breeding and genetical studies are mentioned, among which the results of extensive interspecific crossing in *Theobroma* will be awaited with particular interest.

A report* from the Imperial College of Tropical Agriculture, Trinidad, supplements that for the seven years 1945–51 which was reviewed in *Nature* (**173**, 115 ; 1954). Much of the work recorded is concerned with the nutrition of the cacao tree. One paper continues (from the earlier report) the description of an experiment comparing the reactions of young cacao to different combinations of shade and manurial treatment. Others deal with mineral injections, rapid chemical tissue tests, leaf sampling, the treatmen of iron chlorosis with the iron complex of ethylene diaminetetraacetic acid, and marginal leaf scorch. Biochemical studies are progressing, with particular reference to establishing a technique for the satisfactory fermentation of small samples. A note on the conditions of fermentation will be of special interest to users of raw cacao. The report also includes useful notes on minor insect pests of cacao in Trinidad. E. E. Cheesman

* Report on Cacao Research 1952. Pp. 71. (Imperial College of Tropical Agriculture, St. Augustine, Trinidad, B.W.I., 1953.) 8*s*.

THE POLECAT IN WALES

Like that of several other British mammals, the distribution of the polecat has not yet been fully investigated. Being a creature of the night and mainly haunting sparsely inhabited uplands or the wilder parts of the lowlands, it is a difficult and often inaccessible subject for study. There is the further complication that ferrets, which are apparently not descended from the British polecat but from a North African species, have for many centuries been escaping and crossing with wild polecats so that perhaps nowhere in Britain can the polecat be claimed to be a 'pure' species. It is, according to William Condry (*Oryx*, **2**, No. 4 ; March 1954), only in Wales and the Marches, probably in Devon and Cornwall, and possibly in the Lake District, that polecats can safely be said to be genuinely wild. Mid-Wales is undoubtedly their stronghold. The animal is really common in the counties of Cardigan, Merioneth, west Montgomery, Radnor and Brecon.

A remarkable feature of the polecat is the variety of habitats in which it can flourish. Polecats are found in Wales from the coast right up into the hills, and are as much at home in sand-dunes and sea-cliffs as they are about lowland farms, wild wooded gorges, or the margin of bogs. Rabbit-meat is their staple food ; but some live quite independently of it, for there are polecats but no rabbits in some of the moorland plantations of the Forestry Commission near the head of the Severn. In such places voles are perhaps their commonest prey.

Polecats seem to be most numerous in the rough, semi-upland, marginal farm country of which there is so much in mid-Wales and which is so often overrun with rabbits. For it is in ground honeycombed with warrens that polecats thrive best, where they find plenty of food and endless underground galleries in which to lie up in the daytime and where they can have their litters in comparative safety. Although they are often found very close to farms they very rarely attack poultry, despite the reputation as chicken killers which they have had since medieval times.

The polecat's future is, to a large extent, tied up with that of the rabbit ; for although polecats can live independently of rabbits, they thrive best where rabbits are plentiful. At present the polecat is probably still increasing and, where rabbit trapping is on a small scale, even extending its range.

CHEMICAL PRIMARY PROCESSES IN THE ACTION OF IONIZING RADIATIONS ON WATER: EVIDENCE FROM EXPERIMENTS WITH HEAVY WATER

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It is well known that the energy loss of fast particles proceeds through processes of ionization and excitation. On this basis, it was suggested[1] that the most important chemical primary process in the action of the ionizing radiations on water can be represented by the net reaction :

$$H_2O \rightsquigarrow H + OH, \qquad (1.1)$$

leading to the formation of H atoms and OH radicals. Afterwards, it was pointed out by Allen[2] that there appeared to be an additional relatively small decomposition of the water molecules leading somehow directly to the formation of molecular hydrogen (and of an equimolecular amount of hydrogen peroxide). It was assumed that this also proceeds via the splitting of water molecules, according to equation (1.1), and that formation of this molecular hydrogen was due to preferential recombination of some of the hydrogen atoms in 'hot spots' along the tracks of the ionizing radiations. However, a number of experimental facts were difficult to reconcile with such a mechanism, based as it is on the intermediate formation of hydrogen atoms.

It was therefore proposed more recently[3] that this 'molecular yield' might be due to the direct interaction of excited water molecules (H_2O^*), according to :

$$\begin{matrix} HOH^* \\ HOH^* \end{matrix} \longrightarrow \begin{matrix} H \\ | \\ H \end{matrix} + \begin{matrix} OH \\ | \\ OH \end{matrix} \text{ (rate constant } k_{2\cdot 1}), \qquad (2.1)$$

and it was suggested that these processes could take place in the more densely populated clusters along the tracks created by the fast particles, where excited molecules should be formed sufficiently close to each other to enable a bimolecular interaction to occur with some probability ; this would also be consistent with the relatively very low value of the 'molecular' yield.

The problem has been to design an experiment which would allow one to distinguish between : (i) the hydrogen gas formed by the recombination of hydrogen atoms, and (ii) the hydrogen molecules formed directly in a single elementary process.

It has now been found that such information can be derived from a study of the isotopic composition of the hydrogen gas which is given off from water, enriched with heavy hydrogen, under the influence of ionizing radiations.