furtherance of medical research in the laboratory that more medical men should choose to devote themselves to this branch of their profession.

It follows from what has been said that there is now little hope for success in medical research which is carried out in isolation. An almost essential condition is that such work should be done either in a university where good contacts are available with allied departments or in a research institute which is large enough to contain representatives of all the relevant branches of science. In this country this condition can now fortunately be fulfilled. The problems awaiting solution in the medical research laboratory are many and varied, and it is certain that no kind of work can bring greater intellectual satisfaction to those whose interest lies in science and who desire to help the advance of medicine.

THE STRUCTURE AND FUNCTIONS OF THE MEDICAL RESEARCH COUNCIL

BY

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This account of the Medical Research Council—the British Government organization for promoting medical research—has been prepared, by request, for the guidance of those undergraduate and postgraduate students in medicine and kindred subjects who may wish to consider a research career, or at least to undertake a period of research as an incident in the course of some other form of professional activity. Before discussing constitutional and administrative details it may be helpful to summarize the opportunities offered by the Council to the would-be research worker by indicating, first, the range of its interests and activities and, secondly, the forms of support to the individual worker which it is prepared to give in suitable cases.

In the first place it should be emphasized that, although research into the nature and causes of disease and into improved methods for its prevention, diagnosis, and treatment naturally forms an extremely important part of the Council's programme, that programme is of very much wider scope. It deals also with the fundamental sciences of medicine—physiology, biochemistry, biophysics, genetics, and the like; with problems of nutrition and of the maintenance of general human well-being, mental as well as physical; and with the normal and abnormal physiological and psychological reactions of the human being to his work and environment. It may deal, indeed, with almost any question involving the human factor.

The chief forms of support to individual workers provided by the Council are: (1) permanent or temporary staff appointments, (2) temporary research grants to independent investigators, (3) travelling and research fellowships, and (4) studentships for training in research methods. Each of these will be discussed under the appropriate heading below.

History and Constitution

The coming into force of the National Health Service Act, 1946, provides a not unsuitable occasion to review the history and constitution of the Medical Research Council, for the Council, as at present constituted, is the functional successor of the former Medical Research Committee, which was itself a child of the National Health Insurance Act of 1911. That Committee was appointed in 1913 under the National Health Insurance Joint Commission to administer funds provided for research into tubercu-

losis and other diseases affecting the insured population. It had scarcely had time to embark upon its programme, however, before the outbreak of the 1914–18 war caused it to divert most of its attention and resources to the study of problems of urgent military importance. Co-operating closely with the Army Medical Service, it was able to promote an active programme of studies on such diverse subjects as wound shock and wound infection, cerebrospinal fever, amoebic dysentery, and schistosomiasis, which gave many results of permanent value. That the activities of the present Medical Research Council during the second world war were even more varied and many times more extensive may be gathered from the Council's Report for the years 1939–45, which was reviewed in the *British Medical Journal* of May 15, 1948 (p. 942).

With the passage of the Act of 1919 which set up the Ministry of Health there was a fundamental change in the administrative arrangements for the promotion of British government-aided medical research, one of the provisions of the Act being to transfer responsibility for continuing the work of the Medical Research Committee to a specially appointed Committee of the Privy Council. In 1920, accordingly, the former Medical Research Committee was reconstituted as the Medical Research Council under the statutory authority of the new Committee of Privy Council for Medical Research; the Council was granted a Royal Charter of incorporation, and the funds for its work were thereafter provided direct by the Treasury in the form of a grant-in-aid approved yearly by Parliament—an arrangement which has persisted since. The Committee of Privy Council for Medical Research consists of the Lord President, as Chairman, and of the Ministers in charge of the principal State departments concerned with questions of public health in the United Kingdom and in the Empire overseas; the Minister of Health is its Vice-Chairman, and the Secretary of the Medical Research Council is *ex officio* its Secretary. The Lord President is the Minister responsible to Parliament for the Council's work.

It will be realized from what has been said that the Medical Research Council, although a Government organization financed from public funds, is not constitutionally a Government department. In fact, as will be shown later, it is a nearly autonomous body, predominantly of scientists, which enjoys full discretionary liberty in discharging its duties within wide terms of reference, its sphere of action in promoting medical research being unrestricted by rigid territorial or departmental limitations of function. The Council naturally maintains close touch with the several Government departments among which responsibility for public health is divided, and an important part of its programme consists in investigations of problems referred by the Ministry of Health and other departments for advice. It is able to collaborate freely on subjects of common interest with its sister research organizations—the Department of Scientific and Industrial Research and the Agricultural Research Council, both likewise under the Privy Council with the Lord President as their Minister. The Medical Research Council is also able to have direct relations with organizations in other countries having interests similar to its own—for instance, with the Rockefeller Foundation of New York, which has given much help to the Council's programme in many different ways over a long period of years. In administering the public funds entrusted to it the Council is not merely an advisory body but has full executive control.

Membership

There are nowadays twelve members of the Medical Research Council—three lay and nine scientific. They are appointed by the Committee of Privy Council for Medical

Research, and they retire in turn at regular intervals. Of those appointed for general rather than scientific qualifications one at least must be a member of the House of Lords and one a member of the House of Commons. The nine scientific members are chosen to represent different branches of curative and preventive medicine and the fundamental sciences on which these are based; they are appointed by the Privy Council Committee after consultation with the President of the Royal Society, as representing independent scientific opinion in the country, and with the existing Council.

Scientific members who have served for the normal period of four years are not eligible for immediate reappointment, but the aim is always to ensure that the Council's scientific membership comprises a body of distinguished experts with first-hand experience of research in clinical medicine and surgery and in the more important of the basic sciences, as well as in some of the specialties of medicine. The Council appoints its own Secretary and its other administrative and scientific staff. The present Secretary is Sir Edward Mellanby, G.B.E., K.C.B., F.R.S.

Advisory Committees

The fact that the individual scientific members serve for only a limited period helps to give the Council flexibility of outlook and provides a useful variation in the range of technical interests directly represented by its members. Nevertheless, it is clearly impossible for the nine scientific members at any given time to possess detailed comprehensive knowledge of all the increasingly complex and specialized branches of medicine and allied subjects. To counter this difficulty, and to advise it in promoting research in particular aspects of medical science, the Council is assisted by a large number of expert technical committees which it appoints for the purpose. The terms of reference of these different committees cover a very wide range of topics; some of them are standing committees which assist the Council in the promotion of long-term inquiries over an extensive field; others are appointed on a short-term basis to organize research on a single problem or group of problems and are discharged on the completion of that task. Examples of the former are the Accessory Food Factors Committee and the Chemotherapy Committee and of the latter the two committees set up in 1946 to direct clinical trials of streptomycin in tuberculous and non-tuberculous conditions, respectively.

Two standing committees of special interest at present are the Committee on the Medical and Biological Aspects of Nuclear Physics and the Colonial Medical Research Committee, the latter appointed jointly by the Council and the Colonial Office to direct work on nutritional and other questions affecting the well-being of colonial peoples, including, of course, the study of tropical diseases. In promoting research on problems of industrial welfare and efficiency the Council is advised by its Industrial Health Research Board and by special committees on Occupational Medicine, Occupational Physiology, Occupational Psychology, Industrial Pulmonary Disease, etc. Members of the Council's advisory committees serve in a voluntary capacity, without payment. The Council meets about nine times a year; its committees as often as necessary.

Finance

The funds available for the work of the original Medical Research Committee in the year 1914 amounted to about £55,000; the Parliamentary grant-in-aid of the Medical Research Council for 1948-9 is £770,000, and additional provision from public funds for special non-recurrent expenditure brings the Council's budget for this year to over £1,000,000. At the outbreak of the 1939-45 war the

grant-in-aid was £195,000, and even by 1945-6 it had risen to only £295,000. The impressive increase in the size of the grant since then reflects not only the greatly increased cost of research but also a very wide extension of the Council's activities and commitments; for instance, the number of its research establishments was only sixteen in 1939; at present there are about forty. Important schemes of research now planned into some of the newer developments in radiotherapy for cancer—e.g., by the use of the synchrotron and cyclotron—must necessarily involve heavy non-recurrent expenditure on apparatus, for which Government authority has been obtained.

In augmentation of the public funds entrusted to it the Council is empowered by the terms of its Charter to accept charitable benefactions by gift or bequest for the support of medical research; some of these are used for the general programme, others are limited, by request of the donors, to work on specific subjects. The Council also from time to time receives grants from various public or semi-public bodies in aid of particular investigations. The cost of the Public Health Laboratory Service which the Council administers on behalf of the Ministry of Health (see below) is not a charge upon the research funds at its disposal but is provided separately.

Research Establishments

The Council's administrative headquarters are at 38, Old Queen Street, London, S.W.1, and its central research laboratories comprise the National Institute for Medical Research, at present situated at Hampstead, and associated farm laboratories at Mill Hill, a special building where there is also nutritional research. The Institute at Hampstead—a former hospital, opened for its present purpose in 1920—has become inadequate for growing needs, and it is hoped within the next two years to transfer its work to a new and much more commodious building on the Council's land at Mill Hill; this was begun shortly before the 1939-45 war and is now being completed and equipped. Only laboratory research is done at the National Institute, the Council's programme of clinical investigations being carried out at other centres, as will be shown later. Nevertheless, though much of the research work at the Institute is necessarily of a fundamental nature, a substantial part of it has an immediate bearing on clinical problems, and numerous field studies in hospitals and elsewhere have been organized from the Institute: an instance is the new attack launched in 1946 on the aetiology of the common cold, which is being carried out in a special unit at the Harvard Hospital, Salisbury, maintained jointly by the Council and the Ministry of Health.

The research programme of the National Institute is a very wide one, divisible into the broad categories of physiology, pathology (including bacteriology, protistology, virus diseases, and immunology), pharmacology, chemotherapy, biochemistry, endocrinology, and physics in relation to biological research. Diseases recently under intensive study there have included influenza, malaria, and, during the recent war, the typhus fevers. A special responsibility of the Institute is to maintain standard preparations for the biological assay of certain drugs, hormones, vitamin preparations, and antitoxins; this is done both in fulfilment of statutory obligations of the Council in the United Kingdom and, in many instances, on behalf of the World Health Organization (formerly the Health Organization of the League of Nations). Sir Henry Dale, O.M., G.B.E., F.R.S., was the first Director of the Institute; he was succeeded, on his retirement in 1942, by Dr. C. R. Harington, F.R.S. (now Sir Charles Harington).

It is obvious that in any comprehensive programme of medical research prominence must be given to the study

of problems of disease and injury as they are seen in patients—that is, to clinical investigations in hospital wards and out-patient departments. The Council has not established a special research hospital, deeming it preferable to take advantage of the available facilities and freer supply of clinical material at existing hospitals and the valuable opportunities to recruit and train new investigators which are provided by the day-to-day contact of research workers with undergraduate and postgraduate students at academic centres. In conformity with this policy it has for long maintained, wholly or in part, special units for clinical research at two London teaching hospitals and at the National Hospital for Nervous Diseases, Queen Square, London, W.C.1. The oldest of these establishments is the Department for Clinical Research at University College Hospital, and it was here that the late Sir Thomas Lewis, F.R.S., carried out much of his famous work on diseases of the heart and blood vessels.

It has already been mentioned that the expansion of the Council's programme since the beginning of the recent war has led to a great increase in the number of its special research units. Many of these newer units have also been established primarily to study clinical problems; they include the Otological Research Unit at the National Hospital for Nervous Diseases, the Radiotherapeutic Research Unit at the Hammersmith Hospital, the Department for Research in Industrial Medicine at the London Hospital, the Industrial Medicine and Burns Research Units at the Birmingham Accident Hospital, the Pneumoconiosis Research Unit at Cardiff, the Department of Experimental Medicine at Cambridge, and the Clinical Chemotherapeutic and Clinical Endocrinology Research Units at Glasgow and Edinburgh, respectively. A Table listing the Council's chief existing research establishments other than the National Institute for Medical Research, at Hampstead, is given below.

The arrangement between the Council and the institution housing a particular research establishment varies from case to case, but the Council usually provides the medical and other scientific workers and the research expenses, the institution supplying accommodation and, in the case of the clinical units, the cost of feeding and nursing the patients. A statistical research unit has been an essential part of the Council's organization from the beginning of its work; the unit is housed in the Department of Medical Statistics at the London School of Hygiene and Tropical Medicine, the head of the Department, Professor A. Bradford Hill, himself giving part-time service to the Council.

Work Overseas

As an important ancillary to its programme within the United Kingdom the Council during the recent war dispatched a number of field research teams overseas to carry out intensive investigations of health problems affecting the armed Forces or the civilian populations of colonial territories. Before the war it had co-operated with other bodies in arranging a nutritional survey of Nyasaland, and it had awarded a number of fellowships to enable suitably qualified workers to undertake periods of field research on tropical diseases in various colonies. This type of collaboration with the Colonial Office has been greatly facilitated by the appointment of the joint Colonial Medical Research Committee, and by the setting up in 1944 of the Council's Human Nutrition Research Unit (see Table). Since then a number of members of the Unit and other workers for the Council have been sent to investigate health problems in overseas territories. An outstanding development of this kind has been the establishment in the Gambia of a Field Research Station with clinical facilities;

this, though supported from colonial development funds, is run in direct association with the Human Nutrition Research Unit in London, both being directed by Professor B. S. Platt, of the Council's staff.

Another overseas activity of the Council, also relating mainly to nutritional questions, was the formation of a temporary research unit at Wuppertal, as an annexe to the Department of Experimental Medicine at Cambridge under Professor R. A. McCance; its primary object was to study the effects and treatment of post-war malnutrition in the German population. A research mission of a different kind has been that sent by the Council to Cairo, by arrangement with the Egyptian Government, to investigate problems of schistosomiasis in areas where the disease is endemic.

Research Staff

At the National Institute for Medical Research, at all the research centres listed in the Table, and at many others the Council employs a whole-time scientific staff, appointed on either a permanent or a temporary basis. There are at present about 300 members of the scientific staff, exclusive of technical assistants. Pensions for staff members on retirement are provided by insurance policies under the Federated Superannuation System for Universities.

In addition to those working in the Council's own research units, some members of the staff are attached to hospitals, university departments, or other independent research centres. Among the fields of study of these "external" members of the staff are problems of disease in children, nutrition, clinical bacteriology, tuberculosis, chemotherapy, and the biological effects of radiation.

Research Grants

Although the greater part of the funds at the Council's disposal is devoted to the support of research by its own staff, an important fraction has always been expended annually in the form of temporary grants made in aid of approved researches by entirely independent investigators at universities, hospitals, and other institutions throughout the United Kingdom and, on occasion, overseas. These grants may be made variously for the personal support of the investigator on a whole-time or part-time footing, for the provision of scientific or technical assistance to senior investigators, or for research expenses. Grants made by the Council are usually awarded on an annual basis, and those made to workers for their personal support are not ordinarily renewable over a longer total period than three years. Where an application for a research grant comes within the field of interest of one of the Council's many expert committees the Council has the advice of the committee in considering it.

Studentships and Fellowships

Reference has been made above to the advantages, from the point of view of the recruitment and training of new research workers in medical science, which are gained by the siting of most of the Council's clinical and other research establishments in teaching centres. As a further aid to recruitment the Council awards studentships for training in research methods to young graduates of special promise who are recommended for the purpose by the heads of the departments in which the training would be given. These studentships are tenable for a period of one year in the first instance, and are renewable up to a maximum of three years in all, subject to favourable reports from the supervisors of the studies; one of their chief objects is to make it possible for young men and women who otherwise might be prevented by economic factors from contemplating a research career to display their fitness for that type of work.

Apart from these training studentships, which are tenable in the United Kingdom, the Council awards certain travelling fellowships to enable suitably qualified British workers to undertake periods of study and research at centres abroad. It has for long acted as the agent in Great Britain of the Rockefeller Foundation of New York by awarding the travelling medical fellowships for British

latest of these Reports to be issued was that for 1938-9, but the series has been resumed with a six-year Report reviewing the Council's many activities during the war period, which was published a few months ago. Best known among the Council's several other series of publications are the green-covered *Special Reports*, of which more than 260 have been issued, on a diversity of medical subjects. Others

Table showing Principal Research Establishments of the Medical Research Council other than the National Institute for Medical Research (July, 1948)

Subject	Establishment	Place	Present Director of Unit or Department or Head of Research Group
General medicine	Department of Clinical Research	University College Hospital, London	E. E. Pochin, M.D., F.R.C.P. (post-endowed by Rockefeller Foundation)
" "	Clinical Research Unit	Guy's Hospital, London	R. T. Grant, O.B.E., M.D., M.C.R.P., F.R.S.
Medicine (including nutritional and paediatric studies)	Department of Experimental Medicine	Cambridge University (with temporary field-research unit at Wuppertal, Germany)	Prof. R. A. McCance, Ph.D., M.D., F.R.C.P., F.R.S.
Diseases of the nervous system	Neurological Research Unit	National Hospital, Queen Square, London	E. A. Carmichael, C.B.E., M.B., F.R.C.P.
Problems of ear disease and deafness	Otological Research Unit	National Hospital, Queen Square, London	C. S. Hallpike, M.B., F.R.C.P., F.R.C.S.
Problems of vision	Vision Research Unit	Central London Ophthalmic Institute, Judd Street, W.C.1	H. Hartridge, M.D., F.R.S.
Treatment of cancer	Radiotherapeutic Research Unit	Hammersmith Hospital, London	Miss C. A. P. Wood, M.R.C.P. (D.M.R.E. (half-time))
Industrial diseases and poisoning	Department for Research in Industrial Medicine	London Hospital	Donald Hunter, M.D., F.R.C.P. (part-time)
Industrial health hazards, including injuries and skin diseases	Industrial Medicine Research Unit	Birmingham Accident Hospital	J. R. Squire, M.B., M.R.C.P.
Treatment of burns	Burns Research Unit	Birmingham Accident Hospital	" "
Industrial pulmonary disease	Pneumoconiosis Research Unit	Llandough Hospital and other centres, Cardiff	C. M. Fletcher, M.D., F.R.C.P.
Actions of drugs in man	Clinical Chemotherapeutic Research Unit	Glasgow University and Killearn Hospital	J. Reid, M.D., M.R.C.P. (part-time)
Clinical aspects of endocrinology	Clinical Endocrinology Research Unit	Edinburgh University and Royal Infirmary	(At present directed by a Committee)
Nutrition	Nutrition Building	Mill Hill, London	Sir Edward Mellanby, G.B.E., K.C.B., M.D., Sc.D., F.R.C.P., F.R.S.
"	Human Nutrition Research Unit	National Hospital, Queen Square, London, and London School of Hygiene and Tropical Medicine (with associated establishment in the Gambia)	Prof. B. S. Platt, C.M.G., M.B., Ph.D.
Nutrition (vitamin studies)	Group for Research on Nutrition	Lister Institute of Preventive Medicine, London	S. S. Zilva, D.Sc., Ph.D., F.R.I.C.
" (mainly vitamin studies)	Dunn Nutritional Laboratory	Cambridge University	L. J. Harris, Sc.D., Ph.D., F.R.I.C.
Dental disease	Dental Research Unit	King's College Hospital, London	J. D. King, Ph.D., L.D.S.
Bacterial chemistry	Bacterial Chemistry Research Unit	Lister Institute of Preventive Medicine, London	Sir Paul Fildes, O.B.E., M.B., F.R.S.
" "	Group for Research in Chemical Microbiology	School of Biochemistry, Cambridge University	Miss M. Stephenson, Sc.D., F.R.S.
Cell metabolism	Cell Metabolism Research Unit	Sheffield University	Prof. H. A. Krebs, M.D., F.R.S. (part-time)
Problems of blood grouping	Blood Group Research Unit	Lister Institute of Preventive Medicine, London	R. R. Race, Ph.D., M.R.C.S.
Preparation of blood derivatives	Blood Products Research Unit	Lister Institute of Preventive Medicine, London	A. N. Drury, C.B.E., M.D., F.R.S. (Hon. Director)
Problems of transfusion	Blood Transfusion Research Unit	Postgraduate Medical School of London	P. L. Mollison, M.D., M.R.C.P.
Chemotherapy of malaria	Group for Research in Chemotherapy	Molteno Institute, Cambridge University	Miss A. Bishop, Sc.D.
Toxicology (with special reference to industry)	Toxicology Research Unit	Chemical Defence Experimental Station, Porton	J. M. Barnes, M.B.
Electromedical studies	Electromedical Research Unit	Ministry of Pensions Hospital, Stoke Mandeville, Bucks	R. B. Bourdillon, C.B.E., M.C., A.F.C., D.M.
Biophysics	Biophysics Research Unit	King's College, London	Prof. J. T. Randall, D.Sc., F.R.S. (Hon. Director)
Medical problems of nuclear physics (including research on health hazards)	Radiobiological Research Unit	Atomic Energy Research Establishment, Harwell	J. F. Loutit, D.M., M.R.C.P.
Molecular structure of biological systems	Unit for Research on the Molecular Structure of Biological Systems	Cavendish Laboratory, Cambridge University	M. F. Perutz, Ph.D.
Environmental physiology	Groups for Research in Industrial Physiology	London School of Hygiene and Tropical Medicine	(1) T. Bedford, D.Sc., Ph.D. (2) H. C. Weston, F.I.E.S.
" "	Research Unit on Climate and Working Efficiency	Oxford University	Prof. W. E. Le Gros Clark, D.Sc., F.R.C.S., F.R.S. (Hon. Director)
Occupational psychology	Applied Psychology Research Unit	Cambridge University	Prof. Sir Frederic Bartlett, C.B.E., M.A., F.R.S. (Hon. Director)
" "	Group for Research in Industrial Psychology	Manchester and elsewhere	S. Wyatt, D.Sc.
Psychological and other "human" problems of the building industry	Group for Research on the Building Industry	Birkbeck College, London	Prof. C. A. Mace, M.A., D.Litt. (Hon. Director)
Occupational psychiatry	Occupational Psychiatry Research Unit	Institute of Psychiatry, Maudsley Hospital, London	Prof. Aubrey J. Lewis, M.D., F.R.C.P. (Hon. Director)
Medical statistics	Statistical Research Unit	London School of Hygiene and Tropical Medicine	Prof. A. Bradford Hill, D.Sc., Ph.D. (part-time)
Social medicine	Social Medicine Research Unit	Central Middlesex County Hospital	J. N. Morris, M.R.C.P., D.P.H., D.C.H.

workers generously provided by that body, and it has its own series of travelling and research fellowships in tuberculosis financed from a special benefaction in memory of Dorothy Temple Cross.

Publications

Before the war the Council had to submit to Parliament an *Annual Report* on its work, which was published; the

deserving special mention are the white *Memoranda*, started in 1940 as *War Memoranda*, which are used to record the results of certain *ad hoc* investigations or to give up-to-date advice on practical problems of medicine based on the latest results of research. All the Council's own publications are printed and sold by His Majesty's Stationery Office. The results of the great majority of the investigations supported by the Council are, however, reported direct by the

workers concerned in papers contributed on their own initiative to medical and other scientific journals.

The Public Health Laboratory Service

Reference has already been made to the Public Health Laboratory Service, organized and administered by the Council for the Ministry of Health since 1939. An account of the history of the Service and of its work to date was given by Dr. G. S. Wilson, the Director, in his Milroy Lectures published in the *British Medical Journal* of April 3 and 10, 1948 (pp. 627 and 677). The original object of the Service was to augment the existing public health resources of the country in combating epidemics of infectious disease such as were likely to arise from the abnormal conditions of war, and to keep a constant watch for any suspected instance of "bacterial sabotage." While the Service did not, in the event, have any example of "bacterial sabotage" to contend with, it proved so notably successful in elucidating and restricting outbreaks of infectious disease and bacterial food-poisoning during the war that it has been extended since as the framework of an organization for carrying out nation-wide investigations of problems of public health and epidemiology. At the request of the Government the Council accordingly agreed to administer the peacetime Public Health Laboratory Service on behalf of the Ministry for an initial period of five years. Statutory authority for the Service is provided in the National Health Service Act of 1946.

Discussion

It is often asked: is enough money provided in this country for the needs of medical research? It would be both unwise and untruthful to answer that question in the affirmative, for it is certain that additional funds could always be effectively used to assist research on important health problems to which new clues may have been provided by recent discoveries and for which suitably trained investigators with good ideas and good facilities are available. On the other hand it would be wrong to suggest that the present Government and its predecessors have failed to meet the requests of the Medical Research Council for increased funds for the support even of very costly new work which the Council believes to be necessary and promising.

It is important to remember, moreover, that the grants-in-aid provided by Government for the work of the Medical Research Council comprise only part of the financial support available in the United Kingdom for the encouragement of medical research; there are, in addition, the very substantial resources of the universities and hospitals and of various independent foundations and institutions; of the latter the Nuffield Foundation, the Wellcome Foundation, the British Empire Cancer Campaign, and the Imperial Cancer Research Fund are four examples among many of different kinds. The promotion of medical research in Britain, therefore, is not a monopoly, and both State and private enterprise contribute largely to it. The Council by its constitution is able to collaborate at will with any other official or private body having similar objectives, and a not unimportant part of its function is to decide whether a given investigation proposed to it would be better supported by itself or by some other organization with a view to avoiding undesirable duplication of effort.

The popular belief that a solution to even the toughest disease problem could probably be obtained at short notice by suddenly diverting to it huge sums of money and large numbers of investigators at a time when its prevalence gives it prominence in the newspapers unfortunately has little foundation in experience. This million-pound-in-the-slot-machine principle very rarely applies in medical science.

Time and again it has happened, instead, that control of a particular disease has been gained not by the method of intensive direct attack but as an unexpected result of patient fundamental advances on a much broader front and often involving an entirely different research discipline. Consider, for example, the recent studies of antibiotics, which have made possible the successful treatment of a large number of infections that had stubbornly resisted direct attack upon themselves as single diseases. It is for this reason that benefactions for medical research are often more effective when they are available for use in any part of the medical field which expert opinion deems ripe for exploitation than when they are rigidly dedicated to research on one subject, though cancer research and tuberculosis research, with their manifold problems, are obvious exceptions to the generalization.

Experience has shown that once a really hopeful new approach to a problem has been opened, and the right men or women with the right ideas are available to follow it up, the necessary money to support their activities will generally be forthcoming either from public or private sources. It is the need to find a new approach rather than just to spend more money which too often limits the speed of progress.

In an article published elsewhere¹ I discuss some of the reasons why medical research must generally be opportunist and can rarely be subject to long-term "planning" save in very broad outline (as by the appointment of a research establishment under a suitable director who is given a wide mandate within which to develop the details of his programme). Sir Edward Mellanby made nearly the same point some years ago when he remarked that the policy of the Medical Research Council was "to have no policy but to find the right men and back them in every way possible." The setting up of the Council's research establishments has largely to be governed by this opportunist philosophy—it is a question not only of realizing the kinds of problem urgently needing to be solved but also of finding men or women with the right sort of outlook, imagination, and experience, and of choosing centres with the best available facilities for their studies. Not infrequently the proposal to set up a new establishment has been put up to the Council by the investigator who subsequently has been made director of the unit concerned, though in other cases the Council has taken the initiative in starting a unit under a director considered to be suitable.

Large as is the number of the Council's research establishments at present, a glance at the Table will suffice to show that they do not as yet by any means cover the whole vast field of medical science. More units are being set up as opportunity offers, and the number of members of the Council's research staff increases each year. To meet the growing needs of the future there will be a call for more and more trained investigators in medicine and the allied sciences, and I have tried to indicate the range of opportunities which the Medical Research Council offers for such training to persons with a bent for discovery. The remarkable recent advances in so many different parts of the field have made the prospects for medical research more hopeful now than at any previous time: the demand for new recruits to the skilled army of investigators is correspondingly great.

¹*Brit. med. Bull.*, 1948, 5, 352.

The average annual production of quinine in India in the last three years was about 85,000 lb. per year. Approximately 145,000 lb. of quinine were imported into India during the last two years. There is at present a central stock of about 120,000 lb. of quinine and the question of maintaining an adequate reserve is being borne in mind. The existing cinchona plantations in India are owned mainly by the Governments of West Bengal and Madras, and they are making every effort to maintain and increase production.