RUDOLF VIRCHOW AND SOCIAL MEDICINE IN HISTORICAL PERSPECTIVE

by

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RUDOLF VIRCHOW (1821–1902) was from many points of view a man with a very fascinating and versatile personality. Ackerknecht[1] states in his biography that during his lifetime Virchow excelled in four areas, in all of which he left a lasting mark: in pathology, public health, anthropology and, finally, as a statesman. There can be no doubt that Virchow, in his autocratic manner, and from the seat of eminence he occupied during the later period of his long and productive life—he was called 'the Pope of German Medicine'—rejected certain valid findings, blocked developments in some medical disciplines, and by this caused harm and sometimes confusion. Many a time we find Virchow involved in heated, acrimonious and personal disputes with fellow scientists, and not always has posterity found him either just or justified. One of the longest polemics in which Virchow found himself engaged culminated in a violent attack against him, which we find in the *Gesammelte Abhandlungen* of Emil von Behring.[2] Here this famous bacteriologist offers a sixty-four page critique of the then prevailing philosophy of medicine, propounded chiefly by Virchow.[3] Written at a time when bacteriology and serology were unfolding at an extremely rapid pace; when nearly every year fundamentally new discoveries were made in the field of infectious diseases; in an age in which, for the first time in human history, cause and effect could be stated in a clear and scientific manner in medicine, von Behring attacked Virchow who constituted a stumbling-block and was regarded as one of the chief opponents of the germ theory. Ackerknecht makes the valid point that this was not quite the case, and it is furthermore not borne out by the writings of Virchow. Supporting Ackerknecht's opinion, it might be added that Virchow was on excellent terms of mutual respect with Pasteur—notwithstanding the then very marked rivalry between German and French scientists.[4] Virchow was apparently sceptical towards many of the plethora of bacteriological discoveries and, unfortunately for this young branch of medicine, Virchow proved to be right in many of the instances in which wild assertions had been made public.

Somehow, in all these polemics, in the multitude of attacks and counter-attacks, a very fundamental point seems to have been buried and lost: von Behring, in accordance with the prevailing scientific and technological ideas and hopes of the last quarter of the nineteenth century, postulated a clear-cut 'one cause, one disease', relationship, and found himself fully justified by the great discoveries of these decades. There was great hope for this generation not only to build a liberal world, free of all 'social ills', but also to wipe out disease as such.[5] Virchow, on the other hand, not only took a sceptical attitude

—maybe too much so—towards bacteriology, but rejected completely the philosophy of aetiological medicine and again and again expounded the theory of the multi-causal relationship between man and disease. Gertrud Kroeger[6] interprets the German word *sozial* as having, with these authors, the primary connotation of communal and governmental. This might be so, but we find it extremely rewarding to look at Virchow's famous and beautifully written article about the typhus epidemic in Upper Silesia.[7] How does Virchow's article and approach look in the light of modern epidemiology and social medicine? Is this really the staunch antagonist of the germ theory? And does he conform to Kroeger's dictum? Examining this work we do not find this to be the case; on the contrary, Virchow points out very clearly that there exist many correlates to disease, and he enumerates them in a form and manner still admirable today. We find his approach to disease as such, infectious or otherwise, a far more productive and broader one than that of von Behring's 'one cause, one disease' philosophy of aetiological medicine. Behring could not answer the problem of 'exposed–infected–diseased' in regard to the infectious diseases, and his approach to medicine cannot help us in tackling other problems such as cancer, arteriosclerosis and mental disorders. Virchow postulates the then still unknown contagion for the epidemic under investigation, but ranks it in a structure of other correlates, related to the biological, behavioural and social characteristics of man, as well as to the surrounding habitat in which both the contagion and man are found. Not only this: after carefully describing and enumerating these correlates of typhus in Upper Silesia in 1847, and after laying the foundations for action, Virchow then proceeds in his article to map out a programme, both immediate as well as long-range, for the control of the disease in this region.

In order to illustrate this fully, the above-mentioned article by Virchow will now be analysed, quoting and summarizing whenever necessary. The pages quoted are the pages of the original. Sometimes the order of the material has been re-arranged so that it may be compared with the modern triangle of 'Condition–Host–Habitat', so useful in epidemiology and social medicine.

The Condition

Description and diagnostic criteria. Here Virchow gives a comprehensive description of the clinical picture of typhus, its differential diagnosis and its diagnostic criteria (pp. 179–201). He goes on (pp. 201–2) and describes the possible complications, some of which in his opinion were caused by improper treatment. He then (pp. 202–12) gives nine detailed case descriptions, fully illustrating his former general discussion. In pp. 212–26 he describes and defines the pathological findings of the condition under investigation, gives five detailed autopsy reports (pp. 214–23) and summarizes these (pp. 223–6). Case-finding methods we find in pp. 143, 300–1, together with an attempt to arrive at an evaluation of their accuracy and validity. The treatment of the individual is dealt with relatively shortly (pp. 291–3) and not surprisingly so if we remember that there was little doctors could do then for their typhus patients.

Vital statistics, mortality and morbidity, the development of the epidemic. Here Virchow tries to give the sources, accuracy and validity of the statistical information available. He does this in quite 'modern' terminology, quoting population figures (p. 300), mortality and morbidity (pp. 226–9, 300–1) and finally trying to arrive at an approximation of the case fatality rate in this epidemic (pp. 227, 301).

The Agent

This problem is discussed by Virchow at great length. He gives a full historical review of the ideas and theories about the aetiology of typhus, quoting extensively and evaluating them (pp. 231–91). On p. 263 he says, among other things, '. . . if we summarize all that has been said, we can only state that so far there exists no definite evidence which proves this contagion . . .' and he goes on to deplore the fact that physicians (then) were not sufficiently trained and skilled in using scientific methods in order to be able to deal with this problem efficiently—the great difficulty being their muddled thinking in confusing the terms 'epidemicity' and 'agent'. On p. 264 he clearly names typhus as an infectious, contagious disease, although reiterating that no proof had yet been found for this claim.

The Host (other characteristics of the group)

Biological characteristics. Here Virchow gives figures and explanations in regard to the age and sex distribution of the epidemic and even attempts a breakdown according to occupation (pp. 230–3). He also tries to give figures of mortality in the various social classes (p. 281). In order not to confuse the mortality and morbidity figures of the epidemic proper, he quotes statistics of other concurrent diseases (p. 302). He describes the physique and nutritive state of the population (pp. 151 and 268–9), and discusses possible constitutional predispositions for this disease (p. 153). He also points out that there is strong evidence for the existence of immunity from previous infections (p. 267) and the mild clinical syndrome in these cases. At great length he discusses the endemic diseases of this area (pp. 168–78) and describes and differentiates them, *inter alia*, from typhus, dysentery, typhoid, measles, pulmonary tuberculosis, as well as scrofula, relapsing fever and anthrax. He also discusses in detail the prevalence of malnutrition (pp. 180–3) and its devastating effect on the susceptibility to and the clinical outcome of typhus.

Behaviour characteristics. Personal hygiene (p. 151), illiteracy of the population and alcoholism (pp. 152–3) are described and discussed in connection with the condition under investigation. The sleeping habits, crowding and heating methods are also discussed (pp. 160–2) and the diet of the population is described in detail (pp. 165–7). He also gives a short but masterly description of the popular medical practices of the population (pp. 153–4).

Social characteristics. In this section Virchow gives a detailed description of the housing conditions, types of houses, public or private, crowding indices and the architectural nature of the various types of private dwellings (pp. 162–5), making use of the statistical material available for exact description.

The Habitat

Physical. The geography, climate, topography, geology, rivers and forests of Upper Silesia are described in detail and these facts are correlated with agriculture and industry and with the people living there (pp. 145–9).

Biological. A short historical outline of the area is given and the origin of the population, its language and distribution are traced. An explanation is offered for this area, situated between Poland and Germany, having become so backward, underdeveloped and poor (pp. 149–52).

Social. Here we find a brilliant exposition of the social, political and administrative structure of the region (pp. 152–9). This section contains a penetrating analysis of the roles of the Catholic Church, the local and central governments, and the system of taxation. It gives an account of the social stratification and its consequences, and ends with a description of the region's pitiful state of industrial and agricultural development.

We have given the gist of this remarkable article in sequence from pp. 143–293, although we have sometimes slightly rearranged its original order. In this section we have also included some of the vital statistics which appear on pp. 300–2. The rest of this article, i.e. from pp. 293–322, deals with a detailed report of what Virchow has done to deal with the epidemic as a whole and what steps he initiated as short-term objectives; the article ends with an outline of long-term planning for this region in order to avoid a recurrence of a similar catastrophe (pp. 302 ff.).

These last thirty pages are indeed remarkable; having described and analysed the epidemic, and having taken a hard and critical look at the situation which he found on his official tour, and showing throughout that this devastating calamity which had struck this region could not have been caused by one agent only, Virchow then goes on to draw his conclusions. All the relevant factors could only be evaluated and planned for by correlating the biological, behavioural and social characteristics of the host as well as of the habitat.

An outline of the methods Virchow proposed for the immediate control of the epidemic shows clearly the revolutionary nature of his proposals in the context of the time. These methods included among other steps a Joint Planning Committee, appointed by him, comprising professionals as well as representatives of the community; an Inter-Agency Council, comprising physicians and government officials, both regional and central; a notification system of new cases; the organization of medical care; the organization of food supply to the ravaged area, and the steps taken to improve all existing administrative lines. A detailed programme for long-term planning follows in which Virchow asks for 'full and unlimited democratic government'; partial self-government and development of local authority; free education, also for girls; absolute division between Church and State; reform of the existing taxation system; improvement of agriculture and the development of industry; urging the sending of specialists and experts into the region in order to enable speedy development and raising of the standard of living; the creation of store-houses; finally, he postulates his

conclusion: 'Every individual has the right of existence and health, and the State is responsible for ensuring this.' Judged by modern social medicine, these are certainly no loose or wild revolutionary ideas; they may have been revolutionary in 1849, but in the light of our times they are eminently sound and seem to be almost prophetic.

Secondly, the criticism levelled against Virchow's ideas expounded in this article—he was only twenty-seven years of age when he wrote it—is refuted by his subsequent life work: creating with his monumental work in pathology the very foundations for the scientific study of specific disease processes, he went in to the field of preventive medicine and public health. Here he made a great contribution towards the improvement of the sanitary environment, sewerage systems, school and other conditions in the realm of the Imperial German Reich. He then proceeded to contribute towards laying the foundations of modern anthropology in which—amongst other important work—he conducted a survey of the physical characteristics of over 250,000 schoolchildren in Germany (showing, incidentally, that they have no common 'racial' characteristics). He became one of the most outspoken and progressive members of the German Reichstag, fighting for social reforms, insurance of the worker and improvement of housing conditions. Already, in 1848, Virchow began a new medical journal, *Die Medizinische Reform*, in which he fought for greater concern with social situations as aetiological factors in disease. On page 2 of the first number of this journal he declared: 'Medicine is a social science.'

This article does not claim that Virchow and his concepts were unique for his time. Other authors in England, Austria, France and other countries expressed similar ideas, although none of them did so as comprehensively as Virchow did. We consider that from the historical perspective attempted above, social medicine owes a great debt to Rudolf Virchow, which has never yet been adequately recognized. The grand and broad conceptions outlined in his article of 1849, and powerfully backed up by his work throughout his life, make Virchow one of the eminent founders of this discipline in medicine.

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