weak interactions may be part of a "Universal Fermi Interaction" as had been considered in a number of earlier papers on a purely qualitative basis.

Thus classical beta-decay theory and the non-conservation of parity have together made possible a determination of the interaction constants of beta-decay. It also appears that all the weak interactions are linked together in an overall manner by the same interaction constants, the V-A type of interaction, the law of conservation of leptons and the two-component neutrino; where non-leptons alone participate in the decay process, the situation is more complex.

One should perhaps conclude by remarking how wonderful Varenna is, and the Villa Monastero in particular, for holding summer schools of this nature. An exceedingly strong tradition in this field has been built up by the Italian Physical Society through schools run by them since 1953 at Varenna. A very high level has been maintained in the atmosphere, both academic and social, of these schools. The dissemination of physics in this manner is not only fruitful but so greatly enjoyable.

ULTRASONICALLY DISPERSED SODIUM

It is well known that many chemical reactions involving sodium become more efficient as regards rate, yield, control, temperature conditions, etc., if the metal is used in a highly dispersed form so that the size of the sodium particles is very small and a very large surface area becomes available for reaction. The surface area of spherical particles of sodium 1 μ in diameter is 6×10^4 sq. cm. per gm. The common method of producing sodium dispersions is by stirring molten sodium and the dispersing medium together mechanically at 10,000-20,000 rev./min. when particles between 3 and 15 μ are produced.

It has been recently found that much finer dispersions of sodium in a hydrocarbon medium can be obtained by employing ultrasonic technique. Pratt and Helsby have described a simple laboratory apparatus capable of producing 200 gm. quantities of sodium dispersions by this method (*Nature*, 1959, 184, 1694). A molten mixture of sodium and the hydrocarbon dispersing medium (yellow petroleum jelly in this case), with boiling point higher than the melting point of sodium, 97° C., is contained in a pyrex cylinder (15 cm. $\times$ 6 cm.) from which air has been displaced by an inert gas. The bottom surface of the cylinder is sealed on by a "neoprene" ring to an ultrasonic magnetostrictive transducer with a resonant frequency of 25 kc./s. The mixture in the inert atmosphere is then subjected to the ultrosonic frequency for about 10 minutes till the colour of the dispersion becomes constant (deep blue, the result of scattering of light by the minute particles) indicating that the equilibrium state of the dispersion has been reached. The finished dispersion is then siphoned off, by increasing the pressure of the inert gas, into a collecting vessel, also depleted of air but containing an inert atmosphere. The sodium particles in the jelly being out of contact with air and moisture, keep well and can be safely transported. The sodium is liberated for reaction either by melting the jelly, or dissolving it in petrol.

Sodium dispersed in yellow petroleum jelly reaches an exceptionally fine state of subdivision, 1 μ or less. The superiority of the use of the ultrasonically dispersed sodium over that of the mechanically dispersed metal has been demonstrated in the exothermic reaction between sodium and chlorobenzene to produce sodium phenyl. With the ultrasonically dispersed sodium the reaction is initiated at once, even at 20° C., and the reaction rate is 10-20 times greater. Other reactions which are likely to benefit from the use of ultrasonically dispersed sodium are Claisen condensations, Wurtz reactions, preparation of sodium alkyls, aryls and alcoholates, metalations, replacement of active hydrogen atoms and the purification of hydrocarbons.