available cells and modes of measurement is desirable before any definite specification of apparatus and methods can be drawn up. In the meantime, a fairly full review by different authors of the work done up to date, with extensive bibliographies, will be found in the report of the 1936 meeting of the Council, and a report of the special sub-committee then appointed to consider the question is being presented at the meeting this month in Copenhagen.

Greenland Culture: (I) The Norsemen*

ACCOUNTS of the ill-fated Norse settlements in Greenland in medieval times, such as that recently published by Dr. Nörlund (see NATURE, **133**, 949) have been based hitherto on the evidence afforded by the eastern settlement (now the district of Julianehaab), in which, thanks to the researches of the last fifty years, most problems of topography have been solved and the cultural history elucidated in no little detail by archæological discovery. Of the western settlement, however, in the Godthaab District little was known either from literary sources or from archæological investigation before the expeditions of the Commission for Scientific Research in Greenland, of which the results have been described recently by Dr. Aage Roussell. It was inferred, however, with reasonable certainty that the place now known as Kilaussarfik, visited by Daniel Brunn in 1904 and the site of Dr. Roussell's excavations in 1930, 1932 and 1934, was to be identified with Sandnes, and Ameralik Fjord with the ancient Lysufjördr, not least, perhaps, on account of the rarity of such a sandy formation on the rock-bound coast of Greenland. As, however, the area is being submerged rapidly, and the coast-line has changed considerably since the Middle Ages, this is by no means indisputable evidence.

Historical records relating to the west settlement are few. Apparently it was established simultaneously with, or just after, the east settlement, shortly before A.D. 1000. The Saga of Eirik the Red mentions a serious epidemic there in the first decade of the eleventh century. By the middle of the fourteenth century, Skraellings (Eskimo) had occupied all the west settlement, "so there are many horses, goats, cattle and sheep run wild, and no people, neither Christian nor heathen". All archæological finds, in default of evidence to the contrary, are to be regarded as prior to 1365.

In addition to the church at Sandnes and the neighbouring farm, of which the name is unknown, Dr. Roussell excavated in 1934 two other farm sites on the opposite side of the fjord. Of these, Umiviarssuk alone has been described, the important results obtained at Ujaragssuit still awaiting publication.

The site investigated at Sandnes included church and churchyard, house, smithy, and two large stable complexes. The store-house—invariably part of a Norse farm—presumably stood on the fjord bank, but, if so, it had been washed away. The central part of the farm had been built on sloping ground and a constant movement of soil has covered the whole site with midden, making it impossible to arrive at any accurate idea of stratification. At times, objects were found above others which obviously were of later date.

Since the date of Daniel Brunn's visit, the church ruins at Sandnes have suffered much damage owing to submergence and climatic conditions. Consequently it was found impossible to determine the extent of the churchyard; but accumulations of stones on the fjord beach indicate the probable limit of interment. Only in the westerly part of the churchyard were interments uncovered.

No less than forty-two burials were found huddled in a confined space. They lay under the midden in coarse yellow gravel and only just below the original surface. Owing to crowding, older graves frequently had been disturbed in digging new, and half skeletons, or skeletons with lower limbs hewn off, were found. As is usual in Christian burials, the body lay on the back with the head towards the west and arms crossed on the breast. One interment in the south end of the area contained two adults, presumably man and wife, with the skeleton of a child lying on each. Alongside and evidently buried at the same time lay a fifth skeleton, not fully grown, and beside the skeletons was a small crudely fashioned wooden cross, the only piece of grave furniture found *in situ*. It may be presumed that these five burials were the result of an epidemic, such as is mentioned in the sagas of Eirik and Thorfinn.

* Researches into Norse Culture in Greenland—Sandnes and the Neighbouring Farms. By Aage Roussell. Appendix: Greenland Runic Inscriptions, 4. (Meddelelser om Grønland, Bind 88, Nr. 2.) Pp. 232+6 plates. 11.00 kr.

Researches into Norse Culture in Greenland—Animal Remains from the West Settlement in Greenland, with Special Reference to Livestock. By Magnus Degerbøl. (Meddelelser om Grønland, Bind 88, Nr. 3.) Pp. 55+1 plate. 2.50 kr.

Researches into Norse Culture in Greenland—Evidence of Iron Extraction at Sandnes, in Greenland's West Settlement. By Niels Nielsen. (Meddelelser om Grønland, Bind 88, Nr. 4). Pp. 14+1 plate. 0.75 kr.

(København: C. A. Reitzels Forlag, 1936.)

What was from the artistic point of view the most important find made in the course of this investigation may be mentioned here, as it came from the churchyard, though not found *in situ*. This was a carved slab of wood of unknown use, though it may have been part of the cover of a pyx. The wood has been identified as fir and drift-wood. On it is carved in relief a representation of the Crucifixion showing the figures of the Virgin Mary and St. John in a pose and with attributes characteristic of medieval Scandinavian art. The figures are Gothic; but the ornament is still Romanesque. Though unquestionably of Scandinavian origin, it is not of local workmanship, and may derive from thirteenth century Iceland, or possibly Norway. Examples of local workmanship are to be seen in representations of the Crucifixion, rough in character, in which the figures in metal had been nailed on in a technique familiar in examples known from Iceland.

The important site at Umiviarssuk afforded fuller detail than Sandnes of the cultural level of the Norse farm, though here in the excavation of the house itself the work of clearing the plan was complicated by the fact that a later building overlay one and possibly two earlier structures. The farm buildings of the west settlement were substantial erections of stone. It was possible to ascertain the disposition of living rooms, sleeping rooms, hearths, etc. Immediately behind the farm-buildings at Sandnes was a series, or rather two complexes, of outbuildings for cattle, sheep, pigs, and goats and the farm workshop. In one of these, stone divisions provided 'boxes' for tethering the cattle; while in another, small finds suggested that one or more of the humbler female servants had slept here. Sandnes also had a small forge, which afforded samples of the iron used in working.

An interesting building at Umiviarssuk was a bath house, which, though the bath is frequently mentioned in the records, is the first to be found in Greenland. It is of the usual vapour-bath type, with furnace and shelves, on which the bathers reclined. It was apart from the house, and if the bathers did not follow the modern practice in high latitudes of a cold plunge in the snow, they at least had to pass through the cold air in returning to the house. Another find on this site of an unusual character was a movable bed. Although there are references to such beds in the sagas, its use had died out in the Middle Ages in favour of the bed fixed to the wall. It was not reintroduced until the sixteenth century; but its survival in Greenland points to the backward state of the community.

The most noteworthy feature in the work of Dr. Roussell's expeditions is the very large number of small objects found, which has thrown a flood of fresh light on Norse culture in Greenland. The character of the soil enabled the preservation of a number of objects, especially in wood, bone and baleen, which had perished on sites previously excavated. Nearly twelve hundred objects in all were found. The state of preservation may be judged from the fact that in some the original colour of the wood can still be discerned. Among the small objects, one of the most interesting is a toy model of a boat, which reproduces its original in accurate detail. Comparison with earlier known examples of the Norse boat dating from the sixth century shows that the form of ship virtually suffered no change over a period of six hundred years.

Other finds included tools, weapons, implements, household utensils, clothes, games such as chess, dice and draughts, toys and objects of unknown use. Trinkets were rare. In addition to the objects of art already mentioned—the wood-carvings of a religious character—there was a number of small objects in bone, wood and ivory, including two lively representations of animals, a bear and a walrus, and two of the human face, of which one in walrus ivory with its wide mouth, long upper lip, heavy jaw and coarse skin gives anything but a favourable impression of the physical type of some, at least, of the Greenlanders.

The animal bones indicate that the inhabitants of the western settlement kept cows, sheep, horses, pigs and dogs and hunted the same wild animals, reindeer, seals, whales, arctic foxes, arctic hares, and polar bears, as the settlers on the east coast. For the first time, the bones of the dog are available for comparison with representations of the animal of this period. The surprising feature is the length and slenderness of the legs, which suggest a breed of something of the greyhound type

Although there is evidence to suggest that the Norsemen had extracted iron in Greenland, the number of iron objects found is small. The material from Sandnes is the most considerable find that has been made, consisting of fifty lumps of slag and a small piece of hammered iron of prismatic form. The material has been subjected to detailed examination and is very heterogeneous. Two types of iron are present, which agrees with what is known of Middle Age practice of producing iron in hearth pits, and shows the difficulty experienced by the ancients in producing iron capable of hardening. While some samples consist of a soft iron, practically devoid of carbon, others are a medium hard carbon steel. The evidence from Sandnes is taken to show that the Norsemen did produce a form of steel, but that their methods of working and exposure to the air reduced the product finally to nothing but a soft iron.