The Development of Research in Universities.¹

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FOR some years it was my privilege to direct the work of a research laboratory where young graduates were trained in research methods and, after a period of collaboration, enabled to strike out independent lines of inquiry for themselves. This endeavour to make research work an organised part of the university's activities was successful, and it occurs to me that the experience thus gained in miniature may be of service in discussing the larger problems associated with the development of research in all subjects, in all universities.

It is not necessary to defend here the idea that research is a vital necessity. My plea is that, although much has been done, our research efficiency as a nation can be vastly improved and the full advantage reaped from present expenditure by changes which in themselves would not be expensive. The functions of a university are threefold: to satisfy the intellectual needs of the people, to lead the communities we serve, and to add to the store of human knowledge. Yet it must be emphasised that every advance made by investigation is something more than a mere addition to knowledge; it means also that some one has gained a rich experience. It is not so much the prize as the discipline of training and the joy of supreme effort which makes any contest worth while, and this applies equally in the world of intellect as in the realm of sport. The universities should not leave original research to the solitary worker, to the unaided enthusiast, but must place facilities for research in the way of every one naturally equipped with the spirit of inquiry.

These ideas are widely spread and are all but universally accepted. The movement in favour of the research development in the universities has suddenly taken shape after many years spent in educating public opinion. Glance for a moment at the phases through which it came into being. In doing so I confine myself meanwhile to research in experimental science, where development has been most rapid and is most easily traced.

I commence with the institution of the 1851 Exhibition Research Scholarships, a wise step which placed at the disposal of a few selected graduates the means necessary for extending formal study by research work.

On this was modelled some nineteen years ago the research scheme of the Carnegie Trust which has done so much to improve the efficiency of the Scottish universities. Whatever views may be held regarding the payment of university fees by the Carnegie Trust there can be only one opinion as to the wisdom and success of this feature of their activities. Notice the points of distinction between the Carnegie Trust Scheme and that of the 1851 Exhibition Commissioners. The latter is confined to scientific subjects alone, and, until recently, scholarship awards were made on one uniform standard. On the other hand, the Carnegie Trust also opens the door to literature, language, history, and economics. The award begins with a scholarship, and from this the best scholars are promoted to fellowships and ultimately to research assistantships, which include teaching duties. There is thus a steady weeding-out process at work, and only the best survive.

There are, of course, other research organisations operating in the universities, but I may pass at one step to the national scheme now administered by the Department of Scientific and Industrial Research. The details of this scheme follow closely the lines adopted by the Carnegie Trust for the universities of Scotland, but differ in the exclusion of non-scientific subjects.

I question very much if the full measure of advantage afforded by these schemes could ever have been attained if the universities had not taken the common action of instituting the Ph.D. degree. Now we are launched on this great new effort. The word "research" is on every tongue. In many subjects of study provision has been made for financing the way to research, and the universities have recognised the movement by the award of the new doctorate. What obstacles and difficulties have already been encountered and what have we still to guard against? These are among the questions I try to answer from an experience admittedly incomplete. Let us take the features common to all universities, irrespective of size or location, and to all subjects of study. The first urgent need I perceive is that our research organisation must recognise the claims of three distinct classes of original workers. These are: First, the young graduate, attracted sometimes by the genuine spirit of research, sometimes by less worthy motives, who in practically all cases is immature and untrained. Then there is the second class, represented by the university lecturer who has passed the apprentice stage and couples with teaching duties the continuation of his researches, frequently through love of the work, sometimes through recognition that worldly wisdom and the hope of a chair make it advisable. In the third place, we have the mature worker and thinker, represented by the professor, the man whose experience is ripe but whose time, already getting short, is fully occupied with other things.

Each class merges into and feeds the other, and all three classes need help. Prudence points to using the mature material to the best advantage, yet we have never done so, and the research schemes of to-day make the situation infinitely harder than before. The bulk of support is now afforded to the graduate research worker. Scholarships are awarded generously and widely. The conditions attached are moderate and reasonable, and there is now a rush to research. But the young worker has to be trained, supervised, guided, inspired, and this help can come only from the members of my two upper classes—the lecturers and the professors. I wish specially to emphasise this necessity, for I have seen too many good research workers spoiled and discouraged through lack of help, and too many moderate workers developed into investigators of the first rank by careful guidance. Such supervision and training involve the complete absorption of the time and energy of the mature investigator. There can be no formal course of instruction, no common course applicable to all pupils and all topics. Each individual has to be studied. There must be the daily consultations at the laboratory bench, in the library, and round the study fire.

The question of training and supervision must be taken seriously; there is a great danger, particularly in scientific subjects, that this has not been fully appreciated. How great is the temptation in such subjects to use the technical skill of the graduate

¹ From an address on "The Need for the Provision of Enlarged Opportunities for Advanced Study and Research in the British Universities," delivered at the annual Conference of Universities of Great Britain and Ireland, held in London on May 13.

to carry out one's own researches, to regard these young workers as so many extra pairs of hands. Even when the responsibility of becoming a research supervisor is fully recognised, how difficult it is to put oneself in the position of the beginner. The unexpected result is obtained, and the supervisor immediately explains it out of his long experience. What benefit does the student derive? The real supervisor has to curb his impatience and lead his collaborator to sum up the evidence and at long length reach the conclusion for himself. But that takes patience, sympathy, and, above all, time. The supervisor has his reward when gradually the research pupil reveals himself and emerges as an independent worker, but his own research output fades away. There is a novel called "The Devourers," in which a woman of genius finds her artistic development arrested when in time her children claim her every thought. Just as children are in this sense the devourers of their mothers, so are research students the devourers of their professors. When I relinquished my chair I was spending daily three hours at teaching and seven hours with the "devourers."

My first two points may be summarised thus:

(1) Research training must be thorough and must be taken seriously, both by the student and the supervisor.

(2) This training must be in the hands of mature investigators, who should be relieved of routine or administrative work and who need undertake only a limited amount of teaching.

This will cost money, and staffs must be enlarged to supply the main bulk of routine university teaching. There is plenty of room in university organisation for the patient conscientious teacher on whom the gods have been kind enough to bestow only a modest passion for inquiry. Nevertheless, the research supervisor himself must be a teacher and must mingle freely with undergraduates so as to recognise at the earliest possible stage the potential research workers of the future and to guide their studies accordingly.

The needs of the lecturer class of research workers are easily defined. They require more leisure for research than they get at present, and this freedom must not be secured through the agency of overwork and late hours. It should be defined and form part of the terms of appointment. So many hours in the day, so many days in the week, or weeks in the academic year, should be kept free from teaching or administrative work. Here again we encounter the question of finance. Additional staff must be provided, and for this more money is required. In this connexion the research assistantships recently instituted by the Carnegie Trust are a step in the right direction. One other point appeals to me strongly and involves no finance. Every facility should be given the lecturer-investigator to secure collaborators to work under him. I do not mean, of course, that the professor should take the pick of the bunch and leave the residue to his juniors. Every professor should pass a self-denying ordinance on himself in this matter, and, frankly speaking, he will find that it pays.

The professor's needs have already been dealt with, but there is another thing in which we can help him. Again it is a domestic matter. It is, I am convinced, a mistake for a governing body to call for an annual list of publications from their research departments. Nothing could be more injurious to the true atmosphere of research than the feeling of pressure; that papers must be published or the department will be discredited. Thus we have scrappy, incomplete accounts of topics which

have been chosen apparently for no other reason than that results will come quickly. One point more regarding the professor: Let him have as much financial support for his work as can be spared, but it is well to insist on his keeping these accounts separate from those concerned with university teaching. But these are perhaps petty details compared with the greatest need of the professor-investigator—the necessity to be free at intervals to travel to other centres and refresh himself in the company of kindred workers.

What I have said appears to me to apply generally to all forms of university research and is founded partly on experiences other than my own. I turn now to concrete suggestions. The first and most important is that in each university there should be a Board or Standing Committee entrusted with the supervision of higher study and research. We have Entrance Boards, or Matriculation Boards, governing and regularising the first phase of university study, and it is equally necessary to have such a body assisting in the highest studies. The functions of such a body would be widely varied, and should include the power (1) to recommend additions to the teaching staff in departments actively engaged in research work and to recommend promotion; (2) to allocate money voted from university funds for research purposes, and to see that subjects which are denied benefits from Government or public schemes are properly supported (I speak more particularly on behalf of classical and philosophical subjects, which are in a serious position to-day); and (3) to supervise higher degrees, including approval of the topics given to students.

These need not be elaborated; but here are some specific needs which such a body at once encounters: (1) The provision of research libraries in which reference works can be consulted in the department where the work is carried out; (2) travelling grants to enable workers to visit libraries, to consult authorities, to inspect MSS., or carry out investigations in the field; (3) publication grants, so that where no periodical literature is available in which research results can be published, the work will not remain buried and obscure—the classical and philosophical workers in particular have difficulty in finding a publication medium; and (4) special assistance for subjects not included in National Research Schemes.

As a matter of practical convenience the policy of establishing separate suspense accounts for each of the above has been adopted in the University of St. Andrews, so that heavy expenditure in one year is balanced by accumulations.

An organisation such as I have outlined is, of course, open to some objections. Research cannot be machine-made; it cannot be governed by regulations or committees. The very word "research" is an expression of intellectual freedom. But some organisation is necessary. It is effected on lines similar to those sketched by the Carnegie Trust in Scotland and in miniature within my own university. The system works well in that the available money is fairly distributed without reference to utilitarian demands. All classes of research workers are stimulated by the feeling that their interests are being looked after and that no subject has preferential treatment. The classical scholar can work in harmony with his scientific brother and without a feeling of envy. Above all, it is a step towards the safeguard that all subjects of inquiry will be prosecuted in the universities, and we may be saved from the degradation of a one-sided intellectual development. The system educates even the mature investigator, and I am sure it is a good thing for the twentieth century chemist to

learn something of, say, the social conditions of the twelfth. Then again, the danger is minimised that a young worker will be given, as is so often the case, an absurd problem, either fully explored, or hopelessly ambitious. In many branches of study the research enthusiasts have got their chance now, and they will have to work hard to justify it. The greatest need is money, so that all subjects may be helped, and our greatest difficulty will be to spend it wisely.

English Place-names.

AT a meeting of the Royal Anthropological Institute held on June 27, Prof. A. Mawer, of the University of Liverpool, read a paper on "A Survey of English Place-names." He said that from the earliest times the value of place-names as a possible source of historical knowledge has been recognised. Much early history has frankly been invented from them, and historians have speculated freely as to their meaning. More recently, scholars like Kemble have seen the possibilities latent in place-names; but until Prof. Skeat first put place-name study on its only secure basis, namely, the study of the early forms of the names, most of the work in this direction was only idle speculation. Conducted on scientific lines, place-name study could do much to throw fresh light on the dark places in the history of our country and its civilisation, where we had no documentary evidence or only such as has long been worn threadbare. Place-names and archaeology are the only unworked sources of evidence still remaining open to us, and these studies should be conducted in close touch with one another. With the aid of place-names, not only should we have fresh light on long-standing problems, but we should also be furnished with excellent illustrations of many phases of our history and culture.

At present we are only at the beginning of these studies. Much had been done by individual scholars upon single areas, but it has gradually come home to workers in this field that, in addition to such work, we also need co-operative effort, if ever we are to glean the true harvest of knowledge from place-names. The reasons for this are that (1) no safe inferences, either particular or general, can be drawn with reference to the names of any area except in the light of the full evidence for at least the whole of England; (2) the range of interests, historical, linguistic, topographical, and archaeological, concerned in the problems of place-names is so wide that they could not be dealt with adequately by any single scholar. These considerations have moved a small body of scholars representative of the various interests named to initiate, under the patronage of the British Academy, a scheme for a survey of English place-names with a view, not only of the interpretation of the individual names, but also of drawing from them all that wealth of historical and cultural lore which is latent in them. During the first six months of work of the survey, a start has been made in several counties; many eminent scholars skilled in the various aspects of the work are giving active help, and close relationships have been established with the two public offices most immediately concerned in the matter, namely, the Ordnance Survey and the Public Record Office.

In opening the discussion, Mr. H. J. E. Peake expressed his gratification that the projected survey of English place-names was not to proceed upon purely linguistic lines, as had been done by earlier workers on this subject, but that archaeological, historical and geographical evidence was to be taken

into account. The organisation of local branches and local correspondents in this country which the Royal Anthropological Institute had just initiated, might well be of assistance in the work of the survey on these lines. In connexion with the survival of pre-Saxon elements in place-names, to which Prof. Mawer had referred as an instance in which archaeological evidence might be brought to bear upon this problem, he indicated the possible connexion between the element "leck" (*e.g.* in Leckhampton) and a stone, monument or other, and between the element "wick" (*e.g.* Wickham) and Roman roads. The unknown site of the battle of Wodensburgh, wrongly identified with Wansdyke, to which Prof. Mawer had referred, he himself had identified by archaeological evidence within the bounds of Aston Priors, the name possibly surviving in the neighbouring Woodborough. Dr. Singer emphasised the necessity for the study of anthropology of this country, as well as that of the primitive peoples of other parts of the world, to which attention had hitherto been too exclusively directed, and Mr. Nixon gave instances of explanations of Yorkshire place-names which he had obtained by investigations in Norway.

University and Educational Intelligence.

ABERDEEN.—The recent graduation ceremony on July 13 was one of the heaviest ever carried through; there were 224 degrees conferred, which included 101 in arts and education, 60 in science and commerce, and 57 in medicine. The special graduation of the previous week was devoted wholly to conferring the degree of LL.D. on ex-President Taft. The Vice-Chancellor, Sir George Adam Smith, presided on both occasions.

EDINBURGH.—Mr. J. A. S. Watson has been appointed to the chair of agriculture and rural economy in succession to Prof. Robert Wallace, retired. Prof. Watson was demonstrator in botany under Sir Isaac Bayley Balfour, afterwards continuing his studies in Germany, America, and Canada. He has been lecturer in agriculture in the University for some time.

At the graduation ceremony last week a "record" number of five hundred graduates were capped by the Vice-Chancellor, Sir Alfred Ewing. The B.Sc. degree in mining was conferred for the first time.

LEEDS.—Dr. W. MacAdam has been appointed medical tutor and registrar. Dr. MacAdam is a graduate of Glasgow University. He was awarded the Brunton Memorial prize as the most distinguished graduate in medicine of the year, and, after completing his University course, held the McCunn scholarship and the Carnegie scholarship in physiological chemistry. For two years he was senior assistant tuberculosis officer in Sheffield, and was at the same time a demonstrator in Sheffield University. He has been lecturer in pathology at the University and has held a number of medical posts. Mr. H. W. Symons and Mr. P. J. Moir have been appointed clinical assistants in surgery; both have been closely associated with hospital work for some years. These appointments, to new full-time posts, mark an important step in the development of the clinical teaching of medicine and surgery.

MANCHESTER.—The Council has appointed Prof. J. S. Dunn to the Procter chair of pathology and pathological anatomy in succession to Prof. H. R. Dean. Prof. Dunn at present holds the chair of