A Paper

ON

CHANGES IN THE CHARACTER OF DISEASES*

BY

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Sydenham, the British Hippocrates, maintained that acute diseases had (a) seasonal variations with waves measured in months, and due, as Hippocrates believed, to meteorological conditions, so that their character and response to treatment differed within a short period, a feature now so familiar in influenza epidemics; (b) a long-period evolution with a rise, decline, and fall extending over centuries; and (c), though, as Crookshank has pointed out, Baillou (Ballonius), sometimes called the French Hippocrates, anticipated him in 1574, an "epidemic constitution," namely, that special influences—telluric or cosmic—become dominant and impress some special feature on the clinical manifestations of diseases prevalent at the time to the exclusion of other types, the amplitude of this wave being measured in years. Major Greenwood translates the much-discussed term "epidemic constitution" as meaning that the non-specific secondary infections, such as those seen in influenza and measles, are as important as regards morbidity and mortality as are the specific causes of disease.

That the character of acute diseases undergoes changes has been vigorously contested in the past, especially in 1857 by J. Hughes Bennett in Edinburgh, and by Markham, who in 1864 denied that after the cholera epidemic of 1832 the type of fevers previously sthenic became asthenic, so that bleeding was no longer beneficial; he indeed suggested that this notion of a change in character was largely invented, years after 1832, to justify the change of fashion in treatment—namely, the abandonment of venesection. In 1873 Murchison wrote that each of the acute specific fevers had maintained its identity in all ages and countries, and that the supposed change of type was really due to failure in recognizing that a disease other than that supposed to have altered its character had appeared on the scene; he instanced the confusion between typhus, a killing disease, and relapsing fever, which rarely terminates fatally. The argument that improved diagnosis must be taken into account before accepting a supposed change of type in disease must be allowed due weight: coronary thrombosis has only been generally recognized and found to be extremely common since about 1926, and in the future it might therefore be thought that angina pectoris had changed its type; but is it not that differential diagnosis has altered the label? At any rate retrospective diagnosis has made it highly probable that the rupture of Sir Robert Darcy's heart, recorded by William Harvey in 1649, was secondary to infarction, for there is now good evidence that spontaneous rupture of the heart is nearly always the result of recent acute infarction (Beresford and Earl). This morbid change was first described in 1880 by Weigert, but the clinical syndrome was not recognized until 1910 by Obrastzow and Strachesko,† and did not become widely known for another sixteen years.

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† In his *Classic Descriptions of Disease* (pp. 398-402), Professor R. H. Major reproduces the account of the clinical diagnosis in 1876 in an isolated case of coronary thrombosis by Adam Hammer (*Wien. med. Woch.*, 1878, xxviii, 102).

At the present time no one can doubt the evidence of a change of character in some acute diseases, such as scarlet fever. For the last ten years the type of small-pox prevalent in this country, under the names parasmall-pox, variola minor, or alastrim, has been so mild and the mortality so nearly negligible that the suggestion has been made that it is a new disease and not a mild form of small-pox, a view not acceptable from an immunological point of view (Ledingham). A curious position has thus arisen. Since the Vaccination Act of 1907 came into force it has become easier to evade vaccination, and the unvaccinated proportion of the population must be large; its exact proportion cannot be accurately estimated, but Dr. J. R. Hutchinson of the Ministry of Health has kindly informed me that for the period 1916-30 the yearly average of primary vaccination in infancy has been 43 per cent. This leaves perhaps more than half of the population unprotected, and yet its logical result—namely, an epidemic of severe small-pox—has not yet followed. The present type of small-pox is so mild that many people prefer to run this risk to being vaccinated. Are we in a fools' paradise?; and how does this affect the insurance of unvaccinated applicants for life policies? From the point of view of change of type of disease the mild typhus fever, known in America as Brill's disease, is comparable with variola minor.

In order to realize the high probability that diseases must change their character it is only necessary to remember that they are not rigid entities like, let us say, precious stones or an issue of postage stamps, but are the reactions of the living body when it fails to adapt itself to an adverse environment—internal or external. A morbid state is therefore the outcome of two variables: the resistance or the susceptibility of the body on the one hand and the numerous factors coming under the heading of environment on the other hand. The internal environment, the constancy of which (*milieu intérieur*) Claude Bernard emphasized more than half a century ago and W. B. Cannon in 1930 called "homeostasis," includes the constitution, the make-up of the body, and the metabolic processes which, like the physical structure of the body, may, as A. E. Garrod has so well said, be also subject to congenital malformation. The influence of constitution is seen in hereditary and racial liability to certain diseases—for example, the frequency of diabetes and disorders of lipid metabolism in Jews. The external environment includes micro-organisms, poisons, physical agencies, trauma, unhealthy surroundings, tainted food, poverty, and over-fatigue of body and mind; in fact, the consideration of the aetiology of disease has its sociological side. In infective diseases attention must be directed to the "soil" as well as to the "seed," and the difficult question arises as to which—the individual's resistance or the virulence of the invading micro-organism—is generally the more important factor in the production of disease. From their rapid multiplication bacteria must be more prone to mutations and changes in virulence than is man to develop alterations in resistance; but the complexity of this problem, so exhaustively discussed by Topley and Wilson, should engender caution in attempting to draw a conclusion which might, of course unconsciously, be coloured by "the extreme anthropocentric view of the physician."

In some instances the obvious influences, however various they may be, of environment are overwhelming: In the European war there appeared new forms of disease as the result of stationary trench fighting; an increase of deficiency diseases, and a fall in the incidence of those due to dietetic excesses: in Russia, Gantt found a diminution of chronic alcoholism, obesity, appendicitis, cholecystitis, and diabetes mellitus; in Germany there

was a fall in diabetes, arteriosclerosis, and acute pancreatitis. The greater speed and the wear and tear of modern life, a complaint of generations other than the present, may be correlated with the increased incidence in Europe and America of epidemic diseases of the central nervous system due to some factor or factors such as more rapid transport or concentration in crowded towns. High blood pressure, cardio-renal disease, and diabetes may also be products of strenuous existence.

The improved hygienic circumstances due to the Public Health Services have banished from this country many acute infections, such as cholera, typhus, and relapsing fever, and made enteric fever comparatively rare. Infant mortality has been greatly diminished—from 149 per 1,000 in 1871-80 to 60 per 1,000 in 1930—and, mainly as a result of this, the expectation of life at birth has increased from about 41 years in the middle of the last century to about 57 years in 1922: the population is becoming older—a change of financial importance to life assurance companies and also to their policy holders. But, on the other hand, more people now survive to come into the age period of cancer and degenerative cardiovascular disease.

That cancer bulks more prominently in death rates than formerly is certain, but whether or not this is because it is more correctly diagnosed now and that more people than in the past live into the cancer age is open to discussion. But abdominal malignant disease in males has probably increased. Another debatable point is whether or not low-grade streptococcal infections and septic foci have really become much commoner or have only recently been more generally recognized.

Reference will now be briefly made to some diseases in which changes in character or incidence have occurred within comparatively recent times.

Chlorosis has practically disappeared since the beginning of this century, and with it the conditions of gastrostaxis and perforating gastric ulcer in chlorotic young women (Cope). Its place appears to have been taken by the simple achlorhydric anaemia in middle-aged women (Witts), which is also curable by efficient administration of iron, but is closely related pathologically to pernicious anaemia and, like it, is familial. The disappearance of chlorosis has been ascribed to the discontinuance of the corset (F. P. Weber), improved conditions of life, better food, and exercise.

Acute rheumatism has, during the last eighty years, undergone considerable modification; thus its complication by pneumonia, which occurred in twenty-one out of 136 analysed by Peter Mere Latham in 1846, had disappeared fifty years ago. A more recent change is in the lessened severity of the arthritic affection, and the rarity of hyperpyrexia and of profuse sweating before patients come under treatment. Unfortunately salicylates have not, at any rate appreciably, influenced the incidence of cardiac complications.

Tophaceous gout has been getting rarer for many years.

Syphilis is in some respects less obviously malignant than formerly, for the terrible bone lesions are now rarely seen except in museums. This may be largely due to treatment, but improvement began long before the introduction of salvarsan, and the question of a greater racial resistance cannot be entirely set aside. The new methods of treatment have greatly shortened the duration of the infective period, but their influence on the late nervous and vascular lesions—tabes, general paralysis, aneurysm, and cardiac disease—cannot be finally estimated yet; some statistics, such as Gager's, suggest that unless they rapidly produce complete sterilization the arsenobenzol preparations may damage the immunity mechanism; he

states that syphilitic aortitis has become increasingly common since the introduction of these remedies. Warthin found that the *Treponema pallidum* is extraordinarily persistent in the myocardium, aorta, and aortic valves (1929), and that among 501 cases of syphilis sudden cardiac death was five times as frequent as among the non-syphilitic (1930). Others have not found the treponema with any approach to this frequency; Saphir and Scott, though using the Warthin-Starry method and also the Levaditi method, did not find the treponema in the myocardium in any of their 107 cases of syphilitic aortic insufficiency. My own impression is that thoracic aneurysm has become less common than it was earlier in this century, just as popliteal aneurysm, which in 1847 Crisp found second only in frequency to thoracic aneurysm, certainly has done since 1880. It is a little more than thirty years ago since Dr. Parkes Weber wrote a paper on "Syphilis in relation to Life Assurance, with an Examination of Five Hundred Consecutive Claims." It will be interesting to know in what respects the methods of treatment adopted since then bear on the acceptance of applicants with a history of syphilis for life assurance.

Appendicitis, though recognized more than a hundred years ago, became much commoner after the return in 1889 of influenza, after its absence for forty years.

Cirrhosis of the liver has now become less frequent and, though alcoholism is far from being its only cause, the advance of temperance and the retreat of cirrhosis may reasonably be correlated.

Pneumonia has undergone a change since influenza again became prevalent; the frank lobar pneumonia is less frequent, and a bronchopneumonic form has become more in evidence.

Primary carcinoma of the lung, usually starting in the bronchi, has become much less rare since 1918. The nature of the irritation responsible for this increase has excited some speculation, but no sound conclusion has so far been reached.

Hydatid disease has become quite rare within the professional life of some of us. Sir Charles Ballance remembers a physician who carried in his pocket an ordinary knife and a piece of copper wire to incise a hydatid cyst and extract the daughter cysts.

Urinary calculi, for which Norfolk was formerly notorious, no longer show any predilection for that part of England.

BIBLIOGRAPHY

- Ballance, C. A.: *British Medical Journal*, 1927, i, 100.
 Bennett, J. Hughes: *Edin. Med. Journ.*, 1856-7, li, 769.
 Beresford, E. H., and Earl, C. J. C.: *Quart. Journ. Med.*, Oxford, 1930-1, xxiv, 55.
 Brill, N. A.: *Amer. Journ. Med. Sci.*, Philadelphia, 1910, cxxxix, 484.
 Cannon, W. B.: *Lancet*, 1930, i, 1109.
 Cope, Z.: *British Medical Journal*, 1927, i, 100.
 Crisp, E.: *Diseases of the Blood-Vessels*, London, 1847, p. 115.
 Crookshank, F. G.: *Proc. Roy. Soc. Med. (Sect. Epidem.)*, 1920, xiii, 159.
 Gager, L. T.: *Amer. Journ. Syph.*, 1929, xlii, 411.
 Gantt, W. H.: *British Medical Journal*, 1926, ii, 308, 747.
 Garrod, A. E.: *Inborn Errors of Metabolism*, London, 1909, p. 14.
 Greenwood, M.: *Proc. Roy. Soc. Med. (Sect. Epidem.)*, 1919, xii, 55.
 Markham, W. O.: *British Medical Journal*, 1864, i, 359.
 Murchison, C.: *Continued Fevers of Great Britain*, second edition, 1873, p. 7.
 Obratzow, W. P., and Strachesko, N. D.: *Zeit. f. klin. Med.*, 1910, lxxi, 116.
 Saphir, O., and Scott, R. W.: *Amer. Heart Journ.*, 1930, vi, 56.
 Topley, W. W. C., and Wilson, G. S.: *The Principles of Bacteriology and Immunity*, London, 1929, vol. ii, p. 589.
 Warthin, A. S.: *British Medical Journal*, 1929, ii, 236.
 Idem: *Trans. Assoc. Amer. Phys.*, Philadelphia, 1930, xlv, 123.
 Weber, F. P.: *Lancet*, 1902, ii, 867.
 Witts, L. J.: *Guy's Hospital Reports*, 1930, lxxx, 253.