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THE CHALLENGE OF THE FUTURE TO MEDICAL EDUCATION[1]

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I

WE meet to-day to mark the completion of a century of developing medical education in this commonwealth, to remember with respect and gratitude those who had a notable part in its growth, to appraise the fruits of progress and to look forward, as prophetically as we may, to the future.

Last night we had a spirited and eloquent outline of the heritage of this state in medical education. The line runs far back into the great sources of modern medicine in London and Edinburgh, and has come down through generation after generation of worthy and able men. The central thread of high idealism has held firm, and decade after decade has shown growth and vigor. That I was privileged to touch intimately the lives of some of these men—Starling Loving and Francis Landacre—will always be a treasured memory. To these and all the noble pioneers of medicine in this region we owe a lasting debt. Let us say of them, in the words of the son of Sirach, "They gave their counsel with understanding, and were wise in their words of instruction. All these were honored in their generation, and were a glory in their day. There are some who have left a name, so that men declare their praise; and there are some who have no memorial, . . . yet these were

[1] Address given on March 2, 1934, as the special University Convocation, on the occasion of the centenary celebration of the College of Medicine, of the Ohio State University.

merciful men, and their uprightness has not been forgotten."

At such a time as this, it is prudent to look forward as well as backward, trying to see something of the country through which the stream of our common life and work is to carry us. A good deal of the landscape is hidden around the bends of a winding course; but we owe it to our safety to look ahead, for the current is running faster and faster, the surface is rougher than it used to be, and the hazards of the passage multiply as we sweep on.

During the past hundred years or so a series of new events has come into the collective experience of mankind in such sort and degree that for most of the practical setting and circumstance of life the old earth has passed away, and a novel, somewhat baffling world has become our troubled home. These changes have occurred at different times and have moulded social structures in differing ways; some of them were beginning to operate a century ago, in the dawn of the industrial era; others are more recent and therefore more disturbing. Any reading of the days and years ahead must be done in the light of these happenings and must take into account, no less, the fact that never before in history has humankind faced together problems so perplexing and knotty as those we must struggle with to-day. The things that have brought about the new order may be roughly summarized in some such fashion as this:

The expansion of control over physical environment. One needs not to debate this point; it is only to be stated. The growth of speed, the partial blotting out of time and space, artificial changes in the vegetation of the world, in climate, in the productivity of land; all these are silent witnesses to the tightening grip we hold upon the treasure and substance of nature. As the century has rolled around, the enlargement of this dominion through man's skill and knowledge has had other issues.

Of these, the expansion of population is an indirect result. Within the past two hundred years the number of people in the world has doubled; empty lands have been taken up; conquests of new territory have been made. We come now near to the point of populational saturation. In most if not all of the countries of Europe there is to-day little change in the number of inhabitants, and it is estimated that in the United States our birth rate and death rate will reach a balance in the year 1960 or thereabouts. Even now the pendulum is slowing, and society is beginning to feel the anxiety of a new situation for which it is unprepared. The question of population will be an important item in any guess about the future of medicine and education in this country, and to this question we must return presently.

The expansion of power and productiveness that has come out of the creative imagination of men during the past few generations suggests the Arabic fable of the djinn, who, when he escaped from the bottle that had been his prison for ages, amazed and terrified the unhappy mortal whom he was bound to serve. The recent leap in the production of all-but-unlimited power, the vast output of goods, the replacement of men by machines—all this that seems to be the blessing of prosperity and enterprise turns out to have a dubious, indeed, a dangerous aspect.

For while the things I have listed are properly to be counted as desirable assets of world culture, the liabilities are not to be forgotten:

(1) The lag of social forces, the tardiness of ethical insight and practise. Something is missing in a sequence that seems logical enough; if great reservoirs of energy have been tapped and their power harnessed to the creation of huge stores of food and clothing and shelter; if we know how to make time dwindle and to shrink space, if we can move mountains—not, alas, by faith but by thunderbolts and chemistry, why are so many millions of men in idleness and want, instead of being, as one might reasonably suppose, in leisure and well-being? Apparently no one knows the answer, even dimly, to a problem so far-reaching, so intricate and obscure; but it is evident that certain things have failed to happen. The new environment has not produced a new society, for the individual units of society have not altered to keep pace with a changing world. Wisdom and charity have loitered behind skill and inventiveness; the ferment of moral idealism has gone meager and watery. Great things that might forward the happiness and contentment of mankind as a whole have been held back by blind self-interest or by still more sordid urges.

(2) The incredible disaster of a war which beggared the world not only of its goods, but of its infinitely precious store of human lives and beliefs. In large part, certainly, the dislocations of government, of commerce, industry and distribution, of markets, exchange and trade, are the price of that unbelievable folly, no less than the ceaseless threat of residual fear and hatred. No optimism can dispel the shadow of a calamity that darkens the happiness and welfare of our children's children, and from beneath that shadow we must view the future.

II

All this may seem to be a cosmic approach to a petty piece of business. Medical education is concerned only with a few thousand young men and women, together with a handful of those who are charged with preparing them for professional life.

There are several reasons, however, why one looks at the changing order of the world as a whole in order to prophesy in part. In the first place, the

problems and products of medical education are closely knit to medical practise, and through it to the thoughts and interests of society at large. The primary business of medical training is to equip physicians who will look after sick people intelligently and effectively, and between whiles do what they can to forestall illness. I scarcely need to remind such an audience as this of the marked alterations that are taking place in the forms of medical and nursing service, or of the extent to which the public has been troubled about their availability and cost. There lies back of this growing interest a long process of patient education by a multitude of agencies. Organized medicine, be it said to its credit, has done much in this direction; local, state and federal governments have worked and interworked through schools, public health services, children's bureaus, hospitals and scores of other units, to fix in people's minds such things as the importance of physical well-being, why and when a doctor should be called, common sense about diet and sunshine and temperance in all things. Frankly commercial advertising has played no small part in this form of education, taking particular advantage of radio broadcasting. The result, far as it is from being satisfying, shows an amount of mass thinking in the field of constructive health that could not have been dreamed of a generation or two ago. This is particularly apparent as applied to the rearing and care of children. The general consequence is that there is a fast enlarging body of well-informed people who know a great deal more about what they require in the way of medical guidance than their parents did, and who will be much more discerning in their claims upon the doctor. Such changes in current thought and attitude come about gradually and almost insensibly, but they are real, and sink deep into our social consciousness. A new sort of clientele is emerging for the physician of the future, and our society is thinking about medicine as it never thought before. It is not alone that folk are getting different notions and that the reach of education is wider (particularly in the last twenty years), but that physical environment is altering greatly; hard roads, fast cars, the rapid sophistication of small towns, the disappearance of frontier life, all tend to create new circumstances which will have to be met by the young doctor with all the social and intellectual pliability at his command.

In the second place, the approaching limit of population will modify not only the output of medical graduates, but will tend to change very definitely the nature of medical service. There are going to be fewer children born, and fewer will die in childhood. The babies that do appear will be important to society out of all proportion to their numbers. Problems of nutrition and infectious disease in the young, and of degenerative diseases in the old, are likely to be the focus of the medical practitioner's concern after a generation or two.

But there is something else to be weighed. The biological sciences have not yet discharged their full debt to progress. We look with satisfaction at the widening borders of medical knowledge; it is easy to become complacent about the rapid advances of our science, about the conquest of preventable diseases and the lengthening span of life. But look at the other side of the shield. More than half of the institutional beds in the United States are now permanently occupied by individuals who are gross biological deficits, as far as society is concerned. The burden of financial care for these dependents is slowly but surely strangling the productive fraction of society that pays for their maintenance. For the time being we look upon this as another uncomfortable burr of taxation under the saddle that the solid citizen wears, but in the end, of course, it is basically a problem of human biology, which must be solved either by the calm wisdom of foresight or under the pressure of despair. The planning of a population made as free from the menace of biological incompetents as our tested knowledge can make it lies far ahead, perhaps, but in that direction a step will be taken one day that will endow our race with unimagined powers and opportunities.

Other great areas have yet to be illuminated; we are still frustrated by diseases that take their toll from the later years of life, and their study must concern us more and more; the place of psychic stress not only in functional ailments but in organic disorders needs further exploration. Psychiatry must have a new meaning for the physician. The problems of human disease must be approached, also, by methods involving higher refinements of measurement, by quantitative and precise procedure rather than by the gross or qualitative ones now in use.

These are random samples of scientific trends and social requirements that will demand from the doctor of the future skill and techniques and imagination beyond our present capacity. It is enough for my purpose to indicate these needs and to point out again that the medical problems of the future will be of social rather than individual concern, and will have to do with maintenance rather than with repair. I do not mean that the doctor is likely to be remote from his patient in any degree, but I do mean that medical service is coming more and more to be a function of society and to be untilized purposefully for the needs and aims of the community as a unit. Whatever one thinks or fears about the socialization of medicine and its perils, the actual facts should be philosophically faced. There is not going to be any

disappearance, I feel sure, of the private practise of medicine, but it may be much more limited than is now the case, when we come to the point of making available to every one needing it the best quality of medical care.

In summary, the elements of change in applied medical science to which I direct your attention are these: (1) An altering attitude of society toward its medical needs; (2) a population nearing stabilization, with low birth and death rates; (3) deviations in the occurrence and nature of the commoner diseases; (4) progressive urbanization of town and country.

III

The aim of medical education, I have suggested, is basically the preparation of young people who can care for the sick with intelligence and skill. In the light of a rapid shifting of the social order which has just been sketched, however, there is more to be said about the training of these young doctors. Country life, we agree, is all but gone; people are leading essentially a city and suburban existence; except for minor areas scantily inhabited, there are no medically inaccessible spots in this country. Our population is gradually but perceptibly slowing to a balance. If one takes these facts into account, and studies the present acute problems of the practitioner, there is no escape from the conclusion that more doctors of medicine are being turned out than society needs or can comfortably reward. The situation is perturbing enough now; the shrinkage of savings during these bad times has been disastrous for the physician, because it is from this margin, generally speaking, that he is paid, and when that disappears he gets little or nothing. Even with a moderate revival of business, if population settles gradually to a balance (as it certainly will), and if the stream of incoming practitioners is larger every year (as seems likely), there is no relief in sight. The time is coming, however, when it will be plain to every one that the principal functions of medical service can be effectively furnished by half the number of medical graduates we now have. Here is the first problem of the new day of medicine—the wise selection of fewer students.

There appears to be a wide-spread notion that to close educational doors of any kind to ambitious youth is undemocratic and un-American; that if a young man wants to study medicine and can pass the usual examinations he should be free to do so. I hazard a guess that the future will show this to be unsound doctrine and that the truly democratic process will be to take more thought about the good of the whole, and less about the special satisfaction of the few. Our present system not only opens the responsibilities of medical service to a larger number than can support themselves properly, but to many who have not the basic qualifications for the study and practise of medicine. I contrast basic qualifications with formal eligibility, which is our ordinary yardstick. How many credits has the candidate? What courses has he had in languages, chemistry, physics, zoology? What is the weighted average of his grades? Let us not sniff at these questions. They are important, but they are not fundamental. It is much more to our purpose to know that the prospective medical student has an alert, smooth-working, imaginative mind, that he has physical vitality to endure heavy strains and still be able to communicate to others a sense of reserve power, that he has morals—not in a flabby nor pietistic sense, but in the meaning that he has a grip on intellectual honesty, integrity, perseverance, loyalty, devotion, insight—all those imponderables that go to make up a noble personality. Is he to be the kind of person who can deal effectively with sick lives as well as damaged organs or impaired physiology? For the time being we are balked in determining fitness upon these hopeful bases, partly because they do not lend themselves to measurement or comparison, and partly because in young natures, not wholly mature, such qualities may be hidden rather than evident.

What systems of selection will be found to fit the need I do not know, but their discovery is one of the conditions of progress. Just as society must protect itself in the future by enlightened means from those who are grossly unfit biologically, so must the door to the practise of medicine be closed to the stupid and venal, and opened to fewer men and women than it has been in the past—not to create a monopoly for the elect, but to relate the workers rightly to the work that is to be done. To those who say that this proposal sounds undemocratic and unworkable it is fair to retort that it operates successfully now in one of the enlightened democracies of Europe. But, however desirable such a regulation may be, we shall have to admit that it will be hard to achieve in this country because of prevalent ideas of the place of advanced education in our form of polity, and because of the lack of power in the federal government with respect to medical affairs.

IV

I suggest the studied sifting of prospective medical graduates and a reduction of their number in proportion to the general population as the most important forward movement of medical education. It is not that medical students of the highest types are not already in our schools; they are, but there are still too many whose performance will never come up to the needs and expectations of society and who will be a constant drag upon their abler colleagues.

Let us turn to another deficit of medical education which the golden future may find a way to supply. The physician of tradition was a man of learning; the educational drift of to-day tends to produce men of skill and highly specific knowledge. It goes without saying that technical skill is essential, but it is not enough. The practitioner of medicine must know not only diagnosis, but men; he must be in the highest sense of the words a man of the world, leading a life enriched by close touch with the interests and affairs of humanity. The eager and questioning minds that are to be called into medical practise in the days ahead are going to be responsive to this need, and in some way the vitamins of a more varied learning, so necessary to growth, are going to be added to the monotonous intellectual diet of science on which the premedical student is chiefly nourished to-day.

The expression of a parallel need in the program of professional preparation is to be found in the painstaking studies of the Commission on Medical Education. After discussing the factors that have been altering medical practise so greatly within the past generation, the report goes on to say that without attempting "a prediction of the form that medicine will assume in the future" the commission feels it to be "apparent that conditions of practise to-day are different from those of the past, and are likely to be different in the future." It is important, therefore, "inasmuch as medical education is primarily concerned with the qualification and preparation of students to practise medicine, that the training be permeated with an understanding of the larger social and economic problems with which medicine must deal, and which are likely to influence the form and opportunities of practise in the future. . . ." "The preparation of students for the newer obligations of the profession requires a sound training in the principles of the basic sciences which are likely to remain the foundation of medical practice; . . . the training should emphasize, however, that the forms and methods by which these principles are to be applied in meeting the needs of individuals and the community are likely to be modified in the future." These needs and the responsibilities of practise have already changed materially "not only in regard to technical matters, but also in the larger concept of public relations." Here is a clear call to recast the attitudes of medical faculties toward the social functions of practise. It needs no gift of prophecy to say that by all but a few reactionary groups, who will insist on looking upon medical practise as commerce and organized medicine as a trade union, the call will be heeded.

V

I have done with prescriptions for the future. If we can have the right number of the sort of young people I have been talking about, and can devise ways in which, when they have finished their training, they can be reasonably accessible to those who need them, the other vexations that are afflicting medicine to-day will gradually vanish. The turmoil of anxious emotion about state and socialized medicine comes out of economic fear and uncertainty, and most of that in turn arises from an overcrowded and ill-distributed body of doctors. Medicine is sure to become much more socialized than it is now, but it can do so with advantage and without endangering anything vital to high standards.

The kind of educational program I have sketched calls for no new great endowments nor new plants nor large outlay of money. We have buildings and funds and equipment in abundance and high quality. Medical education and research have lived well for a generation, and have acquired stately mansions. We have, above all, admirable faculties. A superb piece of educational work could be done if we were to use only half of the sixty-odd medical schools in the United States. What is needed is courage and tenacity in the bending of educational processes to great social ends. An ancient Chinese proverb says that a medicine which does not make a commotion in the patient can not be expected to cure the disease. The drastic dose I am suggesting will upset the inwards of professional education, certainly, but if the diagnosis is right, it should relieve the malady.

The things that medical deans and their colleagues used to worry over, and bicker about, are fading away; part-time and full-time professorships, the extent and content of curricula, credits and electives—all these sources of anguish are drying up, as time and experimentation deal with them. The techniques of medical education are good to-day; they will be better to-morrow. What we must concern ourselves about is the student of medicine to-day, the doctor of to-morrow. Neither he nor the social group he is to serve should be let down by what we may do—or still worse, leave undone—in the bewildering swirl of events in which our thinking and planning has to be done.

VI

We look ahead hopefully to better things. Let us not be misled by the grim and gloomy philosophy that thinks of man as a cheerful imbecile, sweating to raise himself above the generation just past, only to see himself surpassed by the one next ahead, and so on into an infinite recession of betterment—a creature "inferior, fatally, to all the future." To accept as folly the divine restlessness that struggles ahead would be to deny our very birthright. For progress, won by agony and tears, is the law of human kind; it is "man's distinctive mark alone;

Not God's and not the beasts,
God is, they are—
Man partly is and wholly hopes to be."

It is in this attitude of expectation that we may, I think, look confidently forward to see at no great distance the science and art of medicine meeting more effectually than it ever has done before the challenge of a changing world.

SCIENCE AND CONSERVATION[1]

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THE conservation movement in the United States has passed through three principal phases. The first two concern the idea of protection as designed to prevent destructive exploitation and undue concentration in private hands of properties derived from public ownership. The third phase relates to development of the highest use of resources. Exceptional illustration of this third aspect of conservation is given in discovery of new modes of utilization for petroleum. From consumption through burning of oil for light or fuel we attain a stage in which these products find a vast range of application in all manner of chemical compounds valuable for industries as also those having special application for medication.

The relation of science to conservation has been important in all these phases. There has been large contribution in determining the occurrence and nature of natural resources. This has enabled us to harvest or gather the materials in such manner as to limit waste. In consideration of new uses science and engineering have had leading parts. These advances were made possible both by extensive application of available knowledge and by new researches in chemistry, physics, biology and many other fields of science. This program gave a vast number of products which have helped to make life more agreeable and more profitable. It increased the types of employment and extended the range of human interests. It is a responsibility of science to devote itself in the most effective way to fundamental and to applied research which may extend the uses of the vast resources with which this country is blessed.

The term conservation has widened from its original narrow limits to express in a great variety of ways activities which have to do with maintenance and extension of values in many types of human activity. As a second phase of this discussion, I think it important to call attention to certain conservation aspects of the great educational program upon which advance of science depends.

In our educational system we attempt to furnish for youth a concentrated statement of available information and experience and to give a point of view which will make possible the most thoughtful and constructive attitude toward life. With particular reference to science, we present an outline defining in some measure the nature of the materials and the forces which constitute the scene of human life. We are now beginning to realize that this effort depends for its success upon our ability to develop a program which will maintain its value through the period of maturity. To state the problem in another way: we support an educational system which should have continuing and increasing influence upon later life, and we find that unless special means are developed for maintenance of this influence, a large part of the original effort is lost for the period in which it should be most effective. The broad plan for continuing education of the adult to-day is designed in a measure for conservation of the values secured in early education. Along with this influence we seek to open the way for evolution or development of the individual through his whole life.

As a third phase of this statement, it is important to call attention to the fact that we need, just at this time, to protect as fully as possible the exceptional opportunity which has come to science and research for bettering conditions of life in nearly every aspect of human activity. With science in the wider sense, including natural science, social science and governmental science, having won high place in the world, we have reached a stage at which question is raised insistently as to possible disturbing influence of science and research upon the course of civilization. It is stated frequently, and from many directions, that the influence of science is in large part responsible for the difficulties in which the world finds itself to-day. We discuss seriously whether science is an asset or a liability. We consider the possibility that a moratorium be established on research.

From my point of view there is no doubt that the opportunities offered for creative work are essential for maintaining the happiness of mankind. In one aspect of the question research may be considered the hope of a changing world, in that it offers a continuing supply of new materials with which to build and opportunity for adequate adjustment to shifting conditions. Seen from another angle, there is no doubt that the introduction of new ideas, however

[1] Remarks before the National Academy of Sciences, Washington, D. C., April 24, 1934.