

were Tokat, Samsun, Ordu, Giresun, Sivas and Gumushare. In the block-faulting associated with this earthquake, four east-west lines were prominent: (1) the line of the upper Yeşil Irmak; (2) the line of the Kelkit-Deliçav; (3) the line of the Yavlas and middle Yeşil Irmak; (4) the line parallel to the Black Sea about 15 km. distant from the shore.

These lines were in part old orogenic lines, and were called into play again to relieve accumulating stress. Two distinct earthquake movements were observed during this shock. The first was horizontal and the latter, separated from the former by a short interval of time, had a distinct vertical component. With these, but particularly the latter, strong low-pitched rumbling sounds were associated.

OBITUARIES

Prof. H. L. Lebesgue, For.Mem.R.S.

HENRI LÉON LEBESGUE, professor in the Collège de France, a foreign member of the Royal Society and an honorary member of the London Mathematical Society, was born at Beauvais, Oise, on June 28, 1875; news of his death during 1941 recently reached Great Britain.

Lebesgue was one of the greatest mathematicians of recent times, but more of a specialist than most great mathematicians. His work has not the variety and versatility of Poincaré's or Hilbert's; he did not, as they did, enrich almost every branch of mathematics with his contributions. He was rather a man with one outstanding claim to fame. He had other things to his credit; for example, he made one important contribution (the *Pflastersatz* or 'pavement theorem') to topology; but that, and all his secondary work, of which there is not much, is overshadowed by his work on integration. There, he was first: the 'Lebesgue integral' is one of the supreme achievements of modern analysis.

It is no exaggeration to say that Lebesgue remade the integral calculus. The theory of functions of a real variable, of which the differential and integral calculus are parts, has been rewritten since 1900. The revolution had been initiated by Borel, whose famous monograph "Leçons sur la théorie des fonctions" was awfully the starting point of Lebesgue's researches; but it was Lebesgue himself who took the decisive steps. The older theories of integration, in spite of all that Riemann, Darboux and others had done, were radically defective at several vital points, and in particular in their relations to differentiation. It was not true that differentiation and integration were 'usually' inverse operations, that integration and differentiation, or differentiation and integration, usually restored the original function. Indeed the whole theory was aesthetically unsatisfying; it tended to be cumbrous, long-winded and full of untidy exceptions; and the conservative mathematicians who detested it had a certain amount of excuse for their distaste.

All this is changed; the theory is now one of the most beautiful in mathematics. It unfolds itself in a series of terse and comprehensive theorems, with all the smoothness and elegance of the best 'classical' analysis. In particular, differentiation and integration dovetail harmoniously together. It is a readily intelligible, almost a 'popular' subject, and for this, by the unanimous testimony of every worker in

these fields, it is to Lebesgue first that honour is due.

Lebesgue was a fine writer, with an admirably vigorous and lucid style. His two great memoirs, "Intégrale, longueur, aire" (1902) and "Sur les intégrales singulières" (1910), and his two books, "Leçons sur l'intégration" (1904 and 1928) and "Leçons sur les séries trigonométriques" (1906), rank among the classics of mathematical literature. It is sad that the second book should never have been re-edited, since the subject gives perhaps the finest illustration of the inevitability and vitality of Lebesgue's ideas.

G. H. HARDY.

Dr. George Washington Carver

DR. GEORGE WASHINGTON CARVER, the distinguished Negro scientific worker who died at Tuskegee Institute, Alabama, on January 5, 1943, was born of slave parents at Diamond Grove, Missouri, in 1864. He was educated at Minneapolis High School and later at Simpson College, Indianola, Iowa. Graduating in science at Iowa State College in 1894, he proceeded to the M.Sc. two years later. In 1896 he was invited by the late Dr. Booker T. Washington to take charge of the Department of Agriculture at Tuskegee. He discovered on arrival that his duties, apart from administration and normal academic lectures, entailed the reshaping of the entire economy of the district. In fact, he had to conduct mobile classes in the field in order to persuade a despairing and ignorant community that its only salvation lay in adopting a new agrarian economy. The soil, he found, was arid, eroded, unproductive, and the system of farming out-moded. Every farmer in the region was cultivating cotton as a staple crop. Carver's open-air lessons included the cultivation of crops, soil conservation, fertilization, insect control, plant pathology, and the canning and drying of fruits and vegetables.

Carver recognized the necessity for introducing the peanut, *Arachis hypogaea*, and the sweet potato, *Solanum tuberosum dulce*, because soil and climatic conditions were favourable, and the crops were already being grown sporadically for local consumption by large sections of the community. He realized early that the replacement of cotton by peanuts and sweet potatoes was not a complete solution, and that newer and more extensive uses for them had to be found. A long series of chemical experiments culminated in the development of face powder, pigments, paints, stains and ceramic materials from Alabama clays; milk, buttermilk, cream, cheese, condiments, coffee, paper, plastics, stains, insulating boards and more than three hundred by-products from peanuts; starch, tapioca, syrup, coconut substitute, breakfast food, stains, artificial rubber, vinegar and paste from sweet potatoes; paving blocks, insulating boards, rugs, and cordage from cotton. Peanut milk is now being extensively used in infant clinics in areas of tropical Africa where the tsetse fly is endemic.

Carver's scientific achievements have dwarfed his artistic work, but those who have seen his "Three Peaches" at the Luxembourg, or his "Yucca" at Tuskegee, are unanimous in their regret that he had not devoted more time to this department of life. As a man of science, he tenaciously refused to make profits from his inventions and discoveries, and never once took out a patent. It was characteristic of him to decline Thomas Edison's invitation to join his staff, preferring to work in obscurity among the simple folks he had come to know and love so much.

During his life-time, more than sixty books, periodicals and films were devoted to his life and work, and he had delivered addresses at most of the leading universities in the States. Carver was awarded the Spingarn Medal in 1923 for distinguished services to science, and in 1939 he was given the Roosevelt Medal for outstanding contributions to agriculture. The unique position he won for himself in American scientific and social life was marked by the Variety Clubs' award of 1941. This award was made by a national nominating committee of thirty-four eminent editors, publishers, authors and radio commentators, and consisted of a silver plaque commemorating his selection, and an honorarium of one thousand dollars in cash "in token of his sublime service in restoring a multitude of helpless people

to happy and productive life through the instrumentality of his brilliant laboratory researches".

Thus grew to maturity and fame, a lad who was once traded for a horse! R. E. G. ARMATTOE.

WE regret to announce the following deaths:

Dr. H. D. S. Honigmann, formerly director of the Breslau Zoological Gardens, and recently scientific adviser to the Dudley Zoo, on November 17, aged fifty-one.

Mr. Geoffrey H. Livesey, a former president of the Royal College of Veterinary Surgeons, and former editor of the *Veterinary Record*, on November 29.

Prof. James Young, O.B.E., formerly professor of science at the Royal Military Academy, Woolwich, on December 2, aged eighty-one.

NEWS and VIEWS

Physical Society: Duddell Medal Award

THE twentieth Duddell Medal has been awarded by the Council of the Physical Society to Mr. John Guild, of the Light Department of the National Physical Laboratory, in recognition of his design of a number of optical and physical instruments of outstanding merit. Mr. Guild, who was born on November 16, 1889, was educated at Allan Glen's School, Glasgow, and the Imperial College, London. His instruments are noteworthy for their sound mechanical, optical and physical design and for the scrupulous avoidance of all elaborations that would not contribute to their final precision and accuracy; they incorporate many features that were novel at the time the instruments were developed. The best-known and most important of them are, perhaps, his spectrophotometer (1924), trichromatic colorimeter (1925) and absolute radiometer (1937); but it is difficult to select any one instrument as being more elegant in design than the others, which include a spherometer of precision (1917), a very accurate angle comparator for the goniometry of prisms (1923), a flicker photometer (1923), a vector colorimeter (1925), an improved goniometric spectrometer (in collaboration with the late Mr. George Watts, 1926), a compensated thermopile (1931) and a new instrument for evaluating the surface finish of metals (1940). The Medal will be presented to Mr. Guild at a meeting of the Physical Society at the Imperial College on December 17.

Chair of Geology, Durham: Prof. L. R. Wager

DR. L. R. Wager, whose appointment to the chair of geology at Durham has been announced, takes with him a distinguished record as a petrologist, an explorer and a mountaineer. Since 1929 he has been lecturer in petrology in the University of Reading, where the efficiency of that section of the Geological Department owes much to his vigorous enthusiasm. While still at Cambridge he had given a foretaste of his ability as a research student in a series of papers on the Whin Sill and part of Connemara. In 1930 he was granted leave to take part in the British Arctic Air Route Expedition to East Greenland, where he made preliminary studies of a peculiarly interesting suite of igneous rocks. In 1933 he was released again to act as one of the climbing party on that year's expedition to Mount Everest. He took part in the first assault, reaching as great a height

as has yet been attained. Incidentally, he made many valuable contributions to our knowledge of the stratigraphy and physiography of that part of the Himalaya. On his return to Reading he began to organize a scientific expedition to continue his work in East Greenland, and took a small party which spent twelve months there. The published results of the petrological and mineralogical studies thus made, although as yet incomplete, are works of outstanding scientific importance. Shortly after the outbreak of war he joined the Royal Air Force in a specialist capacity, and held the rank of squadron leader at the time of his appointment to Durham.

Suggested New School of Aeronautical Science

REPLYING to a question raised in the House of Commons on December 1, the Minister of Aircraft Production, Sir Stafford Cripps, announced that the Aeronautical Research Committee had recommended the creation of a new school of aeronautical science, co-ordinated with existing training facilities, to bridge what it considers to be a gap in the present system. This report is approved in principle by the Government, and an interdepartmental committee has been appointed to prepare detailed proposals for its establishment. The Committee is under the chairmanship of Sir Roy Fedden, sometime designer and chief engineer of the engine section of the Bristol Aeroplane Co. This Company was one of the first in the aeronautical world to initiate an apprentice training school in its works under Sir Roy's guidance, and in addition he has just returned from a tour of the United States, where he has studied the systems of aeronautical instruction in use there.

Although the terms of the report were not announced, it presumably follows the scheme envisaged by Sir Bennett Melvill Jones, the chairman of the Aeronautical Research Committee, in his remarks at a recent discussion upon aeronautical education, before the Royal Aeronautical Society. The school will be postgraduate and will be additional to the facilities of a similar standard at present available at universities. It will deal with advanced study and experimental work of a technical nature, leaving the more scientific and research aspect to the university schools. It is also hoped to include certain aspects of flying, incidental to the teaching. It is hoped that such a training will appeal to the university graduate