

An Oration
ON
**THE INEXORABILITY OF THE LAW OF
EVOLUTION AS MANIFESTED IN
MODERN MEDICINE.**

DELIVERED TO THE MEDICAL SOCIETY OF LONDON ON
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BY
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Medical London Fifty Years Ago.

FIFTY years ago a walk round Harley Street, Queen Anne Street, and Wimpole Street provided a medical visitor from the country with quite an interesting morning. The names on the door-plates were already familiar to him; for the greater part they were those of physicians and surgeons on the staffs of our leading hospitals. The physicians were mostly general consultants, but fame, he knew, had given some of them a reputation for being particularly skilled in certain diseases. The surgeons, too, exercised their art on all parts of the body, but already specialization had taken hold and some were devoting themselves to particular disorders, such as those of the urino-genital system, or even confining themselves to definite organs or systems of the body, such as eye, ear, nose and throat, teeth, skin, and such as required orthopaedic treatment. Our visitor would also have come across the names of men who had made their reputation in the practice of midwifery and diseases of women—a specialty which in 1880 was at least a century old.

Spencer's Law of Progress.

Our country friend, if he were familiar with Herbert Spencer's law of progress*—namely, that it was merely another name for increased specialization—would have found an opportunity, in the three streets just named, of studying the application of Spencer's law to medicine. Of the 120 men who at that time had segregated themselves from the army of practitioners and taken up an abode in the three streets, some, although on the staffs of hospitals, did engage in family practice; others were not on any hospital staff, but sought prestige in practice from their place of residence; the vast majority, however, were consulting physicians, surgeons, or obstetricians, or were specialists in one branch of these three main divisions. Their numbers represent the extent to which medical specialization had spread in the year 1880.

The Rate at which Specialization is Growing.

Were our visitor to return now, after an absence of fifty years, he would be astounded at the rate at which the wheel of evolution has moved in our medical world. Familiar names have disappeared from the doors of our three streets and been replaced by others—quite as noteworthy. The brass plates have decreased in size, but greatly increased in number; a census shows that the 120 of 1880 have been replaced by 954 in 1930. While the medical population of London (and the same is true of the provinces) has only a little more than doubled its numbers in the last fifty years, the army of specialists, in the three streets already specified, has undergone an almost eightfold increase. Progress signifies that the number of young medical men who turn aside from general practice for a specialty becomes ever greater. Everyone whose name is affixed to a Harley Street door is not necessarily a specialist, but after making all allowance on this score; there are certainly seven specialists now where there was only one fifty years ago.

How specialization has sped may also be seen from the fact that the Royal Society of Medicine finds it necessary to divide its proceedings into twenty-four sections. In our three streets we should certainly have to carry the subdivision farther and recognize about thirty-five branches of special practice in place of a bare ten of fifty years ago.

*Ancillary Sciences determine the Rate and Mode of
Medical Progress.*

When we look beneath the surface of things and try to ascertain why the face of medicine has become so changed (and we may be certain it will continue to change) we see

* Progress, its Law and Cause, *Westminster Review*, 1857. Reprinted in *Essays, Scientific, Political, and Speculative*, 1868, vol. i, p. 1.

that the cause lies not so much in what medical men themselves are doing as in what is being accomplished in certain branches of science—particularly in chemistry, physics, physiology, pathology, and biology. The application of modern chemistry to medicine has called into being at least two groups of specialists, perhaps three. Advances in physics have opened three or four new fields of medical practice—for the application of x rays, radium, light, and electricity. Biology—in which we may reckon bacteriology, immunology, and vaccine therapy—has made and is making such progress that a greater number of specially trained men become necessary as medical advisers. The technical methods of the physiologist, pharmacologist, and pathologist are being brought more and more into clinical practice, giving those skilled in their use opportunities for fresh departures in special practice.

While the impetus to specialization comes from advances made in the ancillary sciences, our progress is also determined by the trend which events are taking in general medicine and surgery. As region after region of the body has become "safe for surgery," specialization has been found to be necessary for the patient's sake as well as for the further increase of knowledge. The same is true of medicine: knowledge regarding the ailments of each system of the body becomes so extensive and the technique needed for their full elucidation has grown so elaborate that it is no longer possible for one man to be master of all. As long as knowledge continues to increase and the methods employed to become more elaborate, division of labour—specialization—must also increase.

The Direction of Progress.

Thus we see that "progress," which is another name for "evolution," has transformed the face of medicine as practised in the West End of London in the space of time easily covered by living memory. What will be its state in another fifty years? Let us see how far Herbert Spencer in 1880 could have foretold the state which medicine has actually reached in the three streets at the present time. He would have premised that the same spirit—a spirit of humanitarianism—would continue to urge medical men onwards in their attempt to relieve mankind of its load of suffering. He would have been certain, if this were so, that knowledge must increase, and with each increase must come an augmentation of specialism. But he could not have foretold the direction in which specialism would spread. Our progress has been determined not by deliberate choice but by the force of circumstances, over which, for the greater part, medical men have had no control. That is what I mean by the "inexorability of the law of evolution as manifested in modern medicine." There is behind the medical army an irresistible pressure which thrusts it forward into the future, and it must march, not as it would, but as it needs must.

Evolution as seen in Medical Schools.

I have carried you to Harley Street to give me an opening for my thesis, but now, for the better understanding of the forces involved in medical progress, let us pay a visit to one of our larger teaching hospitals. Let us suppose that after having been in practice abroad for fifty years we are paying a first visit to our old hospital. What do we find? When we left the medical school of the hospital it was manned entirely, or almost entirely, by members of the hospital staff—surgeons and physicians. There were only two exceptions—a chemist and a biologist. Now we find the departments of the school greatly increased in number, and every one of them presided over by a man who, although trained for the practice of medicine, has elected to devote himself to teaching and research in one of its basal subjects. Physiology, taught by a surgeon when we left, has now widened its scope to such an extent that it has been found necessary to have it subdivided into three branches, each in charge of an expert. What strikes us most in our modern school is the birth of laboratories; medicine has passed into a new period—the laboratory period. When we left there was only one—the dissecting room—but now we find the old school trebled in size to accommodate great rooms for the practical study of pathology, bacteriology, pharmacology, physiology, and chemistry. In place of a plain post-mortem room, in which physicians on the staff taught us how examinations on cadavers should

be made, there is now a great institute of morbid anatomy over which a director presides, and has at his command a highly trained staff—all duly qualified medical men.

Evolution is at work in our Hospitals.

In the hospital itself we find ample evidence of how potent a factor the laboratory has become in our modern advance. In place of little closets annexed to certain wards, each provided with a spirit lamp, a few test tubes, and bottles of reagents, we now find suites of laboratories—bacteriological, chemical, pathological, cardiological—each requiring a highly skilled medical staff. We find the Unit System and the Team System at work—physicians, surgeons, and obstetricians, devoting their whole time to the treatment of hospital patients, to teaching and to research. Amongst the members of the hospital staff, who have still to earn an income from consulting practice, the tendency to specialize has become more marked. The special departments of the hospital have grown in number, and everywhere we see evidence of increased technical outfit—demanding increased knowledge and skill. Under the working of Spencer's law of progress our medical schools and hospitals have undergone in these last fifty years a transformation which amounts to a revolution. The main agent in bringing about the evolutionary changes has been the introduction and spread of the "laboratory idea."

Humanitarianism as an Evolutionary Force.

Let us look for a moment at the underground forces which have speeded our hospitals and schools so quickly in the direction of division of labour and of specialization. Harley Street in the olden days had to carry a heavy burden; it had to gather enough from the rich to provide itself with the means of treating the poor in hospitals and in teaching the art of medicine. The rapid increase of knowledge, particularly in the basal subjects of medicine, and more especially the introduction of technical methods of research, made it necessary to man medical schools with specialists—all of them more or less imbued with that kind of spirit which places opportunities for scientific inquiry above those which lead to augmentation of income.

The period of the missionary professor in our medical schools was a brief one. The war brought about a financial crisis in the schools, and the State began to take a hand in their affairs. This intervention was impelled by two motives. There was, in the first place, a "heart" motive—the humanitarian principle that the poor should have, of its own right, as free an access to the best available means of treatment as the rich. The second was a "head" motive—namely, that every advance in medicine brought a clear gain to the public at large—which is the State. Through State subsidies, dispensed by various Government departments, but particularly by the University Grants Committee, it became possible to staff hospital schools and certain hospital services with medical men who could devote their lives to special branches of medical knowledge. Government has provided the sinews of war, and the vanguard of the medical army presses forwards at an unprecedented pace, but neither Government nor any power can determine or regulate the direction of the advance; that depends on what happens at a thousand points along the fighting front. Of one thing, however, we can be certain: every advance made in our medical schools will have its repercussion in the Harley Street quarter of our larger cities. The initiative has passed, or is passing, from the clinician to the laboratory worker; the laboratory has become the "pace-maker" of medical progress.

The Divorce of Research from Teaching.

My aim is to ascertain how far Spencer's law of progress helps us to understand developments which are happening under our eyes in our medical world. There has been an unparalleled increase in our knowledge; that has been accompanied, as Spencer postulated would be the case, by a necessary increase in specialization. In our present ranks I see a separation of duties, a division of labour, which, although I know it to be inevitable, yet fills me nevertheless with some pangs of regret. It is the separation of teaching from research. Time was when games were the pastimes of amateurs; to develop games to their highest pitch the professional became necessary. It was

also so with research; it was the pastime of amateurs. Fifty years ago if a medical man had a bent for investigation he sought for a teaching post which would permit him to earn his bread-and-butter and at the same time offer him the opportunities he desired. Such a man became a source of inspiration to his students—particularly to his best students. To gain his end, and for the advantage of his subject, he was willing to offer up his wife and family as an economic sacrifice. There was in these sturdy pioneers a quality which commands our highest respect, and we shall say good-bye to the type with the utmost regret. Go it must, I fear; the imperious law of progress, which dominates science as well as sport, demands the replacement of the amateur by the professional.

Professional Research.

The introduction of professionalism into medical research has been made possible by subsidies from State as well as from private sources. That such endowments are speeding up the rate of medical progress there is no doubt; we have only to consult the pages of the annual reports issued by the Medical Research Council, or to read the address which Sir Walter Fletcher recently delivered before the British Science Guild,* to have ample confirmation of my contention. The Medical Research Council, and the Royal Society to a lesser degree, are, to borrow Sir Walter's simile, watering the tree on which the fruits of science grow. They have planted in their research orchards only such trees as have proved their bearing capacity, and the results are promising. Nevertheless, the gardeners can but tend the trees; they cannot change their nature nor alter by regulation the kind of fruit they will produce. They can but water the ground and hope in the autumn to gather a profitable crop.

The introduction of professionalism into research illustrates very well a corollary of Spencer's law of progress. This far-seeing Victorian realized that every new departure, every discovery or advance, was attended by a multitude of secondary effects. The segregation of our most gifted investigators is impoverishing the medical staffs of our universities and schools. Our best teachers desire to be relieved of the duties of their office in order that they may devote their whole time to experiment or other forms of inquiry. The gift of teaching, of inspiring young men, of collating and disseminating knowledge, is being ranked below that of the ability to research. The ultimate result of assigning an inferior position to the teacher and to the book-maker is as likely, in the long run, to impede the progress of medicine as to accelerate it.

Results of Progress on the Output of Medical Literature.

Another result is a curious one. So prolific is the output of published researches from our laboratories that a regiment of specially trained men has become necessary to deal with it and make its assimilation by the medical profession possible. How great that output has become may be seen from recent numbers of the *Quarterly Cumulative Index Medicus*—for which we are beholden to our brethren in America. There are now over 2,000 medical journals and periodicals; to index the articles appearing in these journals in the first six months of 1929, and the titles of medical books published in the same period, required 100,000 separate entries—these entries filling a volume of 1,311 pages. A friend, who has confined his researches to a small but important gland of the body, told me that the literature relating to it had become so vast that he could read only part of it. And yet the progress of medicine demands that the output will keep expanding at an ever-increasing rate, and specialization in research becomes more and more necessary.

There is no Alternative.

What, you may ask, is to be the end of it all? There is no turning back; we must press forwards. Will then our specialization reach such a growth that, like the monstrous antlers of the Irish deer, it will sap and endanger the life of the whole body of Medicine? There is a safeguard. When our specialization reaches a stage at which its upkeep passes beyond the powers of the public and private purse,

* See *Nature*, 1929, vol. cxxiv, p. 795; also *British Medical Journal*, 1929, vol. ii, p. 993.

then perforce we shall have to limit our ambitions and discover more economical methods of attaining our ends. As yet we are not within sight of such a crisis.

Co-ordination is a Necessary Constituent of Progress.

Up to this point I have been discussing the manifestations of progress as seen in the Harley Street quarters of our greater cities, in our medical schools and hospitals, and in our subsidized laboratories. In all three quarters we find medical men pressing forwards in search of new sources of knowledge, and as they press becoming subdivided more and more into separate groups. We have, in these instances, been studying only one of the factors of medical progress; there is another which Spencer perceived was equally inevitable. Specialization, if it worked unchecked, would tend to break up our medical forces and dissipate their strength in confusion. Hence we find, in the progress of our profession, just as in the evolution of the earlier animal organizations, there come into play certain unifying influences, exerted by a crude form of nervous system. An astute student of the evolution of medicine, if he had visited London in 1880, would have perceived that this nerve centre had already come into being in the form of a Department of State, situated in Whitehall—the Local Government Board. He would have found London already divided into fifty-two districts—each with a medical officer of health—controlled more or less indirectly by the nervous centre in Whitehall. All England, Wales, and Scotland had then become so divided, and a multitude of medical men, most of whom, while still continuing to attend to their patients, served also as members of a health army, and carried out a policy formulated or suggested in Whitehall.

The Process of Integration.

Unification or integration is just as necessary an ingredient of "progress" as specialization or separation. The influences which tend to bring about the unification of our medical army, like most of the inventions which alter medical practice, arise not inside our medical ranks but outside them. Before the middle of the nineteenth century it became evident to British statesmen that the country could not drift along exposing itself to plagues and pests, to contaminated water and adulterated foods, to overflowing cesspools and to drains which led nowhere. Government began tentatively by calling into being a new kind of medical specialist—the health officer. Presently it was found to be necessary to co-ordinate the activities of the men so enrolled. Even in 1880 this brain, then represented by the Local Government Board in Whitehall, was a small and simply fashioned organ. The deliberative and executive areas of its cortex were composed of laymen; eleven medical officers entered into its texture and were relegated entirely to the sensory or recipient areas. They were advisory in function at the most. No doubt the reformers who placed all our public health Acts on the Statute Book had to fight hard and long; they fought with head and heart, and deserved their victory; but, as they gained it, it never occurred to them that they were being impelled by force of circumstances, and were unconscious exponents of a scheme of evolution. Health reformation was initiated outside the ranks of our profession, but it introduced into our ranks the first step towards their unification.

We are the Slaves of Circumstance.

What I am seeking to make clear is that in all our advances we are the slaves of circumstance rather than masters of our fate. You may ask: Does not the Ministry of Health, which succeeded the Local Government Board in 1919, determine the direction in which we shall advance? Lately I listened to a speech which was broadcast by an able member of Sir George Newman's staff—Dr. T. Carnwath. In this speech the policy of the Ministry of Health was outlined. The Ministry watches how health measures, recently sanctioned by Parliament, work out in practice. Defects become apparent, the Ministry studies how they can be mended. Local authorities may apply for a special bill to meet some local need; if leave is granted, the Ministry notes the effects. If benefits accrue, then steps are taken to extend them to the whole country. The Ministry does not create its opportunities; it waits until they come, and then utilizes them for an "advance." Sir George Newman

and Sir Walter Fletcher have both to wait for their opportunities. They wait patiently for them, and then when they occur apply their genius in utilizing them for the improvement of national health.

Progress implies an increasing Integration.

Every step taken by Parliament leads towards a more perfect unification of our British medical army—in which 54,000 recruits are now enrolled. We are far enough away from the angry discussions which arose in our ranks when Mr. Lloyd George successfully carried the National Insurance Act of 1911 to take a philosophical view of what then happened. We see now that it was the inevitable that happened; it was but another turn in the screw of that evolutionary movement which tends towards the unification—the integration—of Medicine. It was a continuation of that "policy" of the nineteenth century which broadened the franchise to its present limits, gave us compulsory education, established the medical inspection of schools, and more recently gave services for the welfare of mothers and babies. The Local Government Act, which brings the staffs of our hospitals more directly under a central authority, is but another turn of the same evolutionary wheel. The art of healing in its modern development is going steadily through the stages which transformed a brood of discrete independent protozoa into the co-ordinated complexity of cells which form the body of a living animal.

The Law of Evolution.

In this lecture I have been applying a law—the law of animal evolution—to the complex affairs of modern medicine. Given human nature as it is—a nature which demands, and ever will demand, that the poor must and shall have access, so far as health is concerned, to all the privileges the rich can buy, that at all costs suffering must be relieved—then medical progress must go on and follow the path already chosen. Further progress consists, in our modern interpretation, of an ever-increasing degree of specialization, and in an ever-increasing degree of co-ordination or unification. We cannot escape State control in the long run, however much we may regret the loss of personal liberty which is thereby entailed. What I would especially lay stress on is that medicine is not so free to choose its path into the future as most of us think it is. We may mould circumstances to our wills on some occasions, but in most we are carried along in the irresistible current of events. I do not mean we should, like fatalists, cease to strive to steer a course. Nevertheless in things medical, as in all mundane affairs, the main feature of the law of evolution is its inexorability.

A British Medical Association Lecture

ON

THE LOCALIZATION OF ABDOMINAL PAIN.*

BY

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PAIN felt in the abdominal area may for practical purposes be divided into (a) pain arising from a pathological stimulus applied in some other part than the abdomen, and (b) pain in which the causative stimulus arises within the abdominal cavity itself. The localization of the pain in the first class of case is not very difficult so long as one realizes the possibility of the source being in some more remote part. A thorough physical examination of the patient will usually detect disease of the spine or spinal cord, or throw suspicion on to the chest, in cases where that region is to blame.

A very real difficulty may arise in those cases in which physical examination (including radiography) reveals nothing abnormal, and yet the patient avers that he has very severe pain in the abdomen. Speaking generally, such patients must be regarded as suffering from some real abdominal disorder until every means of diagnosis has been tried. Only after a failure of these and the inability to fit in the symptoms with any known clinical

* Given before the Leeds Division on March 6th, 1930.