

derivable as consequences of the special circumstances of each case. For instance, when the azimuthal angle is small, one of the two reflections in each case vanishes and the quartet reduces to a doublet. If, in addition, the angle of incidence is also small, the light paths corresponding to the two surviving sets of beams differ inappreciably and we observe a single sharply defined monochromatic band in the spectrum. *Per contra* when the azimuthal angle is  $90^\circ$  and the incidence is sufficiently oblique, all the four sets of reflected beams have to be

considered, but by reason of the symmetry of the case the paths for the two middle components continue to be identical and hence we observe a triplet. The explanations indicated above are completely substantiated by the observed states of polarisation of the components in each case taken in conjunction with the known characters of the birefringence of the crystal.

C. V. RAMAN.  
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### NOBEL AWARD FOR MEDICINE, 1952

**D**R. SELMAN A. WAKSMAN, Professor of Soil Microbiology at Rutgers University, New Jersey, has been awarded the 1952 Nobel Prize for Medicine, for his discovery of streptomycin. His interest in the chemistry of living processes began many years ago in Russia—he was born in the Ukraine in 1888—and by 1915, five years after his arrival in the U.S.A., he had already undertaken a study and classification of the actinomycetes. His investigations were mainly agricultural until 1939, when Rene Dubos, who had been one of Waksman's students at Rutgers University, isolated from a spore-bearing soil bacterium, a substance (gramicidin) which appeared to be capable of destroying pathogenic bacteria. About this time also Gleming's discovery of the anti-bacterial action of penicillin was being developed for therapeutic purposes, and Waksman turned his full attention to an attempt to isolate from the soil micro-organisms possessing anti-biotic properties. It was early in 1944 that with Schatz and Bugie he announced the isolation from *Streptomyces griseus* of streptomycin, a

substance antagonistic to both gram-negative and gram-positive bacteria including *Mycobacterium tuberculosis*. The fact that streptomycin was the first effective anti-biotic to be used in the treatment of tuberculosis has become a part of medical history. One of its most notable successes has been in tuberculous meningitis, no longer an invariably fatal disease.

Streptomycin has well-known limitations, among them its toxic effect on the eighth nerve and the development of resistance by tuberculosis bacilli. In reviewing the possibility of further advances in this field, Dr. Waksman wrote in the *British Medical Journal* two years ago: "Sooner or later other anti-biotics will be found which are more effective than either (streptomycin and neomycin) and less toxic. The fact that in the various surveys on anti-biotic production by micro-organisms the acid-fast bacteria are found to be among the most sensitive forms points to the possibility of the existence of such agents. Finding these is merely a matter of further search".

(—By courtesy of the *British Medical Journal*)

### THEORY OF EARTH'S INNER CORE

**F**OR some years it has been known that the earth contains a central core with a radius of 2,200 miles. This central core is physically distinct from the outer mantle, which extends up the further 1,800 miles to the earth's surface. Several distinct lines of evidence have pointed to the bulk of this central core being in a fluid state. Over the years from 1935 to 1939, it was concluded that the central core contained an inner core with a radius of about 800 miles. Professor Bullen, Professor of Mathematics at Sydney University, Australia,

has recently adduced some evidence to the effect that while the outer part of the central core is fluid, the inner core is solid, with a density of about 18 times that of water. There is some division of opinion on the question of the composition of the outer part of the central core, but his work favours the view that the central core consists of a high density liquid form of silicate rock with a density about 11 times that of water, and that the inner core is chemically distinct and consists of iron, nickel and probably some denser metals,