for use in power transformers, with an interesting account of the origins of power losses and transformer noise; also included is a short section on future possible improvements in transformer steel. The third chapter, on the properties of ferrites, contains a useful section on various applications of these materials. The remaining chapters are concerned respectively with high-permeability materials, thin films for computer storage elements, and permanent magnets.

The general style of the book is one of brevity. As far as chapters 2 to 6 are concerned this approach is reasonably successful and these chapters constitute a useful, not too detailed, review for new workers in the field. The first chapter is not so successful, however; it is difficult to compress such a large amount of background information without sometimes losing clarity and appearing superficial. In a book intended as an introduction it is perhaps over optimistic to guide the reader all the way from iron filings and unit poles on page 2 to a concept such as interfacial exchange anisotropy on page 31.

Only a very few errors, and these of a minor nature, were noticed. Some ambiguity in the discussion of demagnetizing factors has led to incorrect expressions for the coercivities of single domain particles (pages 28 and 29), the Langevin function is misquoted (page 17) and the units of μ_0, the permeability of free space, are omitted (page 7).

E. D. ISAAC

OBITUARIES

Professor F. P. Bowden

PHILIP BOWDEN, who died in Cambridge on September 3 after a long illness, was a man of great originality who created his own branch of science. His research started in the Department of Colloid Science at Cambridge when he came from Tasmania in 1927 as an 1851 Exhibition scholar. There he worked on the surface of catalytic metals and his experience of surface science, together, as he used to say, with his enjoyment of skiing, led to his interest in friction as a subject for research. It was Bowden, together with David Tabor, who first established that the sliding of one clean surface over another involves the seizing together and plastic deformation of asperities on the surface. His achievements in this field are set out in the series of books by Bowden and Tabor on "The Friction and Lubrication of Solids".

His work on friction, too, and the local heating that can occur between sliding surfaces, was one factor leading Bowden to his investigations of the initiation of explosions, which are described in his books with A. D. Yoffe, *Initiation and Growth of Explosion in Liquids and Solids* and *Fast Reactions in Solids*. Yoffe and Bowden first met during an investigation of a nitro-glycerine explosion in Australia during the war, which Bowden thought might be due to this cause. It was during a visit to his family and friends in Tasmania in 1939 that, when war broke out, he was invited to set up a laboratory in Australia to deal with wartime problems connected with friction and lubrication. Soon after he left for England the laboratory became the Division of Tribophysics of the Australian Council of Scientific and Industrial Research, and this laboratory continues in many respects the traditions which he established.

On his return to Cambridge after the war, Bowden started to build up his research group in the Department of Physical Chemistry, refusing to be daunted by the lack of space on the New Museums Site and installing some of his equipment in a caravan parked in a corner. When the Department of Physical Chemistry moved to its new buildings at Lensfield Road, Bowden remained on the old site and his group became a sub-department of the Cavendish Laboratory, named "Physics and Chemistry of Solids" and later "Surface Physics". Its interests widened to include fracture, oxidation, radiation damage, dielectric breakdown of mica and optical properties of transition metal compounds. Over all this Bowden presided and it was his group in a very real sense to the end of his life. He was single minded in the pursuit of its interests and its creation, financial support and scientific leadership were his personal achievement and pride—"The lab. . . ." he used to say when speaking of it.

Working on subjects so close to the interests of industry and government service, he did not lack offers of positions of high responsibility in the world of technology. But Bowden knew what he wanted; "Not my kind of thing . . ." was his reaction, and he stayed in Cambridge. But the visitors from industry who flocked to his laboratory were always welcome and he became a director of the English Electric Company and was instrumental in setting up the Tube Investments Research Laboratory at Hinxton Hall, near Cambridge. He gave his time to a great many government and industrial committees.

Bowden was elected a Fellow of the Royal Society in 1948 and was awarded the Rutherford Medal by the Society in 1956; he received the Redwood Medal of the Institute of Petroleum in 1953, the Elliott Cresson Medal of the Franklin Institute in 1955, the Glazebrooke Medal and Prize of the Physical Society in 1968, and the Barnard Lewis Gold Medal of the Combustion Institute in 1968. He was a fellow of Gonville and Caius College and for many years director of studies in natural science. He was elected to an *ad hominem* professorship in the Cavendish Laboratory in 1966, taking the title of professor of surface physics.

Bowden had a wide interest in all aspects of life and at the Bowdens' beautiful house, Finella West, you never knew whether you were in for a discussion on science or on painting or on literature. Those who worked with him felt the influence of this aspect of his character in the elegance and simplicity of his experimental work. He commanded great loyalty from his co-workers and created a tradition of research in Cambridge which is likely to last. He will be very greatly missed.

Correspondence

Chemistry of the Brain

SIR,—Your most informative and concise review on schizophrenia, a section in "The Chemistry of the Brain" (British Association—Dundee, as reported by *Nature*, **219**, 838; 1968), contains a minor error: bufotenin is referred to as a well known hallucinogen.

It appears, however, that it is extremely difficult to differentiate the alleged psychotic reactions (*Sci. Monthly*, **83**, 232; 1956) from the cardiovascular effects of the drug. "The latter include sudden hypertension and development of an arrhythmia which actually amounts to a ventricular standstill. The auricle does not beat, the beat drops out, and the ventricle takes over, and it is very frightening. Simultaneously with the hypertension and ventricular escapes, one sees spectacular cyanosis in the upper part of the body, similar to that which has been described in the carcinoid flush, which is presumably due to serotonin" (*Ethnopharmacologic Search for Psychoactive Drugs*, USPHS Publ. No. 1645, edit. by D H. Efron, 376, US Govt. Print. Office, 1967).

A careful analysis of the paper which first claimed that bufotenin is a hallucinogen (*Science*, **123**, 886; 1956) makes me believe that the short-lived entoptic phenomena called "colour hallucinations" must have been due to a sudden increase in intraocular pressure and that bufotenin is not