BRITISH MEDICAL JOURNAL

LONDON: SATURDAY, MAY 4th, 1935

PROGRESS IN MEDICINE DURING THE PAST TWENTY-FIVE YEARS

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The advances in medicine during the present reign have been so many and so varied that an attempt to mention them all would result in a mere catalogue. It is better, therefore, to lay the emphasis mainly on those advances which involved the establishment of new principles. It is, moreover, helpful towards a right perspective, and a corrective against overweening pride in the achievements of our time, if we bear in mind the great and outstanding advances made in the previous twenty-five years; the establishment of bacteriology on a solid basis, with the corollaries of antitoxins, agglutinins, and vaccines; the discovery of radio-activity; and the recognition of the principle of internal secretion. It is sufficient to mention these to appreciate how much of recent advance is built up on those foundations.

Recognition of Deficiency Diseases

The new principle on the chemical side which inevitably comes first into the mind is the recognition of deficiency diseases. But even here we must remember that the part played by polished rice in the production of beriberi had been known since 1897, and it had long been recognized that scurvy was in some way associated with lack of fresh food. Moreover, in 1906 Hopkins had started the scientific study of accessory food factors which led to the recognition of vitamins in 1912. Yet even at the end of the war it was still hotly disputed whether rickets was a disease of diet or of the dark. The realization that both factors were involved is an interesting chapter in the history of medicine: that a particular part of the solar spectrum could produce metabolic changes in a particular sterol leading to the formation of vitamin D was a revelation. Indeed, it was a revelation which led for a time to an uncritical application of ultra-violet rays for all sorts of diseases. Yet it is not unreasonable to regard calciferol as "bottled sunlight." The history of the other vitamins is hardly less dramatic, particularly the story of the tracing of the antiscorbutic principle to ascorbic acid, its production during the germination of seeds, and its abundant presence in paprika. Historians tell us that Elizabethan wars often resolved themselves into a struggle for pepper fields—as if man had been urged to obtain something that was good for him, he knew not why, just as herds will stampede towards a salt-lick. Appetite is a craving to satisfy biological needs which cannot always be expressed in terms of calories.

And so dietetic deficiency as a factor in disease became increasingly recognized. The intense potency of the small dose received scientific sanction and vitamins were labelled exogenous hormones. For it was believed that animals were incapable of manufacturing their own vitamins, though later it was found that they could in

some instances complete that manufacture. Closely associated with these discoveries was the demonstration that pernicious anaemia was not a haemolytic process but a disease due to both an intrinsic and an extrinsic deficiency. Many anaemias were recognized to be the result of a failure at some stage in the maturation of the red blood corpuscle.

Endogenous Hormones

This naturally leads on to a consideration of the endogenous hormones. Several of these had already been identified, and Starling's theory of the chemical control of the body had been enunciated by 1905, but insulin, parathormone, and oestrin were still unknown. The discovery of insulin in 1922 revolutionized the prognosis and treatment of diabetes, and further emphasized the principle of antagonistic hormones. Parathormone clarified our ideas on calcium metabolism in general, and led to the recognition of a new clinical entity—hyperparathyroidism. Oestrin not only threw light on the physiology of reproduction, but in the hands of the biochemists gave us an entirely new view of the relation between hormones and other potent chemical agents.

On the one hand, it was realized that the central nervous system, acting through the diencephalon, had a greater control over the endocrine system than had been thought, and that this control was exercised mainly through the pituitary, the leader of the endocrine orchestra. On the other hand, it was shown that while thyroxine, pituitrin, and adrenaline contained comparatively simple benzene rings, oestrin contained more complicated ones; that it was a sterol closely allied chemically to calciferol and carcinogenetic substances. A similar substance is contained in the organism of the developing embryo, and its release at the wrong time or place may give rise to teratomata and even more malignant growths. It would lead us too far to speculate on the effect this discovery must have on our views on cancer, but it is extraordinary to find a common chemical factor in reproduction, normal growth, and the disorderly growth of tumours. The fact that the body itself uses chemical agents for its own regulation has re-established our belief in the efficacy of drugs, which has been reinforced by Sir Henry Dale's proof that every nervous impulse liberates a chemical substance, and that drugs can facilitate or inhibit the effect of such substances on the tissues. This will lead to a new pharmacology, in which individual reactions of the patient will call for further attention.

To this the study of allergy is leading. It has already contributed to a scientific explanation of the old adage that "one man's meat is another man's poison." As is so often the case in medicine, this conception is being

rather too extensively invoked to interpret many diseases of hitherto unknown causation, but it has been fruitful in a number of ways. Particularly does it illustrate the relation between the chemical and nervous factors in the reaction of the organism to disease, for it is a familiar observation that the psychic state can modify the chemical manifestations of allergy.

Blood Chemistry in Clinical Medicine

But before we turn to that other great change in our outlook—the psychological aspect—we must briefly consider the means by which the new biochemical knowledge has been utilized for clinical ends. We are no longer satisfied with the study of the end-products of bodily chemical activity as manifested in excretions; we concentrate our attention more on the internal medium of exchange—the blood. It is true that the biochemist is going further back still—to the changes in the tissue cell itself—but here at present he eludes the clinician. However, the study of blood chemistry has notably advanced our ideas of metabolic diseases. The blood sugar curve explains more than merely examining the urine for sugar. The estimation of urea in the blood is a more valuable indication of the condition of the kidney than the percentage of urea in the urine; the relation between the two, the urea clearance as it is called, gives perhaps the most valuable information of all. The estimation of cholesterol, calcium, and phosphorus in the blood is throwing light into obscure corners. The analysis of the blood for its uric acid content has banished the bogey of “suppressed” gout, while its overt manifestations are mysteriously declining.

The fractional test meal has compelled us to modify many of our ideas concerning altered gastric secretion in disease. That achlorhydria is a necessary or frequent concomitant of several diseases was, like the recognition of allergy and of other inborn errors of metabolism, a step towards the re-establishment of the doctrine of diatheses, this time on a scientific basis. But the increasing incidence of achlorhydria in the successive decades of life has also demonstrated the revolt of the stomach against the many insults heaped upon it, and the remote results of that revolt are better understood. It would be true, however, to say that the x -ray diagnosis of digestive diseases takes pride of place over the test meal to-day. It has been amusingly said that we now do test meals for blood diseases rather than for gastric diseases.

One senses an increasing recourse to the sedimentation rate for prognosis and a diminishing reliance on the basal metabolic rate among diagnostic measures. It is, of course, inevitable, and rightly so, that we should be able to dispense with elaborate apparatus to some extent, once that apparatus has sharpened our clinical acumen. Thus the electrocardiograph was necessary for the accurate recognition of, and addition to, the types of cardiac irregularity and their significance. It completed the pioneer work of Sir James Mackenzie with his polygraph. But the beautifully exact researches of Sir Thomas Lewis have taught us how to be able in many cases to dispense with the method he brought to such perfection, and he himself has turned his attention from the heart to the periphery of the circulation, with rich results. The electrocardiograph, however, retains an important place in the exact diagnosis of obscure cardiac lesions.

Radioactivity in Medicine

In the same way one notes that electrical methods are less in vogue than formerly, except as a means of manifold applications of heat by diathermy. But on the whole massage, manipulations, and exercises of various kinds are largely replacing treatment by electricity. It is

curious to recall that x rays were originally adjuncts to the electrical department. Now every year they assume increasing importance both for diagnosis and for treatment. The technique of barium meals has been greatly improved, revealing details formerly beyond our ken. Quite as striking have been the advances in the diagnosis of diseases of the chest, largely owing to the accidental discovery of the remarkable properties of lipiodol. The selective action of the gall-bladder and the kidneys in the excretion of substances opaque to x rays has been utilized for diagnosis. Even lesions of the central nervous system have been demonstrated by radiology. But the interpretation of shadows must always be open to fallacies, which can only be avoided by the fullest co-operation between the clinician and the radiologist. Deep x -ray therapy has proved of great value in the alleviation of new growths, leukaemia, and various other diseases, but it is too soon yet to speak of cures thereby. This is also true of treatment by radium. Research is still needed on the biological effects of radioactivity, and we have been forced to realize the imperative need for the most scrupulous accuracy in its application and of judgement in the dosage. But even now dramatic results are being obtained, though naturally time must elapse before permanent cure can be proved. Risks to the patient or to the administrator of such powerful agents have been largely controlled.

Therapeutics

It used to be said that there were three things in treatment: the first was diagnosis, the second was diagnosis, and the third was diagnosis. At the beginning of the present reign a physician said to the writer that the in-patient treatment of a medical case consisted of appropriate food, good nursing, and something three times a day out of a bottle. Such expressions were perhaps exaggerations, but they indicated a frame of mind much too prevalent then. Therapeutics have come into their own much more in the last quarter of a century. It was in 1910 that Ehrlich introduced the organic compounds of arsenic, which have revolutionized the treatment of syphilis, with the aid of other heavy metals such as mercury and bismuth. Indeed, one has only to think of the extended use of arsenic, and the revival of treatment by antimony, by gold, and by iron in new ways to realize how much more reliance is placed on metals than formerly. The therapeutic applications of hormones and vitamins have already been alluded to. Vegetable analogues to hormones have been found in ephedrine for adrenaline, and for oestrin, and claimed for insulin. Some hormones have been synthetically prepared and others may be expected shortly. Meanwhile, the chemist has been busy experimenting with new chemical compounds, of which, perhaps, the barbiturates are the most outstanding example. Coincident with all this activity our conceptions of therapeutics have been greatly extended by the introduction of so many physical methods. Basing our treatment on the natural history of the disease, we stand by, ready to use anything which experience or experiment teaches us may help the native forces of the patient in his struggle.

Psychotherapy and its Future

I have left to the last what is perhaps the profoundest change of all: a new realization of the psychological aspect of medicine. From time immemorial the successful physician has been consciously or unconsciously a psychotherapist. Indeed, looking at some of the prescriptions of the past, it is difficult to see what other value he could have possessed. But such psychotherapy was based on intuition, sympathy, and personality, as indeed it must continue to be. Before the war any more formal

psychotherapy was largely suspect. Then the psychoneuroses of the soldier simply forced it upon our notice. No longer was it possible for us to reach the diagnosis of "functional" or "hysterical" and leave it there. At last we understood why more than half the patients we saw on entering practice were suffering from conditions undescribed by our teachers or our textbooks. We turned our attention to their mental conflicts and their environmental difficulties; and then to our surprise and chagrin we found there was a neglected mass of information ready to hand. True we had heard that Charcot had induced in his patients most of the dramatic symptoms he described, that Janet had talked of dissociation, and that there was a man named Freud who had some very uncomfortable ideas. But our seniors strongly disapproved of him, and he was disowned by his own confères.

This is not an unfair picture of the medical outlook in 1914. Within four years that picture had completely changed. If psychotherapy has not achieved as much as was anticipated it is due to two main causes. On the one hand the patient may hug his or her psychoneurosis as a cherished possession. Indeed, of some personalities it may be asked, What is left if you take away the psychoneurosis? It has become the keystone of the arch. It sometimes seems as risky to try and impose a normal attitude to life upon them as it is to try and impose a normal rhythm on a long-standing case of auricular fibrillation. Neither the individual in the one case nor the heart in the other can stand up to it. This, indeed, Janet realized. On the other hand, the fissiparous tendencies of the psychotherapists themselves have indeed been a stumbling-block. Dictatorships, heresy hunting, and excommunications have been all too prevalent. In so far as these exist medical psychology has failed to become a science and interferes with its own art. Not until such internecine struggles subside will real advance be possible, and it will cease to be said that the trouble about psychotherapy is the psychotherapists. Yet the need for them is a crying one, for not only is psychoneurosis the only basis for many ills apparently physical, but all physical ills have their psychical aspect.

When the dust and smoke of the battle now raging have settled, it will probably be realized that the services of Freud to knowledge have been as great as those of Darwin. His views as to the working of the unconscious mind and of the effect of repressions form a great unifying conception. His use of free association has placed a valuable method in our hands. But his extension of the idea of sex to include practically the whole of life, stated as aggressively as possible, not only challenged opposition, as it was presumably intended to do, it has revealed an unwillingness to recognize that a clash between any of the primary instincts may induce a psychoneurosis. It was on this point that his two leading disciples, Jung and Adler, broke away from him. Jung's chief contributions to psychological theory have been the distinction between the extraverted and introverted types of personality, and the idea of the collective unconscious. For Adler the individual's behaviour, whether normal or abnormal, is determined by his aim or goal. Hence he calls his view-point individual psychology. He maintains that neither "the conscious" is so fully conscious nor the "unconscious" so unconscious as the others imagine. He regards the individual's "style of life" as determined during the first six years of his existence, when he appreciates his own weakness and develops a feeling of inferiority. This feeling should normally act as a stimulus to fresh effort, but if the individual retreats from such effort and adopts an attitude of non-co-operation he will become psychoneurotic. If he fails to adapt himself to

any one of the three great demands—society, occupation, and sex—this is almost certain to happen.

Now it ought not to be beyond the wit of man to adopt some of the main ideas promulgated by each of these leaders in medical psychology and to constitute thereby a satisfactory eclecticism. Rivers, basing his work on a depth of biological and physiological learning which none of them possesses, was on the way to construct such a system when his death dealt an irreparable blow to the English school. Nevertheless, many English psychologists, displaying our national gift for compromise, have been able to make such selections, and are going ahead on sane and helpful lines. Medical students are avid for instruction in medical psychology, general practitioners are finding a new zest in their work in the realization that neurotic symptoms have as definite a cause as physical ones, and these newer conceptions are permeating the whole of treatment.

Conclusion

Thus biochemistry and psychotherapy are bringing new aids for the relief of suffering. Their combined efforts are leading to the comprehension of the individual who has the disease, and not merely of the disease which the patient has. In other words, dis-ease is seen as a reaction of the patient to some abnormal stimulus, physical or psychical, in his external or internal environment. The practitioner is being provided with many new weapons, diagnostic and therapeutic, to aid towards a successful issue of that struggle. The future for the advance of medicine is full of hope, especially if we are filled with the spirit which prompted Clifford Allbutt, when approaching the age of 80, to write, soon after King George ascended the throne, "With all this new knowledge coming up on the horizon, what a joy it would be to begin it all over again."

According to J. Mikler (*Thèse de Paris*, 1934, No. 810) the rarity of scarlet fever in the infant is shown by the fact that only five cases in a series of 3,000 occurred in the first year of life, as compared with sixty in the second and 238 in the third year. The maximum was reached at the age of 6 years, with 333 cases. From 7 to 8 there was a decline (302), and after the age of 9 there was a sharp fall until the lowest number was reached at 15 (three cases). Like measles, scarlet fever is essentially a disease of winter and spring, but its highest incidence occurs slightly later. The number of patients attacked during the first six months of the year was almost double that of the last six months. It frequently declines rapidly during the summer, and shows a recrudescence during the last three months of the year. Deaths amounted to 112 out of 3,000 cases—a fatality rate of 3.7 per cent. During the first two years, when the patients were not isolated in separate chambers, fifty-one out of 544 cases (9.3 per cent.) were fatal, whereas during the last seven years, when individual isolation was established, only sixty-one deaths occurred among 2,455 cases (2.4 per cent.). Another result of individual isolation was the disappearance of diphtheria from the scarlet fever block, every child who was found to be Schick-positive on admission being immunized by Ramon's anatoxine. The fatality was highest among the youngest children, the chief cause of death being bronchopneumonia (twenty-six cases), and then in order of frequency: malignant scarlet fever (nineteen cases), suppurative otitis (seventeen cases), mastoiditis (six cases), acute meningitis (six cases), appendicular peritonitis (three cases), empyema (one case), and cerebral arteritis, erysipelas, and haemorrhagic nephritis (one case each). Isolation of from thirty to thirty-five days was found sufficient to prevent return cases, except in cases complicated by tonsillitis, otitis, and suppuration, which require to be isolated until complete recovery takes place.