The case for a national environmental health service*

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IN 1849 when John Snow removed the handle of the pump in Broad Street, he effectively brought to an end an outbreak of cholera which had claimed over 500 victims in the preceding ten days. His actions clearly illustrate the value of practical observations in the field, he recognised an environmental hazard and by terminating the affected water supply provided a valuable clue to the aetiology of cholera.

It is interesting to draw the parallel that almost 120 years later an association has been shown between the incidence of coronary heart disease and the relative hardness of the water, one is aware that association is not causation, but using the wisdom of hindsight it is interesting to note that it has taken epidemiologists concerned with coronary disease so long to unravel this important yet simple finding. What other diseases may become clearer if relatively simple epidemiological correlations are made?

All the common cancers vary in incidence with changes in the environment and in the patterns of human behaviour (Doll, 1965). This variation may be quite substantial, even within such homogeneous areas as North-west Europe and North America there is a fourfold variation in the incidence of many of the common cancers. The incidence of cancer amongst other populations is even more marked, admittedly many of the reasons for these variations are undiscovered. It is not known why cancer of the stomach should be almost twice as common in this country in the white population, as it is in the United States of America or only a third as common in the professional classes as in the unskilled labourers, nor even why its incidence should have fallen in the U.S.A. in the last ten years by more than a quarter. Differences of this magnitude clearly cannot be due either to different diagnostic standards or to genetic factors. However some of the factors are already known, and it is reasonable to suppose that the annual death rate due to cancer of the lung which occurs in Scotland of just over 600 deaths per million could be reduced to that of Norway where only about 100 deaths per million occur annually due to this neoplasm.

Studies in medical geography (Melvyn Howe, 1970) clearly illustrate the tremendous variation that occurs between the regions of this country in the prevalence and incidence of many different diseases. A particularly startling variation occurs in the prevalence of cancer of the stomach amongst the population of Wales.

Other diseases vary considerably in their locations, and work correlated by the Royal College of General Practitioners in its Tamar Valley project has shed an interesting light on a facet of the aetiology of multiple sclerosis (Hargreaves, 1964). The adjacent towns of Camborne and Redruth in Cornwall are very similar to each other but they have a different water supply, however the town of Camborne has about twelve times as many cases of multiple sclerosis as does its neighbour Redruth, and the total heavy metal content of the water supply of Camborne is more than twenty times greater than Redruth. The lead and copper content of the water supplies are similar but the difference is largely accounted for by an excess in the amount of zinc in Camborne's water. Many

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of the differences and variations which occur in disease prevalence may become clearer with long-term environmental morbidity studies.

All power sources pollute, and until a change is made from what is elegantly described as 'the cowboy economy' with its wide open prairies and limitless resources of raw material (Boulding, 1972), to the economy of the spaceship where recycling of raw materials is the aim, this pollution must inevitably increase as our demand for sources of power grows. The gross national product still remains the golden calf for the Government and industry.

Pollution should be interpreted in its broadest sense, meaning not only the heavy metals and other toxic substances to be found in our atmosphere, but also, for example, the effect of noise and stress on people's lives. The parameters of unhappiness that can be measured like divorce, suicide, juvenile delinquency and mental disease are all increasing and this suggests that for many their life style is not improving. This pollution appears always to be on the increase, and those who object by the argument that whatever is intended is for the common good, can be answered by evidence that whatever is intended will be injurious to our health either in the long or short term. Such evidence could be provided by environmental health studies.

General-practitioner involvement

Most people would agree that some form of environmental surveillance is of value, the question at issue is whether the general practitioner with all his other demands should involve himself in an active role as a doctor, rather than giving such surveillance his passive blessing as an educated scientifically-trained citizen.

There are several factors now working which should encourage and promote this involvement, firstly owing to the considerable shift in the content of our workload during the last decade, the antibiotics together with our vaccination programmes have made infectious diseases far less of a life-threatening situation. These changes broadly speaking have meant that our service commitments have been reduced leaving, we hope, more time for the proper planning of a complete health service, as opposed to the disease service which has existed to date.

In addition there has been a marked increase in a number of general practitioners who now work together either from group practices or health centres, they can now

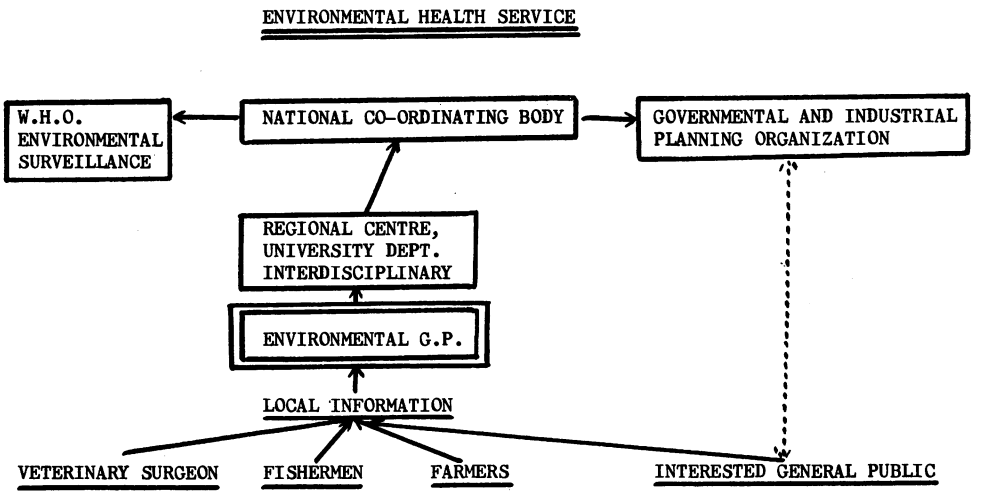

Figure 1

provide primary medical care as a properly organised team. This should mean that more of our working lives can be spent in preventive medicine.

Finally, the reorganisation of the health services which is occurring will mean that there are closer linkages between our colleagues in hospital and in the public health sector, and therefore the logistics of supervising preventive health projects for the community will be greatly simplified. I hope this will provide an excellent opportunity for co-operation between the family doctor and the new community physicians.

Considerable expertise has been developed by general practitioners in devising methods of recording basic morbidity data. A practitioner through his practice provides a population of precisely measurable size and character which can be observed in detail and documented in continuity during many years. The family doctor as he is closest to his patients is in the best position to evaluate any possible harmful environmental effects, many of them may be subtle or only manifest themselves after considerable time.

It should not be difficult to correlate the morbidity findings from these practices with the geological, geographical, climatic and other community parameters prevalent in the area; this information has also usually been gathered sometimes during many years, but often by completely different organisational bodies.

It is suggested that a national network of environmentally-orientated scientific observers be set up, and that the general practitioners of this country have a fundamental role to play in such a scheme. Clues either to an acute or long-term threat may well be provided from the practitioner's local knowledge and from his patients. Valuable information would be gathered from other scientists like veterinarians and botanists who are working in the same community, interested parties, fishermen, farmers and the general public could supply a vast amount of relevant background information. There is a growing interest in the environment by the general public, and in having a scientifically trained observer at local levels much anxiety and worry may well be averted. One of the functions of such an observer would be to reassure the worrying individual that probably no hazard exists, when these probabilities, after evaluation of the scientific evidence appears small. It may be very distressing to live in the lee of a pig farm, but it probably does health no harm, in contra-distinction to having a house 20 miles downwind from a chemical works which quietly spreads heavy metals on to your garden. Many observations made by the general public on environmental hazards are based on *post hoc* arguments, and it is hoped by having a scientific evaluation at the very beginning of these problems many expensive red herrings will be avoided.

"All science is measurement" and as Sir Henry Dale said "All true measurement is essentially comparative". The apparatus and skills required for the measurement of many of the physical characteristics of the environment are expensive and require sophisticated technical expertise, however it is believed that these facilities may well be readily available in the university departments of biochemistry or the other earth sciences, and this may well present an excellent opportunity for a combined interdisciplinary venture. Each discipline working within its own confines, but providing a vital piece of the environmental jig-saw puzzle.

A central co-ordinating body would be equipped with modern data-storage and retrieval methods and would have the function of advising and correlating environmental health throughout the country. A second function would be to provide a source of skill and expertise for governmental and other bodies who are responsible for the vast changes that are occurring in our environment today. Figure 1 illustrates how such an environmental health service could function.

Under ideal circumstances we should be anxious to obtain evidence that a given environment is 'safe' as opposed to 'dangerous', the World Health Organisation and

various national bodies have set very few safe limits for substances which people may absorb from their environment, and these are usually set only for single items, usually risks like radiation which can be precisely defined. Less attention has been paid to the possible hazardous situations which may occur when these toxic substances occur in combination with one another. In addition much work has to be done on the individual variation of toxic influences based on our different genetic constitution.

From the planner's point of view it is important to know that one place is safer than another in which to site a reservoir, but from the householder's angle it is important that the cabbages he grows in his garden do not contain levels of toxic substances that may be a danger to himself or his children. There is now tremendous pressure for the release of extra building land, and new estates of houses are being built on old mine workings, chemical tips or other unsuitable sites with possible serious results to the occupants in the future. Recommendations as to land usage have often been made in the past purely on economic grounds, for lack of evidence in the health field. This evidence would come to light during the operation of an environmental health service.

Summary

In summary therefore an environmental health service would have three main functions:

1. To conduct long-term morbidity studies relating environmental factors with morbidity changes, this would provide information about the environment and monitor its effect on man's health and welfare.

2. To provide an early warning of probable changes in disease presentation which may be due to significant environmental change, appropriate protective measures could then be instigated. This would also check the effectiveness of established regulatory mechanisms. This is the so-called, popularised 'doom watch' function, however, this concept is better extended to a 'health watch' activity.

3. In the light of the information and expertise derived from the preceding functions, an environmental health service would play a vital part in the future planning of technological developments.

If the principle of an environmental health service is accepted, interdisciplinary planning involving medicine and the earth sciences must begin at the highest level. The implications are not for us alone, there are doctors of first contact in almost every country of the world who are recording the morbidity patterns in their patients and were we to work out the mechanics of an environmental health service in this country, it may be but a short step to an international organisation possible under the sponsorship of the World Health Organisation.

The problems of environmental morbidity are common to us all. In contributing to this aspect of preventive medicine general practitioners in this country can make a very real contribution to the whole scientific knowledge.

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