of tomorrow into less than a four-year high-school course, plus two years of university work which shall include the basic sciences and a modern language, plus two years of medical science, and two years of clinical instruction, followed by a compulsory year in an approved hospital in interne service. Minnesota was the first school in the United States to take this step. At the conclusion of such training, the student should emerge with his arts or science degree and the medical degree.

We are now confronted with the matter of licensure, the ultimate safeguard which the public should demand for its own protection in addition to the standards of teaching which it enforces in its own provincial or state universities. A federal licensing board is best. It, like all licensing boards, however, should provide searching practical examinations in addition to written and oral tests.

The examination conducted by many of the state medical licensing boards is farcical in the extreme. The appointments are given all too frequently for political or personal reasons to men who are unfitted by natural aptitude, training or temperament for this exacting work. The United States might well take a leaf from Great Britain's book with respect to the conduct of examinations for licensure, whilst the latter might follow, with profit, the example set by this country in the matter of improvement in medical teaching.

Such boards should demand, as a minimum the amount of training specified above. The constitution of the board is a matter which requires careful thought. In the long run, I am convinced that the responsibility for its personnel should be placed upon the government and not upon the profession. If we are to avoid the public and private suspicion that the medical profession is a sort of trades union, the appointments should be made by the government. If our system of government is sound, this is the logical step. If not, our government needs change and we, as citizens, have been neglecting our duty. The prime consideration is that the standards of medical teaching and medical licensure are for the protection of the public and not for the protection of the profession. Licensing boards must take account of the teaching institutions in their own and other countries, and some governmental, in fact international, clearing-house arrangement be made for the careful inspection and accurate report to all the world regarding the facilities, equipment and standards which exist in all countries. A state or province or country can protect itself best from undesirable additions to its medical profession from other communities and other countries by insisting upon one standard for all.

In view of the present trend towards the socialization of medicine and the increasing importance of public health, together with the over-supply of physicians, immediate attention should be paid to the training of public-health workers and the development of adequate public-health machin-

ery, which provides work, pay and authority commensurate with the responsibilities which the workers are expected to assume. It means training in the sciences fundamental to medicine, in diagnosis and in certain branches of sociology, law, economics, engineering, etc., and can not be undertaken in a medical school but in a university which has full faculties and in a state or province where all public institutions are coordinated and work in cooperation.

The history of Johns Hopkins Medical School is significant. Medical teaching there grew out of the graduate medical teaching which had developed in the hospital.

Our faces are turned toward public medicine. If the profession accepts this as inevitable and also desirable and the public realizes its opportunity and responsibility, the change may be brought about as an evolution, rather than as a revolution. Instead of developing more medical schools to meet a demand which does not exist, society should unite in strengthening those which have shown a progressive spirit and some realization of the medicine of to-morrow. The rational evolution of the medical school would be the development at universities which are adequately equipped, of schools of public health in which all of the faculties of the university participate. It simply means the re-grouping of certain existing university departments as a committee under the name of a "School of Public Health." New universities have a particularly good opportunity in the foundation of such schools to help orient some of the medical graduates, who have failed in practise to adapt themselves to present conditions.

Our overcrowded profession has in it many men who would welcome the opportunity to secure freedom from the commercial aspects of practise. Many are better fitted for public service than for private practise. Such men could be trained by such a mechanism, for certain phases of public health administration. Others, for their own sake and the sake of humanity should receive further training in the practise of medicine and others should be excluded from the profession for which they are unfitted, or have failed to fit themselves. It would be some time before *all* of the present graduates in medicine could be intelligently utilized. When the demand has caught up with the supply and new medical schools are required, they will naturally evolve from such graduate schools, in this case of public health, instead of as the Hopkins did from a graduate medical school. Such public health schools would inevitably become more specialized and if private practise, as we have known it, persists, it could be logically related to and become the natural outgrowth from such public-health colleges.

Our profession has to play the part of social pioneer in demonstrating the inevitability of specialization and the need of cooperation between and coordination of specialists. We have not realized, however, that all of the workers in the medical field do not require and should not receive the same training. The public has long recognized that a short course of three or four months is insufficient for the training of specialists and there is an increasing interest within and without the profession in the development of adequate facilities for graduate training of those who desire to enter a particular medical field, *i. e.*, to become specialists. If an additional training period of two or three years is required for such a purpose in addition to the six to eight years required now by various medical schools and licensing boards, it is clear that great expenditure of time and money is demanded of the would-be specialist and he has a right to expect a fair return on his investment. Will anything less than

free opportunities for training and the entire taking over of medicine by governmental mechanisms, solve these difficulties, is a question which many are asking.

It seems that it would be most easily possible to coordinate the different elements in medicine in groups on a governmental, rather than a corporation basis.

It is necessary to provide each community, no matter how remote, with a group of trained medical men in which each special field is covered and the work of each properly related to the others.

The general practitioner and the family doctor seem doomed to disappear. No single individual can hope to keep abreast of new knowledge in all branches. Such a plan is for the best interests of the individual, the public and the doctor, and is in line with the trend of the times, which seeks to make of each citizen an expert in an increasingly circumscribed field. An agreement could easily be made whereby each member of the group in turn could get away to some of the continuation schools to bring himself abreast of the latest advances in his chosen work and carry back inspiration to his colleagues.

Whether this group system is a part of a municipally or a state or a nationally controlled mechanism can not be foreseen. Whether it will evolve through a corporational or state health insurance can not be foretold. Life insurance companies, railway and mining corporations and other similar organizations are drifting into makeshift arrangements which have these objects in view. In any event commercial concerns are realizing a little of the huge tax on the world of sickness, and the increasing load which the well assume in caring for the state dependents.

If medical school inspection is such a good thing, why should it not be extended to embrace society as a whole?

As this group system develops, it will be found that all the members of a group so constituted will not require the same training nor will some of the individuals require to be trained as long as certain others. For instance, all might have the same basic training, and employment could be found under competent supervision for those with the minimum training until such time as they had opportunity to demonstrate aptitudes. They could then be returned for certain formal training to graduate institutions so as to fit them for the new line to which they aspire and for which they have shown capacity. This would be a sort of continuation school in medicine whereby the original medical science instruction in laboratory, in clinical and in various public health phases could all be related to each other and to practise.

No one of us can see clearly the outcome. He sees indications of a coming change and, in many instances, instead of adapting and preparing himself for such changes, resents them. Here is an opportunity for medical leadership. The public has been aroused. We must not fail to rise to the opportunity and meet the obligation.

The abolition of sectarian ethics and the adoption of one brand, based on the Golden Rule, will cure many of the ills of humanity. In passing, we may ask ourselves why we should have one standard of personal ethics, another for professional and business purposes and yet another for political ends. Why, when owing to specialization, each group becomes increasingly differentiated from other groups of workers and at the same time increasingly dependent upon them, should the members of a group so often stand by their fellows in that group against the best interests of all the groups? That medical men have stood together, quite often against the best interests of other social groups, has estranged and insulated them to such an extent that they

have lost individual and collective power in their attempts at the solution of the problems of society. This has, at the same time, been to their economic disadvantage.

Medicine is founded on the highest ideals which inspire human action. Its traditions are of the noblest. The relation of the patient to his physician is sacred. Nearly every individual looks upon some member of the profession as almost divine. Yet the public, which is composed of just such individuals, has been suspicious of the profession which has in it many hundreds of just such physicians. We realize that in order to cure, as well as to prevent disease, it is necessary to deal with humanity one at a time. Yet to-day we are facing, as never before, the problem of harmonizing the individual's obligations and rights with collective needs and mass efficiency.

The greatest asset of the individual, as of the mass, is physical efficiency. Yet we can not solve our present problems in terms of the medicine of the past. The physician's problem, as it involves himself and others, is not medical alone, or economic alone, but social. We physicians have to return to the ideal of our fathers in medicine, which is that of service. We must go on in our search for new means of preventing and curing disease. We must employ these means for the benefit of humanity. In our interest in the details of this work, we must not lose sight of the increased complexities of those whom we seek to serve. We must either adapt ourselves and our profession to the ever-increasing needs of humanity, or expect that they will be adapted for us by others, who are less sympathetic with our traditions and aims. We must not stand aloof. We must develop leadership within the profession, which is only possible to those who understand the spiritual, intellectual, social and economic needs and problems of those whom they may seek to serve as well as they do their physical ills.

The day for American leadership has dawned. If she realizes it she may go further than any other country has yet been able to go, and one of her greatest opportunities is in the orientation of medicine with other social forces.

To her is proffered the honor of gaining universal recognition of medicine as the highest calling whose motto is "I serve." Will she accept it? Has her medical profession the needed vision and strength? Will her people receive such leadership kindly?

The agony which the world is enduring will have been suffered in vain if we can not learn how to develop the best that is in each of us for the advantage of all. Is not the world at war to determine whether the greatest right of every man is that of serving others, or of being served? We are now adjusting our perspective of obligation on the background of individual right.

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DEDICATION OF THE NEW MUSEUM BUILDING OF THE CALIFORNIA ACADEMY OF SCIENCES

The dedication of the new museum building of the California Academy of Sciences and the formal opening of the museum to the public occurred on Friday afternoon, September 22. The dedicatory exercises were held in the California Mammal room, a hall 180 feet long by 60 feet wide.

Mr. C. E. Grunsky, the president of the academy, presided. The invocation was by the Right Reverend William Ford Nichols, bishop of California. Brief addresses were made by the following: Mr. William H. Crocker, president of the board of trustees; Mr. C. E. Grunsky, president of the academy; Mr. Edward Rainey, for the mayor; Mr. George Haviland Barron, curator of the Memorial