

these services should not be equally available for the assistance of outside bodies as are those of the experimental and other facilities of the Station.

A branch of the work which has expanded rapidly during these years is that of dealing with technical inquiries. In the past year the number of inquiries received from architects for advice on the problem of sound transmission in buildings has been commented upon. On this subject investigation shows that the solution is primarily a matter of planning, as structural precautions can mitigate but not eliminate the discomfort of having noisy and quiet rooms adjacent. The report indicates that the most promising method of dealing with the transmission of noise in buildings is the provision of what is described as a 'floating floor'. The special investigations carried out in this branch also include those which are necessary to resolve difficulties or problems met with in practical operations, and the independent testing carried out for manufacturers of proprietary products. Reference is made to several of the most important or interesting of these in the report.

During the period a vast amount of work has been done on, and in connexion with, building materials—stone, brick, concrete, etc.—and the continuance of these activities is indicated. About those, their properties and limitations, much information has been obtained and made available for use. The investigations on bricks and brickmaking clays having been brought to a stage at which they can usefully be applied, attention is now being given to what is referred to as the efficiency of the brickwork structure as regards such matters as strength, permanency of

bond, thermal insulation and exclusion of rain. In the cleaning of the exteriors of buildings the use of chemicals is condemned as destructive, and a process is recommended in which fine jets of water are employed for a period dependent on conditions, and this is followed by brushing. It is held that this gives satisfactory results without causing immediate or ulterior damage to the stone or even to carvings on it.

Among the major investigations made during the year were a series of tests to ascertain the resistance of I-beams of high tensile steel and of mild steel to failure by bend yielding of the flanges, by shear yielding of the web and by buckling of the web. Where necessary the surfaces were scraped and painted with a thin coating of plaster of Paris, the flaking of which indicated local yielding; this is clearly seen in the photographs taken during the tests. On behalf of the Ministry of Transport, tests were made during the year on six bridges; some particulars are given of these, but the data obtained have yet to be completely analysed. Three of the bridges were tested to destruction—a stone arch bridge of 21-ft. span built in 1793 collapsed under a load of 77.6 tons, a brick arch bridge of the same span and date failed at 123 tons, while one constructed in 1870 of cast iron beams and plates, with a span of 13 feet, broke under 74.6 tons, in each case the load being applied by hydraulic jacks at the centre of the span.

The record of work and results as set out here fully justify the Board in its statement that in this short period the Station has become a real factor in the building industry.

## Eskimo Origins

THE essay on the origins of the most ancient civilization of the Eskimo, for which a prize was awarded by the Danish Government to Mr. Henry B. Collins, jun., in 1936, is now published under the title "Archæology of St. Lawrence Island, Alaska" (Smithsonian Misc. Collect., 96, 1).

The essay takes as its starting point a descriptive account of the results achieved by the author and others in excavations on ancient sites in St. Lawrence Island, which established the succession *Old Bering-Punuk-modern Eskimo* in Western Eskimo culture. On the basis of this material it has been possible to make a detailed comparison not only of the elements of the two prehistoric and the modern cultures *inter se*, but also of this Western Eskimo culture, both as a whole and in each of its phases, with the other Eskimo groups, ancient and modern, including the Thule culture of Th. Matthiassen, the Caribou Eskimo of Kaj Birket Smith, and the Eastern Eskimo, as well as the neighbouring aboriginal peoples and cultures of America and north-eastern Asia.

In arriving at a series of general conclusions a number of problems come under consideration.

As regards the relation of the Western Eskimo and the Thule cultures, it has been demonstrated by Matthiassen that the Thule culture must have originated in the west along the Alaskan or Siberian coast, north of Bering Straits. This is now seen to be within the range of the Old Bering Sea and Punuk

cultures; and on the basis of the St. Lawrence Island finds, it is shown that the Thule culture is more closely allied to Punuk of a late stage and the modern culture than to the Old Bering Sea culture. The Thule culture has also been shown to be close to the modern Point Barrow Eskimo. There is a close relationship between the Old Bering Sea culture and the prehistoric or Birnirk culture of old Point Barrow sites—the Birnirk culture, in fact, was, in part at least, contemporaneous with the old Bering Sea culture, while the modern Point Barrow is the closest to the Thule, possessing a number of important Thule elements, absent in the Birnirk culture.

This prominence of the Thule elements in modern northern Alaska is explained as due to a late return migration within the past few centuries of Thule Eskimo, after the original eastward spread of the Thule culture, which had developed out of the Birnirk, rather than the Old Bering Sea culture. This inference of a late migration westward is supported by the cultural, linguistic and physical uniformity of modern Eastern and Western Eskimo, while the physical characters of the modern Point Barrow Eskimo are quite distinct from the skeletal material from old Point Barrow sites.

The hypothesis that the north coast of Alaska has been subjected to a relatively late wave of migration from the east would serve to explain the view that the Eskimo had entered as a wedge at Bering Strait, breaking off earlier connexions between the

Palæo-asiatic tribes of Siberia and the Indian tribes of the north-west coast of America, for which the strongest evidence lies in their mythologies.

As to the place and cultural stage at which the Thule culture originated, indications, at present far from definite, point to a period late in the Birnirk cultural stage, which itself must be regarded as an outgrowth of the Old Bering Sea culture, but with an even closer relationship to Punuk. Sites intermediate between Birnirk and the oldest eastern Thule sites excavated by Matthiassen are much desired.

The weight of evidence is against the Aleutian Islands having served as a migration route from Asia to America. The known cultural remains of the Aleutians are of an essentially Eskimoid or American character, showing that the islands must have been peopled from the Alaskan mainland. It would have been no difficult undertaking for such expert navigators as the early Aleuts to push on to the Commander Islands and Kamchatka, while the reverse journey is improbable for Asiatics. The character of the American (Alaskan and North-West) affinities in Kamchadal and Koryak culture and mythology favour the southern route from America to Asia over the Aleutian chain.

Although on theoretical grounds we are forced to

assume that man originally entered the American continent at Bering Strait, archaeological work in this region has as yet revealed no trace of these earliest immigrants; nor has any trace of pre-Eskimo culture been found on St. Lawrence Island. It has, however, been shown that the Old Bering Sea culture of St. Lawrence Island is basic to existing phases of northern Eskimo culture from Siberia to Greenland. The bearing of the Alaskan investigations on the theory of a central origin of Eskimo culture is to show that the view put forward by Kaj Birket Smith of Caribou Eskimo culture as a form of proto-Eskimo is untenable, demanding as it does that this culture should have been static through a period of hundreds, or even thousands, of years, while everywhere else Eskimo culture was undergoing marked changes.

The existence of a number of elements in the Old Bering Sea culture, such as toggle-harpoons, sledges, kayak, etc., which are of widespread distribution in the Old World, but in the New World are found only among the Eskimo, points to an Old World origin for a culture which embodied the general features of Eskimo culture as we know it in its earliest western form; while certain indications suggest north-east Siberia, between the mouths of the Anadyr and Kolyma Rivers, as the area in which the Old Bering Sea culture in its specific form came into being.

## Stimulation of Adventitious Root Formation by Chemicals

ON November 6, 1937, by invitation of the Director, a meeting to discuss the use of chemicals for stimulating the formation of roots on cuttings was held at the Royal Botanic Gardens, Kew. It is well known to botanists that, following the investigations on the Continent which led to the discovery, isolation and chemical identification of hormone-like substances controlling the growth of seedlings, these were found also to be capable of inducing the formation of adventitious roots. Since then, use has been made of  $\beta$ -indole-acetic acid and other synthetically produced substances in the hope that their application in aqueous solutions either directly in jars or by watering the compost would induce the formation of roots on cuttings. It would be of great value to horticulturists if cuttings of plants which do not 'strike' easily could be stimulated to do so in this way, or if the rooting of moderately easy subjects which are cultivated on a very large scale could be accelerated.

It is evident that an authoritative opinion concerning the practical value of these substances can be formed only as a result of co-operation between botanists, practical horticulturists and those who manufacture the chemicals. For this reason, those interested in the subject from these points of view were invited to the meeting at Kew. That interest in the subject is widespread may be judged from the ready response which was received to the invitation.

An unfortunate fact is that those plants which present most difficulty to experienced cultivators are in most instances precisely those which show least response to the application of chemicals that induce root formation. The degree of response exhibited by other plants appears to be more or less proportional to the ease with which they root without special

treatment, the easiest subjects reacting with greater facility than the more difficult ones. So far as can be judged at present, the greatest hope for the practical utility of root-promoting substances will be in accelerating the rooting of woody cuttings of plants of 'medium' difficulty, as well as cuttings of herbaceous plants such as chrysanthemums which, although easy to propagate without special treatment, are cultivated on a very large scale. The production of a root system at the earliest possible moment is of great importance to nurserymen, especially with the latter type of material.

It will be appreciated that in the present state of knowledge the use of these substances is far from being a panacea for all propagating difficulties. Nearly everyone who spoke stressed the fact that the amount of experimental work which has hitherto been carried out on the practical application of these substances is too small to permit judgment on them to be passed. The fundamental physiological processes on which their activity depends are not at present understood at all. It has been known for many years that very dilute acetic acid possesses root-promoting properties, and its use has often been recommended to horticulturists. A point which needs elucidation is whether in fact the more complex root-promoting substances which have now come into prominence are superior to acetic acid. The small amount of experimental work to test this point which has so far been carried out rather indicates that they are, but the matter is by no means clear.

In view of the economic importance of the subject and the very varied experience necessary for assessing the value of various researches which are being or may be carried out on this subject in the future, a