of the shapes and curves of growth of stellar spectral lines, that the atmospheres of cool giant stars resemble 'fields of prominences' rather than atmospheres in normal hydrostatic equilibrium. The evidence of the behaviour of the *K* line in the spectrum of 31 Cygni, discussed above, is in general agreement with this view and, indeed, may be considered as possibly the most direct evidence in its favour yet obtained. It can readily be appreciated that the application of theories of radiative equilibrium, which presuppose material stratified in parallel layers and in a static state, will have certain shortcomings when applied to the analysis of the atmospheres of such giant stars. Furthermore, while the considerable width of lines in the spectra of supergiant stars has been attributed quite reasonably to correspondingly large motions of the atoms in their atmospheres, it is perhaps unfortunate that the term 'turbulent velocity' has been used to describe the motions. The modifications of the static theories of stellar atmospheres by application of recent physical theories of turbulence proper must be open to question because the restrictive conditions under which the latter are valid do not exist in stellar atmospheres.

A hitherto anomalous feature of systems like 31 Cygni finds its explanation in the above picture of the structure of a giant stellar atmosphere. In the case of ζ Aurigæ, it has been found that for the several observed eclipses and even for ingress and egress at the same eclipse the extents of the chromosphere, as judged by spectroscopic observations, are often unequal⁷. This phenomenon can now be attributed with some confidence to prominence-like activity in the *K*-star atmosphere.

¹ *Ann. Harvard Coll. Obs.*, **28**, 93 (1898).

² *Lick Obs. Bull.*, **1**, 22 (1901).

³ *Astrophys. J.*, **83**, 433 (1936).

⁴ *Astrophys. J.*, **100**, 8 (1944).

⁵ *Pub. Astro. Soc. Pacific*, **62**, 13 (1950).

⁶ See, for example, Struve, O., *Astro. J.*, **56**, 115 (1951).

⁷ See, for example, Welsh, H. L., *J. Roy. Astro. Soc. Canada*, **43**, 217 (1949); *Contrib. Dom. Astrophys. Obs.*, Victoria, No. 21.

OBITUARIES

Prof. Guido Castelnuovo

GUIDO CASTELNUOVO, whose death occurred on April 27, was born in Venice on August 14, 1866, the son of a well-known high-school teacher of that city. After graduating, as a pupil of Veronese, from the nearby University of Padua, he went, in 1888, to Turin, where Corrado Segre was already installed as professor. The effects of this encounter were immediate and striking; for the conversations which the two young geometers held during their walks about the city resulted in the completion of the classical theory of algebraic curves, characterized by the frequent use of hyperspatial methods which is the hall-mark of the Italian school.

In 1891 Castelnuovo was appointed to the chair of geometry in Rome; here he was soon joined by Federico Enriques, who had just left Pisa, and who had arrived armed with the intention of founding the new science of algebraic surfaces on a basis analogous to that previously adopted by Segre for curves. Castelnuovo quickly perceived the best means of instructing the younger man: the peripatetic conversations were resumed, this time on a grander scale. (It may be added that Enriques eventually followed the same method with his own

pupils.) Mutual stimulus again had its advantages; and there now began a collaboration and friendship (strengthened later by Castelnuovo's marriage to Enriques's sister) which led to the creation of the invariantive theory of surfaces, in its essentials almost entirely their work.

The partnership was in all respects an ideal one: while Enriques, an impulsive intuitionist, was held in check by his friend's temperamental caution, on the other hand, Castelnuovo's reluctance to publish was often overcome by encouragement. Although the number of avowedly joint publications was small (but highly significant), the reciprocal influence on their work must have been incalculable. When, in 1894, Enriques went to Bologna, the exchange of ideas was maintained by an almost daily correspondence which lasted for many years. The story of the collaboration, if fully told, would form one of the most fascinating, as it is certainly one of the greatest, episodes in mathematical history.

In 1935 Castelnuovo reached the age of retirement; to mark the occasion, his friends and disciples organized a ceremony in his honour, and initiated the publication of his selected papers (see *Nature* of December 10, 1938). Castelnuovo's seniority thus spared him the worst effects of the racial laws of 1938; but he suffered a grievous blow when, a year later, the Lincei Academy, to which he had been elected in 1901, was virtually dissolved.

With the fall of the Fascist regime, one of the first acts of the new government was to re-establish the Academy; this could not be fully accomplished until 1946 and then, inevitably, Castelnuovo was the choice for president. In 1949 the Italian Government, in recognition of his services, nominated him a life senator of the Republic. He continued with remarkable energy and resourcefulness to perform his various duties until a few months before his death.

It is difficult for a mathematician to imagine Rome without Castelnuovo; during his sixty years sojourn there, he had become one of the city's principal monuments, revered and loved as much as any of them. With his nobility of character and utter integrity of conduct, he set a standard for the nation and for all mankind. As a lecturer, even in his last years he was unique: the measured utterance, the unbroken succession of perfectly turned phrases, free from all suggestion of rhetoric, was something never to be forgotten. While it is perhaps impossible for such a man to be wholly unconscious of his superiority, Castelnuovo gave no sign of it beyond a certain Olympian serenity tempered, however, with great kindness towards all. In the course of his career through the high noon and—as he held—into the sunset of modern mathematics, he received many academic distinctions; in particular he had been an honorary member of the London Mathematical Society since 1907. But it was typical of the man that, when replying to the speeches made at his retirement ceremony, he should have remarked: "For myself, I have always preferred the joys of family life to the glories of scientific achievement". That may well be his most fitting epitaph.

L. ROTH

Dr. Maria Montessori

THE death on May 6 of Madame Montessori at the age of eighty-one removes a remarkable figure in twentieth-century education. Entering the Medical Faculty of the University of Rome, she was the

first Italian woman to obtain the degree of M.D. Her first notable work was with mental defectives, with whom she used methods based on those of Séguin. With some of the children classified as mental defectives she obtained results which were acclaimed as remarkable, some of her children doing better than the (supposed) normal children in the State examination.

We know now, however, how unreliable the detection of mental deficiency was in those days—and even to-day by inadequately trained psychologists or medical men. Probably some of Dr. Montessori's mental defectives were appreciably above the borderline in intelligence, and some of the supposed 'normal' below.

Shortly afterwards, Dr. Montessori began to apply her ideas to normal children, maintaining that methods good for mentally deficient children were appropriate for very young children. Her originality consisted chiefly in two things: first, her elaborate apparatus for 'sense-training', which was self-checking so that the child found out his errors without correction; and second, in her doctrine that the child should be free to choose his activities. Her main influence, however, was through her charm of personality, her intense love of little children, and her unbounding enthusiasm for reform—social or educational—which would benefit them.

Her first and best book, "The Montessori Method", attempts a justification of her views about sense-training, but with serious psychological fallacies. No doubt substantial gains in knowledge of shapes and colours and in hand control came as a result of play with the apparatus; but the main truth behind Dr. Montessori's practice was that it is better for dull and very young children to play about for a time with things of slight or even of no educational value, rather than to be prematurely forced, as they usually were in those days, to begin reading and arithmetic when quite unable to make any progress, and so develop an antagonism to such work and become hopeless about their own abilities.

The common idea that Montessori advocated complete freedom for the children is quite wrong. She states that "it is necessary to hinder . . . with absolute rigour . . . and little by little suppress, all those things which we must not do". She was also right, however, in maintaining that to provide the child with work precisely adapted to his stage of development, is to make much repressive discipline in the school unnecessary. C. W. VALENTINE

Dr. W. R. Ivimey Cook

DR. IVIMEY COOK, whose recent death at the age of fifty, after a short illness, will be deeply regretted by his wide circle of friends, was senior lecturer in botany at University College, Cardiff. He was educated at Dulwich College and later at King's College, University of London, where he took his Ph.D. degree, and for some time acted as demonstrator. Afterwards he was appointed assistant lecturer at the University of Bristol, where he remained for four and a half years, eventually transferring to University College, Cardiff.

Dr. Cook was, of course, primarily a mycologist, and his work on Archimycetes and especially on the Plasmodiophorales was widely known and appreciated. While at Cardiff he organized a considerable series of researches, in collaboration with pupils, on

the Phycomycetes, which added greatly to our knowledge of the group in Britain. These he intended to publish as a collected work; but post-war costs forced postponement of the plan.

His name was familiar to several generations of medical students as co-author, with Dr. Hentschel, of "Biology for Medical Students", a very successful text-book, now in its fourth edition. He was also co-author of "Plant Science Formulæ" and "Practical Field Ecology", and was collaborating in the production of two large general text-books, on theoretical and practical botany respectively; but at the time of his death only one of these volumes had appeared. He was also planning and had almost finished a book on economic botany in which he was deeply interested.

Dr. Cook was a man of indefatigable energy and wide interests, and he was one of the hardest workers I have ever known. No man ever threw himself more unselfishly into his work, and the Department of Botany at Cardiff owes him a great debt for the many developments he carried through. A fact not generally known is that he was one of the first to give the impetus to the scheme for the national training of laboratory technicians, which has recently come to fruition. During the War he served as a special constable and also found time to run a small-holding, on which he raised almost every kind of livestock, all without any relaxation of his professional duties. Home and garden, camping and canoeing were his pleasures and contributed much to a life lived to the full.

His cheerful, friendly presence, his very human love of discussion and his remarkable flair for organization will long be missed in his College and wherever botanists are forgathered.

R. C. MCLEAN

Dr. F. Earnshaw

DR. FREDERICK EARNSHAW, who died in Edinburgh on April 27, was born in 1914. He was a student at the University of Cambridge during 1933–37. In 1937 he was appointed assistant lecturer in botany at the Edinburgh and East of Scotland College of Agriculture, relinquishing the post on joining the Army in 1940. During the period 1937–40 he also worked as a research student at the Scottish Plant Breeding Station and prepared a thesis entitled "Genetical and Cytological Studies in the Genus *Plantago*" which gained him the degree of Ph.D. at the University of Edinburgh.

After returning from the Army in 1946, Earnshaw joined the staff of the National Institute of Agricultural Botany, Cambridge, as an economic botanist, and while there conducted work on varietal differences in cereals.

In 1949 a new post of genecologist having been established at the Scottish Plant Breeding Station, Earnshaw left Cambridge and returned to Edinburgh to revive a programme of genetical ecological investigations which had been interrupted during the War. He is survived by his wife, two sons and a daughter.

WE regret to announce the following deaths:

Dr. F. W. Carter, F.R.S., lately consulting engineer to the British Thomson-Houston Co., Ltd., on May 29, aged eighty-one.

Colonel L. Newcombe, C.B.E., librarian and secretary to the Trustees, National Central Library, during 1926–44, on May 25, aged seventy-two.