between Kwangtung and Fukien Provinces. Its length from north to south is twenty-two miles, and its width from east to west is eighteen miles; a channel separates the northern part of the island from the mainland and connects Tungshan Harbour on the east with Chaoan Bay on the west. Tungshan Harbour is a fishery port, and Chaoan Bay is of importance for its saltworks. Fishing and salt-making enrich the islanders much more than the rice fields do the farmers on the mainland, though the lack of fresh water deprives the islanders of farming. As the results of warfare at sea, off-shore fisheries have practically disappeared. On the other hand, salt manufacture, because of the encouragement given by the Central Government and the increase of salterns and labourers, has been tremendously developed during the last five years.

It is to be noted that Tungshan is an important fishery centre in Fukien Province, and Tungshan Harbour is a very useful port along the south-west coast of China. Both as biologists and fishery investigators, we want to know the natural conditions of the fauna and flora in Tungshan waters, since these will give precise knowledge as to the position of the intermediate zone, biologically speaking, between the tropical and the temperate seas. From the practical point of view, such general biological knowledge will lead us to more accurate conclusions as to fish migrations.

Tungshan Harbour is mid-way along the Amoy-Swallow sea route, and affords merchantmen and fishing vessels a very convenient shelter during the typhoon season. However, the nature of the tides and currents in Tungshan Harbour is not yet known, as the necessary observations have not been made.

Several papers have been published upon the last survey, both at Chungking and at Yungan, by the China Institute of Geography. I have prepared two papers: "The Tides and Currents around Tungshan Island" and "The Semi-daily Variations of Salinity in Tungshan Waters".

In the first of these, I have shown that the tides and currents around Tungshan Island are of the semi-diurnal type, and that the salinities of Tungshan waters are variable.

The second paper can be summarized as follows:

1. The salt-content of the waters around Tungshan Island, especially along the northern part, varies considerably in a day. The greatest range, from 23.20 to 31.40‰, was recorded in the water of Tungshan Channel, and the periodicity of the variation was found to be semi-diurnal.

2. It appears that around Tungshan Island the variation of salinity follows exactly the movement of the tide; that is, when the tide rises and the current is inward, the salinity of the water increases; when the tide recedes and the current is outward, the salinity of the water decreases.

3. The salinity of Tungshan waters was found to reach the highest point generally half an hour before high water, as the salt-water at the time of high tide has already been covered on the surface by a layer of brackish water which comes down from up-stream.

4. Considering the Tungshan waters as a whole, the highest salinity recorded was 33.03‰, the average was 28.12‰, and the lowest was 21.92‰. The difference of 5‰ between the highest and the average means that the water of high salinity may produce one-fifth more salt than that of the average salinity which is generally used by the salt-makers of Tungshan Island.

5. The best sea-water for filling up the reservoirs of the salterns around Tungshan Island can therefore only be obtained during the period from three hours to half an hour before high water; and the best day for filling up is the day following the new and full moons in each month.

ROLE OF ISOLATION IN THE DIFFERENTIATION OF PLANT SPECIES

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THE differentiation or origin of species depends upon the development of discontinuities or gaps in the variation pattern of Nature. We recognize species not because of the amount of difference between their most divergent individuals, but because of their distinctness from each other, or the breadth of the gap between them. The formation of these gaps between species depends upon the development of some isolating mechanism. Many different kinds of isolating mechanisms are found in Nature. In order to understand the forces which direct evolution, we must solve two major problems. These are first, how isolating mechanisms develop and become established as barriers between species, and second, what relation they have to morphological divergence, or the "descent with modification" of Darwin.

As an aid to the solution of these two problems, evidence is produced from our knowledge of species and species hybrids in the higher plants to support the following five statements.

First, isolation of two groups of individuals by geographic barriers, even for very long periods of time, does not necessarily cause them to evolve into distinct species. Certain species of eastern North America have been isolated from their relatives in eastern Asia for millions of years, and yet the populations on the two continents have remained exactly like each other during these long ages. Second, if two species have become recognizably different as a result of long-continued geographic isolation, they do not necessarily become isolated by genetic barriers also. Some American species, such as the American sycamore (*Platanus*) (British plane) and the *Catalpa*, are different in appearance from their Asiatic relatives; but the hybrids between them have been found (by other workers) to be fully fertile. Third, genetic isolating mechanisms, such as cross-incompatibility and hybrid sterility, do not appear suddenly, but evolve slowly as do the visible differences between species. Many plant species, as typified in the genus *Pæonia*, are in hybridization experiments partly incompatible with each other or form partially sterile hybrids. Such species may be in the process of evolving barriers of interspecific sterility between each other. Fourth, genetic isolating mechanisms have been produced artificially and analysed in laboratory or field experiments, but most of these mechanisms produce their effect in one or two large steps, and are transmitted in a relatively simple Mendelian fashion. On the other hand, the isolating barriers between natural species arise through the accumulation of many small steps, and are transmitted in the progeny of partially sterile interspecific hybrids according to the multiple factor pattern of inheritance. Fifth,

evidence from the progeny of partially sterile inter- and intra-specific hybrids in *Apocynum*, *Galeopsis*, and *Oryza* indicates that there is no direct genetic connexion between the causal agents of hybrid sterility and the genes which produce the visible differences between species. This association in Nature is a result of parallel evolution.

Based upon these five assumptions, a working hypothesis is formulated to explain the relationship in evolution between morphological divergence, or descent with modification, and the development of discontinuities in the variation pattern of natural groups of organisms, or the origin of species. Descent with modification takes place as a result of the interaction between mutation, natural selection, and the random fixation of genes in small populations. If these forces are relatively static, the species will not evolve. Discontinuities are developed when two parts of a more or less rapidly evolving species are separated from each other by any of a number of isolating mechanisms. These mechanisms evolve gradually, and are genetically independent of the changes in outward form which produce visibly different species.

TERMITE-PROOFING OF TIMBER

TERMITES, or 'white ants' in popular terminology, are known to most of the inhabitants of the tropical parts of the world, and also to some warm temperate regions such as parts of the United States. Although occasionally introduced into Great Britain, they have never made any headway in this temperate island climate. Various remedies or preventions against the termites' attacks have been introduced or are practised locally in tropical countries—some effective, or partially effective, others more or less worthless. One of the greatest troubles and losses from this pest is the depredations it commits on furniture, instrument boxes, packing cases, etc., made in Britain (or in temperate Europe generally) and sent to the tropics; in termite-infested areas such have little chance of escaping destruction.

There is an exception—teak is unattacked, and so articles made from teak are immune. The writer had a full-plate expensive camera in India packed in a beautifully built teak wood box. It was left on the cement floor in a corner of a room in a well-built rest house out in the District. Returning three weeks later an inspection of the box showed traces of termites round the bottom edges. The box was unlocked and lid opened. The wood work of the camera, mahogany, was entirely eaten, skeleton 'beams' and cross pieces being left to support the brass mountings of the camera. At a touch the whole structure collapsed. An examination showed that the bottom of this expensive teak brass-cornered box had consisted of a piece of pine wood.

Leaflet No. 38 (Forest Prod. Res. Lab., Princes Risborough, Department of Scientific and Industrial Research; Aug. 1944) is entitled "Termite-Proofing of Timber for Use in the Tropics". This leaflet opens with the statement that manufacturers in Great Britain handling timber, or making furniture, etc., for use in the tropics are often called upon to render wood proof against possible infestation by the termites, and therefore are directly concerned in the injury which these insects may cause. It is admitted that

in some countries termites cause the most serious damage, especially to permanent structures, unless precautions have been taken during their planning and construction. "In temporary structures and contents of buildings the risk of severe damage, it is said, is less and it need not be assumed that all materials or articles in which wood is present will at once be attacked and rapidly destroyed by termites when brought into a country in which these insects occur". There may be an element of truth in this, but the experience of many must render them chary of subscribing to this statement, or of taking the risk. Temporary structures may be ruined in a few days if left uninspected.

The leaflet summarizes information from a number of publications from certain countries, particularly from those of the Forest Research Institute, Dehra Dun, and the Bureau of Entomology, United States Department of Agriculture, and gives a brief account of how termite damage takes place; and also how it may be prevented. The subject is treated under the headings: habits of termites, prevention of damage, use of timber treated with wood preservatives, use of termite-resistant woods (among those usually available in Great Britain are iroko (*Chlorophora excelsa*), opepe (*Sarcocephalus diderichii*), Pacific Coast redwood (*Sequoia sempervirens*), teak (*Tectona grandis*)). Plywood and fibre or composition boards and termite attack are also dealt with. It is said that treatment against termites will in most cases also prevent destruction of timber through fungal decay.

MAGNESIUM DEFICIENCY OF FRUIT TREES

THE occurrence of magnesium deficiency of fruit trees growing in the field has been recognized only in recent years. L. Southwick (*Proc. Amer. Soc. Hort. Sci.*, 42, 85; 1943) describes a leaf blotch of apples which appears as an edge burn or interveinal necrosis, together with in some varieties a yellow banding or mottling of the leaves, appearing first in the older leaves and associated with a low magnesium content of the leaves, the scorched leaves usually containing less than 0.25 per cent magnesium. In the same journal D. Boynton, J. C. Cain and O. C. Compton report that seasonal variations in the potash and magnesium content of apple leaves agree with the seasonal differences in the incidence of leaf scorch and leaf blotch respectively. Leaf blotch due to magnesium deficiency may be reduced by soil application of magnesium sulphate, while it is aggravated by chloride of potash dressings (*ibid.*, 42, 95; 1943). L. Southwick and J. K. Shaw find that spraying with magnesium sulphate solution (16 lb. per 100 gallon) gave a partial control of the magnesium deficiency leaf blotch, and that most magnesium-containing substances applied to the soil were effective but magnesium limestone was ineffective in curing the trouble.

In the tung (*Aleurites fordii*) magnesium deficiency symptoms again consist of leaf blotches which increase in size at the margin and the development of brown necrotic areas which progress from the margin inwards between the main veins. As with apples, magnesium sulphate as a soil dressing effects a cure, but soil applications of potash aggravate the symptoms (M. Drosdoff and A. L. Kenworthy, *ibid.*, 44, 1; 1944).