

are also illustrated and described. The book is written in considerable detail so that a polarographer working in the laboratory, or the hospital or in the pharmacy can carry out the analyses without any further reference to the original work. It is indeed an exhaustive laboratory manual which one working in the field could hardly afford to miss. Further, as no single book of comparable quality is available in English, the present edition will bring the subject of Polarography in Medicine and in Biochemistry nearer to a greater number of workers in the field and stimulate further research in this direction.

This English edition, with its excellent printing and get-up, coming as it does on the eve of his 70th birthday, can be regarded as a tribute to the author of Polarography, Academician Jeroslav Heyrovsky. Prof. Heyrovsky not only discovered the polarographic method but also was able to develop it to the full extent of its practical and theoretical application and to set up a school that would continue the development of polarography in the years to come.

The Polarographic Institute at Prague, of which Prof. Heyrovsky is the Director, since its founding in 1950, has been extending polarographic studies into new vistas. The poten-

tialities of employing the oscillograph for the study of electrode reactions proceeding on a single drop of mercury are being examined and Prof. Heyrovsky has succeeded in developing the "Polaroskop" based on oscillographic polarography wherein the presence of reducible or oxidizable substances is signalled by cuts appearing on the oscillographic curves. The depth of the cut indicates the amount of the substance contained in the solution while its position enables one to identify the substance. Another new investigation in oscillographic method in which Prof. Heyrovsky has been working is the "Impulse polarography". In this method polarographic curves are obtained by the application of voltage impulses, and the duration of study will be a matter of few seconds only.

The forthcoming Second International Congress of Polarography to be held in Cambridge in August of this year will focus attention on the recent achievements of Polarography and its applications in Fundamental studies, in Industry and in Biology and Medicine.

India recognized the outstanding importance of the work of Prof. Heyrovsky when the Indian Academy of Sciences elected him as an Honorary Fellow at its last meeting.

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### MINIATURE GENERATOR POWERED BY RADIOISOTOPES

**T**HE U.S. Atomic Energy Commission, under its project for constructive uses of atomic energy, has developed a miniature Atomic Generator known as the "Radioisotope—fuelled thermo-electric generator". In this device the heat continuously given out by a radioisotope is converted into electricity by use of special semiconductors which act as thermo-couple materials causing flow of current under differential temperature conditions.

The cylindrical generator is  $4\frac{1}{2}$  inches wide and  $5\frac{1}{2}$  inches high, weighs only 5 lb. and has no moving parts. It is capable of generating five watts of electricity from a 3,000 curie source of Polonium-210. The tiny pellet of fuel is in the centre of the device and is surrounded by 20 pairs of thermo-couples radiating like the spokes of a wheel. The polonium capsule heats itself to more than  $700^{\circ}\text{F}$ . by the energy of disintegration (5.3 Mev., alpha particles). The double-layered spokes are composed of the thermo-electrical material lead telluride that is alloyed with other substances, including bismuth and manganese. Doped semiconductors with their poor heat transmission characteristics

have revolutionized the field of old bimetal thermo-couples. When the ends near the source get heated by the continuously radioactive isotope, electric current is set up in each of the thermo-electric spoke and is collected at the rim into a central outlet.

Polonium-210, of half-life 138 days, used as fuel in the model is particularly expensive. But it is intended that later models will use longer lasting and less expensive radioisotopes. One of these is Cerium-144 whose half-life is 290 days, which, if used as fuel, would turn out more power for a longer period of time. Eventually use could be made of radioactive atomic materials now regarded as waste. The weight of the generator could also be reduced to about 3 lb.

The Generator has great potential use as power sources for instruments carried in satellites and space probes on account of its compactness, efficiency and long life. The conventional batteries in the U.S. Atlas satellite [see *Curr. Sci.*, 27 (12), 480] weighed 20 lb. and lasted only for 18 days.—*Atoms for peace Digest*.

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