Mill in Decapoda. II.—A Comparative account of the Gastric Mill in Brachyura.—The gastric mill is essentially typical in all cases of Brachyura examined. S. S. PATWARDHAN: *Nematodes from the Common Wall-Lizard* Hemidactylus flaviviridis *(Ruppel).*—Examination of the intestines of several specimens of the common wall-lizard *Hemidactylus flaviviridis* (Ruppel) revealed the presence of two species of Nematodes: (1) *Thubunea asymmetrica* (Baylis, 1930); and (2) *Thelandros hemidactylus* sp. nov. a new species of the genus *Thelandros* Wedl. 1862. C. R. HARIHARA IYER, G. S. SIDDAPPA AND V. SUBRAHMANYAN: *Investigations on the Rôle of Organic matter in Plant Nutrition, Part VI. Effect of minute quantities of certain forms of organic matter on plant growth and reproduction.*—Injection of minute quantities of certain organic extracts into mature sunflower plants led to not only better growth but also greatly increased flowering and seeding. The best results were obtained in the case of plants receiving extracts of yeast or farmyard manure. Comparative trials with inorganic salts which were fed directly to pot or plot cultured French beans or barley did not lead to any marked improvement.

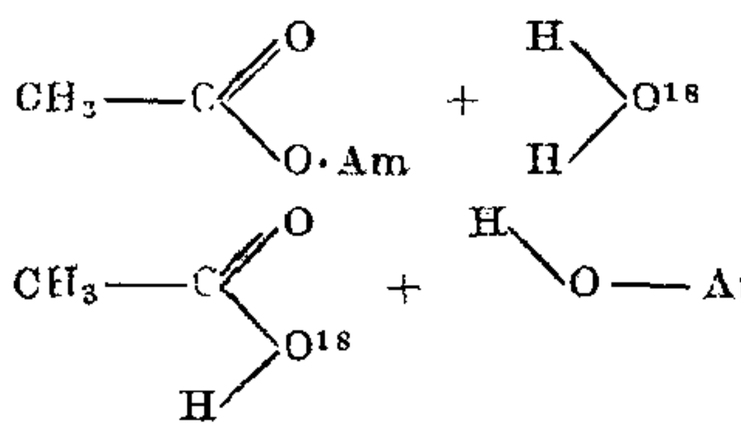
Heavy Water in Chemistry.

IN a lucid exposition before the Royal Institution, Prof. M. Polanyi (*Nature*, **135**, 19) points out that the new isotope of hydrogen is viewed so differently from other isotopes that some chemists consider its discovery to be possibly the greatest advance in chemistry made in this century. In fact this structural isotope does not behave as an isotope at all and can be separated from the normal hydrogen by chemical means. In general, compounds of heavy hydrogen (D) react more slowly than the corresponding ordinary hydrogen (H) compounds, heavy water reacting 20 times more slowly. These differences cannot be sufficiently accounted for as a mass effect. The compounds of the two hydrogens differ actually in their energy content, and this can be explained according to the Law of Uncertainty, a principle of Nature recently discovered by Heisenberg. According to this, every molecule has a kind of permanent energy called the "uncertainty energy", and it can be calculated that for ordinary water the energy is 13,097 cal., while for heavy water it is only 9527 cal. Thus ordinary water requires a much smaller quantity of energy to split it into hydrogen and oxygen than does heavy water. This permanent energy is greater the tighter the bond which holds the atoms in position and the corresponding contrast between the two hydrogen compounds also becomes more marked. The consequence is that D prefers to exchange places with H wherever it is more tightly bound, with a resulting release of some energy as in

$$HF + DI = HI + DF + 700 \text{ Cals.}$$

Such interchange reactions have been the object of numerous studies in recent years. According to the relative preference which a compound gives to D over H, a rather intimate knowledge of the permanent energies in the compounds is obtained. Further, this capacity of some compounds to accumulate a comparatively higher quota of D present in a mixture, can be utilised to work out a cheaper method of manufacturing pure D_2. The interchange reaction can be used to prepare more complicated compounds of heavy hydrogen, such as C_6D_6. It also throws a considerable light on the mechanism of chemical reactions, such as hydrogenation. Again, it may be possible to utilise the lowered reactivity in synthetic chemistry as hydrogen compounds which ordinarily are readily oxidised or otherwise decomposed,—might become more stable if H is replaced by D.

Heavy isotopes of other important elements, such as O^{18}, N^{15}, and C^{13} can also be made similarly useful. Thus, the hydrolysis of amyl acetate with water containing H_2O^{18} and examination of the OH of the resulting alcohol showed that the oxygen in the alcohol does not come from the water used in the saponification and the actual reaction mechanism is



It is likely that the greatest stimulus of all will be given to the chemistry of living matter when such labelled carbon, hydrogen, oxygen and nitrogen atoms will become more generally available.

M. A. G.