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