Born on April 27, 1882, at Wimbledon, Agar passed from his preparatory school to Sedbergh and then to King's College, Cambridge, where his tutor was S. F. Harmer. He went through the regular courses of instruction for the Natural Sciences Tripos, Parts I and II, in both of which he obtained a first class. Of all his teachers he looked back with special gratitude to Harmer, for his inculcation of precise and orderly method, and to Bateson, then in the flood tide of Mendelism, for turning his mind in the direction of his future research in genetics.

I had been impressed by Agar as the most outstanding member of the Tripos class in zoology during my last year as demonstrator; so when he had completed his Tripos, I invited him to join the staff of the Zoology Department in the University of Glasgow, on which he remained until 1920, holding latterly the position of senior lecturer.

During his Glasgow years, Agar showed himself to be an admirable teacher, and he also achieved a large proportion of his most valuable research work. During his first two years this was devoted to vertebrate morphology, and he produced valuable papers upon the skull and visceral arches, and upon the anterior mesoderm, of *Lepidosiren* and *Protopterus*. In 1907 he made an expedition to the Gran Chaco to supplement my work on *Lepidosiren*; but above all to obtain full material for investigating the gametogenesis of that fish—outstandingly suitable for such a research on account of the relatively enormous size of the chromosomes and their strongly marked individuality. Agar made a splendid success of his expedition and brought back a large amount of perfectly preserved material which he proceeded to investigate in detail. His skill and accuracy as an observer, in conjunction with his admirable technique, enabled him to achieve what is still probably the most reliable account of the gametogenesis of a male vertebrate. In his work he made full use of the Glasgow technique, which enjoined that all microscopic work under high-power oil-immersion objectives be done with stereoscopic eyepieces—the technique which enabled Ballantyne in 1925 to establish with certainty the passage of neurofibrils across the generally accepted discontinuity between the neurones of the vertebrate nervous system. Agar's Chaco expedition achieved other results than those of his main quest, the most important being the discovery of the 'neonychium'—the cushion-like structure which in the embryo of the Amniota fills up the concavity of the claw and safeguards the amniotic membranes against injury.

Agar's work on the chromosomes of *Lepidosiren* may be said to inaugurate the second phase of his research career, devoted to genetics. Next after it came the breeding through long series of generations of Daphnid crustaceans and having as their main object the testing of Lamarckian inheritance of environmental or 'acquired' characters. The Daphnids in question were chosen as specially advantageous for such investigations in view of their parthenogenetic reproduction, their short life-cycle, and the fact that all members of a clone are genetically identical so as to exclude the disturbing effects of Mendelian segregation. The results of Agar's work on the whole, including one particularly precise set of experiments extending over a hundred generations, was to show the complete absence of any evidence of such inheritance.

Both by his own original work and by his critical examination, and in some cases repetition, of the work of others, Agar played an important part in substantiating the view that environmental or 'acquired' characters are not inherited and are therefore not available for the process of racial evolution.

In its third phase, Agar's work diverged from the realm of pure science, in which things are observed, accurately recorded and when possible seriated into a general expression, into the realm of 'philosophy', which deals rather with ideas or opinions, and is free from the constraints to which purely scientific research is subject. In this phase Agar was, above all, influenced by the philosophy of A. N. Whitehead—primarily a mathematician, not a biologist—as expounded in his "Process and Reality". According to this philosophy, reality consists not in substance but in process, and the difference between living and non-living 'organisms' is merely one of degree—"Biology is the study of the larger organisms; whereas physics is the study of the smaller organisms." Whether or not Whitehead's philosophy is destined to have any influence upon the advancement of biological science, it is clearly of advantage to have an account of it and its implications from the pen of one who not only accepts the general principles of that philosophy but also holds a distinguished position in the realm of biological science. Such an account with further developments in detail is provided by Agar in his last book, "A Contribution to the Theory of the Living Organism" (Melbourne University Press, 1943), a revised edition of which he had just completed at the time of his death.

It would be wrong to conclude this notice without mention of Agar's activities outside laboratory and lecture-room. At Glasgow he held a commission in the Officers' Training Corps, and during the First World War he was captain in the 5th Highland Light Infantry, until invalided home from Gallipoli. Later he acted as adjutant to the 1st Volunteer Battalion of the same regiment. Then in 1920 came his appointment to the professorship of zoology at Melbourne. There he served as dean of the Faculty of Science (twice), president of the Professorial Board, in which he played an important part in the deliberations preceding the appointment of a full-time vice-chancellor, and as member of the University Council (twice).

As a Melbourne colleague writes, "Wilfred Eade Agar will be remembered by all as a thoughtful and kindly man, reserved, yet with a delightful sense of humour, slow to assert himself, yet vehement when the need arose. With his death the University of Melbourne has lost one of its great men."

JOHN GRAHAM KERR

Brigadier E. M. Jack, C.B., C.M.G.

BRIGADIER EVAN MACLEAN JACK, who died on August 10, was born in Edinburgh in 1873. Commissioned in the Royal Engineers in 1893, he served first at Gibraltar and St. Helena; and in 1903 joined the Ordnance Survey, on the staff of which he served for four years.

In 1907 he was selected for duty with the Uganda–Congo Boundary Commission under Major Bright and four years later became chief commissioner of another Central African Boundary Commission, which, in the course of its work, measured a section of the arc of the 30th meridian. In 1913, Jack, now promoted major, was posted to the Geographical Section of the General Staff at the War Office; and on the

outbreak of war, in 1914, went to France with the B.E.F. as officer in charge of maps at G.H.Q. In this post, which he held throughout the War, he was responsible for directing and controlling a great variety of survey developments, including the mapping of the trench lines, German as well as British; sound-ranging and flash-spotting (for the location of enemy batteries); and, last but far from least, the 'Artillery survey' procedure, which made possible the sudden accurate bombardments of 1918 by massed artillery—a development which, from the battle of Cambrai onwards, contributed so much to the Allied victory.

For his services in the First World War Jack was awarded the C.M.G. and the D.S.O. and was several times mentioned in dispatches. The Royal Geographical Society, which in 1916 had given him its Gill Memorial Award for his work in Africa, awarded him its Founder's Medal for his geographical work on the Western Front. In 1920 he became head of the Geographical Section, and two years later succeeded Sir Charles Close as director-general of the Ordnance Survey. In 1924 he was promoted to the rank of brigadier, and in 1928 was made a C.B.

Jack retired from the Service in 1930, but this 'official' retirement was only the beginning of another career of unpaid service to many charitable and other causes, scarcely less distinguished than the one he had just completed, and which lasted for twenty years more. The kindliest and most modest of men, Brigadier Jack has left a record which any man might envy; and a memory which all his many friends will cherish.

M. N. MacLeod

Prof. E. Baldi

Prof. Edgardo Baldi died on August 10 at the age of fifty-two very much regretted by all his friends and colleagues. He was director of the Istituto Italiano di Idrobiologia at Pallanza on the Lago Maggiore, a research institute founded in 1939 which has become one of the world's leading limnological laboratories.

Baldi's research career began with work on insect neurophysiology which has left important traces in the literature. He soon turned, however, to hydrobiology, beginning with systematic work, especially on diaptomid copepods. He made a study of the distribution of the various races of *Eudiaptomus vulgaris* in Italian lakes. One of his favourite fields of research was the biology of alpine lakes, the chief object of which was to define the communities and discover their degree of temporal constancy. Rivers were also studied, the main thread of the research being the seasonal variation and survival in rivers of plankton derived from lakes.

In the last period of his life, Baldi's particular interest was in the biometrical study of form differences between planktonic Crustacea of certain species belonging to populations of varying density living in different parts of a lake. General accounts of this important part of his work are to be found in *Experientia*, **2**, 476 (1946) and *Vierteljahrschrift Naturf. Ges. Zürich*, **95**, 89 (1950), while details are in the *Memorie Ist. Ital. Idrobiol.* His was always the spirit of pure scientific research for its own sake. To British and other foreign biologists who had the pleasure of visiting or working in his Institute, Baldi always extended a most generous welcome.

H. Munro Fox

Dr. G. A. Shakespear

Dr. Gilbert Arden Shakespear, who died as a result of a road accident within a few days of his seventy-eighth birthday, was a prominent member of the University of Birmingham for more than half a century. Educated at Wyggeston School, Leicester, and Mason College, Birmingham, he was one of J. J. Thomson's research students at Cambridge before returning to Birmingham as lecturer under Poynting. He was acting professor during 1914–19 and, though he retired in 1938, he continued active research work in the Department of Physics.

Dr. Shakespear was distinguished for his ingenuity and skill in making precise measurements by simple methods. Much of his early work was inspired by Poynting, whom he greatly admired, and was concerned with thermal radiation. His most important contribution to science, however, arose from a practical need and was made with characteristic speed and perfection. During the First World War his attention was directed to the need for measuring the purity of hydrogen in connexion with airships and observation balloons; he quickly produced his 'katharometer', a sensitive and robust apparatus for gas analysis by thermal conductivity, and then applied it in many different directions, the principal one at that time being the permeability of rubberized fabrics.

Although the instrument has now been extensively used in measuring mixtures of many gases and in all kinds of applications, it still remains in the essentially simple form which Shakespear originally devised. The katharometer, in the hands of many workers, has been the means of making substantial contributions to many branches of science—physics, biology, physiology, medicine and chemical engineering. It is ideally suitable for measuring diffusion and thermal diffusion: it is used for measuring the respiration of plants and animals, for the control of anæsthetic gas mixtures, for the analysis of flue gases and the exhaust gases from internal combustion engines, and in ammonia plants. An indication of Shakespear's ingenuity and breadth of interest is given by the fact that with only a slight modification he was able to convert the katharometer into a very sensitive extensometer.

Shakespear was always most generous in freely giving his ideas to others. He delighted in having problems brought to him and in assisting in their solution. For this he wanted no recognition or reward; his pleasure lay in sharing in the enthusiasm for any subject and in sowing the seed of progress. His influence has thus been much greater than can be measured by the volume of his published work.

In his teaching, Shakespear was remarkable for his originality and freshness of approach on the experimental side of his subject. A student's measurement of the acceleration due to gravity in the elementary laboratory was to him a matter of importance and excitement, in which the result really mattered.

Shakespear was a man of extraordinary activity, both mental and physical, and an uncommonly keen observer of everything that lives and moves, as well as of the inanimate things. His wife, the late Dame Ethel Shakespear, was a geologist and a notable figure in the pub ic life of the Midlands. Their farm, garden and laboratory at Caldwell Hall, near Bromsgrove, formed an ideal centre for a rare breadth of interests.