parent diseased, seed parent diseased, and both parents diseased—and in not a single instance have we found the seedlings diseased; nor have the plants afterwards shown symptoms of disease when grown in isolation. This ensures, at least, that breeders and raisers can always begin with healthy stock—unlike, of course, those who propagate varieties by bulbs—and it would obviously pay all raisers of new varieties to take the greatest possible care to ensure that their seedling plants are grown as far away as possible from infected plants.

It is clear that some varieties of *Narcissus* are less affected by the disease than others, and that some varieties continue to flower and to flourish, if perhaps not so well as they might, at least sufficiently well to satisfy the not too-exacting grower. Other varieties, on the other hand, are so crippled by the disease that the plants become progressively smaller and smaller, cease to flower, and may actually 'starve' themselves out of existence. In many of the yellow varieties the flowers are flecked with white or lighter yellow areas, and may even be distorted. Distortion also of the flower-stalk spoils the flower from the gardener's or the commercial grower's point of view. It is now almost certain that there is only one virus agent which causes all these apparently different types of disease, and the difference in symptom-expression is a varietal difference, not a difference in the agent. We have found, for example, that juice from a diseased 'Sir Watkin' plant inoculated into a 'Croesus' plant causes the typical symptoms found in 'Croesus'. Inoculum from 'Croesus' into a healthy 'Helios' plant induces 'Helios' symptoms, and a back-inoculation from the diseased 'Helios' plant induces typical 'Sir Watkin' symptoms in a 'Sir Watkin' plant, and so on. It is clearly essential, therefore, that any suspected plants of all varieties should be 'rogued' as soon as they are noticed, since they will act as sources of infection for other varieties which may be much more susceptible to the disease than are the original diseased plants. This question of susceptibility to disease is one in which much help might be obtained from the grower and especially from the raiser of *Narcissus*. It is quite clear to us, as it must be to anyone who has had occasion to make similar observations, that some varieties are quickly reduced to uselessness by mosaic disease while others are only slightly affected, others again occupying an intermediate position. Clearly this susceptibility must be connected with the hereditary make-up of the variety, and any observations on these points would be most helpful. For example, *Narcissus jonquilla* and its hybrids, in our experience, are apparently little affected by the disease and show very slight symptoms, as also do the *N. poeticus* varieties. *N. triandrus* hybrids, or at least some of them, seem to be very susceptible, and so forth. Incidentally, I have not so far found a single case of mosaic in a plant of the wild *Narcissus pseudonarcissus*, though I have carefully examined many thousands of plants.

As more information becomes available about the nature of the disease, further methods of control may suggest themselves. In the present stage of knowledge, the most effective method is obviously careful rogueing of the stocks. Periodic inspections should be carried out and suspected plants should be removed and burnt. Clearly, inspection should begin early in the growing season before there is a likelihood of 'masking' of symptoms by higher temperatures. In small plantings, additional protection could be afforded by spraying with an insecticide like nicotine. Haasis has suggested that some measure of control might result from the selection of the larger bulbs from a group grown under similar conditions, as the effect of the disease is to reduce the bulb size appreciably. That reduction of size is found in diseased bulbs we have also found, but obviously this method would be only partially effective. Raisers of new varieties should remember that the seedling plants are always healthy, as the disease is not seed-borne, and great care should be exercised in growing new stocks as far away as possible from stocks of diseased bulbs if the latter must not be destroyed.

REFERENCES

Caldwell and James, *Ann. App. Biol.*, **25** (1938).

Haasis, Cornell University Agric. Exper. Station. Mem. 224 (1939).

Van Slogteren and De Bruyn Ouboter, Laboratorium voor Bloembollenonderzoek Te Lisse., No. 64 (1941).

Caldwell and Prentice, *Ann. App. Biol.*, **30** (1943).

SOCIAL MEDICINE AT OXFORD

IN a letter to Fulgenzio, Francis Bacon remarked that "the instauration of the sciences require some ages for the ripening of them". Social medicine may, in some respects, be regarded as an "instaurated', or "renewed" science, for it is one of broad outlook and revives the philosophical attitude with which the Greeks approached the study of social problems and natural phenomena. It is one of the most comprehensive of sciences, calling to its aid many branches of knowledge in the elucidation of its problems. It is fitting, therefore, that the first chair and Institute of Social Medicine have been established at Oxford, a University rich in many founts of learning, including the activities of Nuffield College, which is conducting important investigations into social problems. The University was exceptionally fortunate in securing for its first professor of social medicine so eminent a physician as Prof. John A. Ryle.

The Institute came into being as from April 1, 1943, but, owing to war-time difficulties, its working life only began in the spring of 1944. Yet, as its first annual report shows, a comprehensive programme of work has been drawn up and a number of investigations are already in progress. Certain of these, as the list of publications indicates, have either been completed or have reached a stage which justifies a preliminary report.

The purposes of the Institute are as follows:

(*a*) To investigate the influence of social, genetic, environmental, and domestic factors on the incidence of human disease and disability.

(*b*) To seek and promote measures, other than those usually employed in the practice of remedial medicine, for the protection of the individual and of the community against such forces as interfere with the full development and maintenance of man's mental and physical capacity.

(*c*) If required by the University to do so, to make provision in the Institute for the instruction in social medicine of students and practitioners of medicine approved by the Board of the Faculty of Medicine in the University of Oxford.

A review of the activities of the Institute reveals that the investigations made conform closely with the above requirements. Several of these relate to the health of infants and children. One of the criticisms of the School Medical Service has been the number

and variety of defects among school children. It has been pointed out in successive annual reports of the Chief Medical Officer of the Ministry of Education that these defects come to light chiefly when children are first examined medically on entrance to school. They develop during the pre-school age, and accurate knowledge concerning them is lacking. In 1944 the Institute launched a long-time survey to study and compare the health, development and sickness experience of children in all social groups from the first weeks of life to the age of five. The medical officer of health for Oxford City, his colleagues and the health visitors co-operate in this investigation, which should yield important results. A statistical analysis is being made of the still-birth rates and neo-natal rates in England and Wales in relation to environmental and social factors, and a special genetic study of twins is in progress.

The relationships between occupation and morbidity is another field in which extensive knowledge is lacking. Dr. W. T. Russell is making a statistical analysis of sickness absence at Morris Motors works, Cowley, including correlations of the main causes of sickness with such factors as age, sex, trade and season. On the basis of the initial study, it is hoped later to select particular causes of sickness, such as peptic ulcer and the chronic rheumatic diseases, for a more detailed inquiry into incidence and etiology. It is believed that certain useful analyses will emerge which should prove of ultimate advantage to the health of the workers, to the management and to production. When this inquiry extends to other industrial centres, comparisons of morbidity experience as between different industries, or between factories of the same industry in differently situated districts, should in time become possible.

On behalf of the Goitre Sub-Committee of the Medical Research Council, an extensive survey has been made on school-children at ages eleven to fifteen in several districts of England and Scotland to determine the varying incidence of thyroid hyperplasia in relation to the iodine content of drinking water. Significant variations in incidence have been demonstrated which correspond with variations in the amount of iodine present in the drinking water as well as with the varying incidence of childhood hyperplasia and adult goitre in the country. In the course of the survey a standard method of examining and recording the state of the thyroid gland was established.

Radiographic studies bulk largely in the report. They have been used in the investigations mentioned, and special inquiries are also being made to obtain more precise information on bony changes related to nutrition and intercurrent disease during the period of growth.

These important researches by no means exhaust the activities of the Institute. Its work is intimately connected with the Bureau of Health and Sickness Records in Hospitals (Nuffield Provincial Hospitals Trust). It has helped in investigations directed by the Ministry of Health and other official bodies, and has established itself as a consultative and advisory centre. It is responsible for the teaching of Oxford medical students in social and preventive medicine, and is extending its work in many directions.

Social medicine is an uncharted sea. The information in the present report reveals not only the possibilities of new discoveries, but also how well the work to this end is being directed, planned and organised.

ANATOMY OF THE PRIMARY VASCULAR SYSTEM IN DICOTYLEDONOUS PLANTS

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A STRIKING feature of botany as the science exists at present is the lack of any coherent body of comparative morphological doctrine dealing with the angiosperms. There are no books on the flowering plants in any way comparable with Bower's work on the ferns or Chamberlain's on gymnosperms. As a result, the treatment of angiosperms in university courses on botany is usually confined to separate and unrelated series of lectures on systematics and on plant anatomy. In seeking a remedy for this remarkable situation one cannot but be impressed by the almost complete neglect of the gross anatomy of the primary vascular system, or what the older anatomists called "the course of the vascular bundles in the stem". Analogy with the study of other groups suggests that this department of anatomy may be expected to yield data of phylogenetic significance. The pioneer paper published by Nägeli[1] in 1858 is still our principal source of information on this topic, the few memoirs which have appeared since that date being for the most part descriptions of the development of single species or accounts of the more obviously aberrant groups such as Piperaceæ. There have also been some publications dealing with the number of traces to a leaf in various families (for example, Sinnott[2]). The neglect of the subject may be attributed almost entirely to the fact that Nägeli and nearly all subsequent writers have paid altogether too much attention to the supposed basipetal development of the leaf traces, and have described vascular systems in terms of traces running down the stem and joining on to the traces of older leaves. Descriptions framed in this way make very tedious reading, and are so ill-adapted to the comparison of related vascular systems as to be almost unintelligible without the aid of diagrams. Furthermore, such accounts tend to emphasize relatively trivial features, especially the numbers of internodes which the various bundles traverse, at the expense of others which are really far more important.

In some recent publications[3,4] I have therefore made a complete break with tradition and employed a terminology which is independent of ontogenetic considerations. A primary distinction has been established between 'open' vascular systems, in which the bundles, as they run upward through the stem, branch but do not anastomose, so that the foliar gaps are open for an indefinite distance upwards, and 'closed' systems, in which the foliar gaps are regularly closed by anastomoses of the bundles. An open system is shown in Fig. 1, where the stele is represented as having been cut open down one side and then laid out flat. Crosses denote the median traces of leaves and the small circles lateral traces. Examination of this diagram will reveal a property common to all open systems, namely, the segregation of the primary vascular tissue into a number of units (in this case five), which have no communication with each other except at the base of the shoot, and, in some cases, including the one illustrated, also through the leaves. In closed systems, on the other hand, as in that shown in Fig. 2, the primary vascular tissue