

with an iodine mirror and the subsequent formation of the additive compound $\text{CH}_2\text{I}_2\text{Hg}_2$ of melting point 230°C .

Finally, a number of papers were devoted to the study of free radicals in electric discharges by spectroscopic or positive ray methods. Of these there is only space to mention the important report by Mecke on "Free Radicals and Spectroscopy". Spectroscopic methods not only detect the presence of free radicals but also for diatomic radicals give exact information about their dimensions and the strength of the interatomic linkage. It is true that polyatomic radicals and

molecules give spectra of such complexity that a full analysis is difficult, but Mecke pointed out that there is a good deal of evidence for regarding simple radicals as the bricks from which larger molecules are built up. Their dimensions show little change when they form part of a larger molecule, and similar linkages have similar binding energies in diatomic radicals and in larger collections of atoms. Thus the accurate spectroscopic data for diatomic radicals and molecules can be applied with little modification to the discussion of the dimensions and strength of linkages in more complex systems.

S. S.

Obituary

PROF. P. EHRENFEST

THEORETICAL physics has lost one of its ablest and most enthusiastic exponents through the death on September 25 last of Paul Ehrenfest, professor of theoretical physics in the University of Leyden. Born in Vienna in 1880, he studied first under Boltzmann. From Vienna he went to Göttingen; there he made the acquaintance of his future wife (Mrs. T. Ehrenfest-Afanashewa). In collaboration with Mrs. Ehrenfest, he undertook a thorough critical investigation of the principles underlying the kinetic theory of matter, a problem which had fascinated him ever since his Vienna days. The elucidation of certain paradoxes in Boltzmann's *H*-theorem (1907) and the extensive article on statistical mechanics in the "Enzyklopadie der mathematischen Wissenschaften" (1912) testify to the fertility of their combined activity. The latter work was written in Russia, where the Ehrenfests lived for several years.

In 1912, Ehrenfest was called to Leyden to take the chair of theoretical physics on the retirement of H. A. Lorentz. With the exception of minor interruptions (lecturing trips to the United States and Russia) he worked and taught at Leyden until his death. Of his scientific work of this period we may mention his prediction of the interference patterns produced by X-rays travelling through a diatomic gas (1915), his work on the adiabatic hypothesis in the quantum theory (1916; his own delightful survey of this topic in *Die Naturwissenschaften*, 1923, should be consulted) and his theorem on the propagation of wave packets in quantum mechanics (1927).

Ehrenfest's intellectual enthusiasm and his innate desire to communicate to others (especially the younger workers) everything he understood and also every question which he felt unable to answer, was a novel experience to the phlegmatic sons of Holland. In contrast to the usual educational principles, he infected his students with his own enthusiasm and rushed with them to the outposts of the empire of physics, where the fighting against the great unknown—relativity and quantum theory—was going on. But at the same time, he did not forget to take them to an occasional

tower, from which he could show and explain to them in his masterly way the domains already conquered. Finally, he taught them the importance of careful attention to details; his own love for detail and his perseverance in following up minor points until every elementary logical thread was unravelled, set us an example of highest scientific value.

Ehrenfest's success as a teacher was inseparably connected with his critical vein. How can a teacher expound what he does not himself fully understand? In harmony with his ideals, he maintained, throughout his life, that the obvious rules of scientific communication should be kept, namely, that a lecturer or author should understand what he says or writes and should be understandable by his audience. Readers of NATURE who have not had the privilege of meeting Ehrenfest may deem such an ideal quixotic; those who have will remember that, besides his honesty and his seriousness, he had a ready wit and boyish laughter at his disposal. Lectures where the audience was expected not to interrupt were, as a rule, a bore to him, especially if he was himself the lecturer.

Those who came in personal contact with Ehrenfest were struck by the richness of his personality, every domain of true spiritual culture being dear to him. The profoundly human and altruistic sentiment, which was always in the background of his thoughts and actions, made him a valued friend to many and also brought him many devoted friends who—in his later years—would have liked to see him happy more often.

H. A. KRAMERS.

WE regret to announce the following deaths:

Mr. David Miller Muir, a well-known radiologist of Exeter, who worked under Sir J. J. Thomson at the Cavendish Laboratory, Cambridge, before taking up the medical aspects of his subject, on October 18, aged forty-six years.

Dr. Christine Murrell, a member of the Council of the British Medical Association and first woman member of the General Medical Council, on October 18, aged fifty-nine years.