the luminous efficiency of these lamps, initially and throughout life. A spherical integrating-photometer, 12 ft. in diameter, has recently been built and is used for measurements on tubular fluorescent lamps up to 10 ft. in length, as well as large lighting fittings.

Of the large number of projects in the field of telecommunications in hand at the Laboratories, a few deserve particular mention. Concerning pulse-modulation, demonstrations of an experimental 28-channel pulse-system were in progress. The signals can be compressed at the transmitter and expanded at the receiver, thus considerably improving the signal-to-noise ratio in this type of communication. Apparatus for generating very short pulses, of the order of 0.01 μ sec. duration, was on view.

A system, using the frequency bands 70–72.8 and 85–87.5 Mc./s., has been developed to provide a long-distance six-channel multiplex circuit using radio links. This system uses wide-band frequency modulation. Intermediate stations, spaced about every fifty miles, may use a simple combination of terminal-type transmitters and receivers or may incorporate a special type of non-demodulating radio-repeater.

In order to cover the greater area required in fixed-mobile communication, as, for example, in systems used for police cars, a very high frequency modulated system has been developed. Instead of using a single transmitter, several remote transmitters are used and their transmitting frequencies synchronized. This synchronization is obtained by radiating signals of multiplied and divided frequency to the satellite stations, where they are divided and multiplied and re-radiated. The talk-back signals from the cars are received at either master or satellite stations, the whole system being arranged to operate without the attendance of operators other than the message dispatchers.

A wide selection of cathode-ray tubes, valves and components was displayed. Intensive research on secondary emission is carried out, and valves employing one or two stages of secondary emission, in use as wide bandwidth amplifiers, were shown. Visitors also saw high back-voltage germanium point-contact rectifiers, based on the old 'cat's-whisker' principle. The current-voltage characteristic of such a germanium rectifier was displayed on an oscillograph screen and compared with that of a low back-voltage silicon type.

An item of exceptional interest was the new germanium triode amplifier and oscillator. This device consists of two point-contacts mounted close together and in contact with a piece of germanium material which forms the third electrode. The necessity for manipulative skill in its manufacture has been greatly reduced in a new type which can be made quickly and efficiently by accurate machining only. This triode operates with a negative voltage of the order of 20 volts on the anode and a small positive voltage on the grid, no heater being necessary.

All valves, germanium crystals and Geiger-Müller counters manufactured by the Company undergo the same rigorous life- and performance-tests as lamps, and visitors were able to see the apparatus with which these are carried out.

The alloys of which valve-cathode-filaments are made must lie within close composition specifications, and the technique of powder metallurgy, used in their manufacture, was demonstrated. This technique is also used for making 'G.E.C. Heavy Alloy', which is composed of tungsten, nickel and copper

and has a density of about 17 gm. per c.c. 'Heavy Alloy' is therefore particularly suitable for making screens against harmful radiations and for radium containers, the purpose for which it was originally developed. Another major use is in the aircraft industry, for balancing ailerons, rudders and elevators and in crankshaft balance weights for aero engines.

The new method, developed in the Laboratories, for welding aluminium and its alloys without the application of heat has recently aroused much interest. The main factors ensuring the satisfactory use of this cold-welding process are the preparation of the surface to be welded and the design of the tools used. Examples of the many possible types of structures and joints were shown, and practical demonstrations given.

The high precision necessary in the manufacture of magnetrons was demonstrated by two machines which carry out the grooving and slotting respectively. The former machine automatically cuts the strap grooves in magnetron anode blocks, without leaving any burr in the holes or slots. The slotting machine cuts the radial slots, which connect the central bore with the planetary holes, to a minimum width of 0.004 inch.

Development work on diamond dies for drawing the very fine wires used in lamps and valves is carried out at the Laboratories, and visitors were shown experimental work on the various methods used for piercing holes of correct profile through diamond.

Sapphire crystals, for use as gramophone needles, and for jewel bearings in instruments, are synthesized, either in the form of 'boules' or long rods. The automatically controlled furnaces, in which fine alumina powder is converted into the required crystalline form, were shown.

A large number of demonstrations connected with the manufacture and working of glass was given. General glass-blowing and hand bulb-blowing was in progress, while equipments for measuring the creep of refractory materials, the devitrification temperature of glass and the low-temperature viscosity of glass aroused considerable interest.

This brief summary cannot adequately cover the varied activities of the Laboratories as shown to its guests. The motive underlying the occasion is best expressed in the words of Mr. Leslie Gamage, the vice-chairman and joint managing director of the Company. When addressing visitors from the Press on the second day of the conversazione, he said: "We want you to feel that we are always ready to try to give you the information you may need, and to answer any questions you may have. Only if those who carry out research are in the closest possible touch with those who will ultimately benefit from that work can we achieve our aims and can our efforts reach full fruition."

OBITUARIES

Mrs. R. H. A. Plimmer

VIOLET GERALDINE SHEFFIELD, whose death occurred on July 4, became the wife of R. H. A. Plimmer before her academic career was far advanced. She had one son and three daughters, and she applied her scientific training and knowledge to the rearing of them in a thoroughly wholesome and healthy

manner. She became intensely interested in the influence of nutrition on health and made it her especial study. Her husband became interested in it also, and, in addition to his pioneer work on the structure of the proteins, he carried out experiments on the influence of vitamin B on the nutrition of different birds, for example, hens, guinea fowls, turkeys, etc. Prof. and Mrs. Plimmer jointly wrote a book entitled "Food, Health and Vitamins", which was first published in 1925. By 1942 it had reached its ninth edition. In this, they quoted from Browning:

"Man must pass from old to new,
From vain to real, from mistake to fact,
From what once seemed good, to what now
proves best:
How could man have progression otherwise?"

To discard "what once seemed good" for "what now proves best" has been their guiding principle throughout their scientific writings. Prof. and Mrs. Plimmer wrote "Vitamins and the Choice of Food" in 1922, thus bringing within the reach of everyman knowledge which was then in its very early infancy, the only vitamins then known being A, B and C. Mrs. Plimmer alone produced "Food Values at a Glance" in 1939, which was found to be of very great value to people who had to cater for schools and other large fraternities as well as those who had to feed only a family. Later, in 1941, she wrote "Food Values in Wartime", a most practical and readable book for people who seriously tried to make the best of the war-time rations. To many people, it probably brought the first indication that the choice of food should be guided by influences other than mere taste. A second edition was published in 1943. Mrs. Plimmer's writings must have had a very far-reaching effect on the health of the British people, not only during the War but also in the even harder catering times since it ended. Her readers as well as her many personal friends will miss her kindly and understanding help. KATHARINE H. COWARD

Mr. F. S. Smythe

THE sudden death on June 27 of Francis Sydney Smythe, the well-known mountaineer and writer, has removed one who for a considerable number of years has brought home to the public in effectual manner both the beauty of great mountains and the supreme adventure of climbing them. This he did in some twenty or more books, apart from numerous articles, relating to the Alps and the Himalayas especially, and it is significant that it was his last visit this year to the beloved Himalayas which was the cause of his decease through infection from some unknown germ.

As a boy Frank Smythe was delicate, and in consequence, after a period at Berkhamsted School, he was sent to Switzerland, where his love of mountains grew to full maturity. There, too, he received some of his training at Zurich as an electrical engineer. But a brief appointment in the Argentine convinced him that engineering was not his *forte*, and he returned to England to engage in a severe struggle to establish himself in article-writing, relating mainly to his Alpine and British mountaineering experiences.

The international expedition to Kangchenjunga in 1930 gave him his first taste of Himalayan mountaineering, out of which experience grew his successful

ascent of Kamet (25,447 ft.) in 1931, and his three attempts on Everest with the expeditions of 1933, 1936 and 1938. In another field, that of the Canadian Rockies, his last success in 1947 was in the pioneer ascent of Mount Lloyd George, in northern British Columbia, where his natural force and skill seemed quite unabated. I was a member of this exploratory expedition and can bear witness, moreover, to Smythe's habitual enthusiasm for the mountain flora, which was found in surprising profusion in that far northern district.

The collecting of mountain plants, particularly in the Himalayas, was the chief adjunct of his climbing enterprises, and as a result many of these plants have been acclimatized and introduced into English gardens, notably his own beautiful one in Sussex. But Kew and Edinburgh were the recipients of many new or rare species, especially from the central Himalayas of Garhwal, whence in the course of one expedition he brought back some 250 varieties. This achievement was described in his book "The Valley of Flowers", published in 1938, which was well illustrated in colour.

As a photographer Smythe was in the first class, and his more recent books were often albums of beautifully artistic subjects and views, with minor text as commentary. He died at the early age of forty-eight, having been twice married, and leaving three sons by the first marriage. N. E. ODELL

WE regret to announce the following deaths:

Mr. Charles Day, a past-president of the Institution of Mechanical Engineers, on June 18, aged eighty-one.

Prof. Ottavio Munerati, director of the Sugar-beet Experimental Station, Rovigo, Italy, on July 18.

Prof. P. E. Newberry, O.B.E., formerly Brunner professor of Egyptology in the University of Liverpool, on August 7, aged eighty.

Sir Frank Stockdale, G.C.M.G., C.B.E., vice-chairman of the Colonial Development Corporation, a leading authority on Colonial agriculture, on August 3, aged sixty-six.

NEWS and VIEWS

Earthquake in Ecuador

ON August 5 a great earthquake, immediately followed by two severe and many lesser aftershocks, struck the South American Republic of Ecuador. A preliminary account may now be given though further news from the affected area and from observatories throughout the world is awaited. The area most affected was that lying between the two volcanic peaks of Chimborazo and Cotopaxi. Casualties may be more than nine thousand dead and twenty thousand injured, and damage to property has been estimated at over £5,000,000.

The epicentre was near the towns of Pellileo, Patate and Pillaro, Guano and Salcedo, which are now virtually in ruins. Ambato, some seventy miles south of Quito and once the fifth largest city in Ecuador, famed as an agricultural and commercial centre, has 80 per cent of its buildings down. In particular the cathedral and the Civil Guard barracks were badly damaged and some people inside them at the time killed; water supplies, other public services and communications were cut. Rescue work is pro-