were told, crossed at 40-45 years. It was mentioned that a heavy thinning early on, reducing the capital of the crop somewhat, could prove economic.

Using the same technique as in the case of the Norway spruce crop, the interest % of the Sitka crop showed to be 6%. It was generally considered that the crop should be kept at least to 40-45 years.

Again wind problems and allied dangers were brought forward, but remedies by various thinning treatments were considered practical—for example, a lowering of form factor by substantial opening of the crown.

The feasibility of different initial espacements, and the possible advantage of wider initial planting with corresponding lower costs, and perhaps subsequent protection from a more stable crop were discussed.

The progressive deterioration of the weather rather dampened a very stimulating discussion which otherwise would have gone on considerably longer and members reluctantly, withdrew from the ground to more sheltered surroundings and tea. A vote of thanks was proposed to the District Officer, Mr. Prior, and to the Forester, Mr. Maguire, for their co-operation and interest and to Mr. Morris for the choice and comprehensive coverage of an interesting subject.

G.J.G.

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# Excursion to Clonsast Bog

ON Sunday, July the 14th, the Society visited Clonsast Bog where we were introduced to the interesting subject of peat-structure and pollen analysis by Dr. Neil Murray.

Pollen analysis he told us formed the backbone of his investigations. For those not already acquainted with it he outlined the principles of this study. It was well known that the remains of former vegetation were preserved in peat. It must also be long observed that all peat was not the same, varying from place to place and also at different depths. The first methods of investigating late quaternary changes of vegetation made use of larger fossils e.g. timber, leaves, seeds, etc. Positive identification of much of this material required the use of magnification with the resultant discovery of smaller fossils, inter-alia pollen grains. It appeared that the first pollen grains observed were found in pre-quaternary deposits about 1836, but, as far as known, the first to use systematically the occurrence of pollen grains in post-glacial deposits was a German called Weber in 1893. The first percentage calculations were made it seems in 1905 by a man called Lagerheim but the first to realise the full potentialities of the method was the Swedish geologist, Lennart von Post, who presented the first modern percentage pollen analyses in 1916. From the middle twenties pollen analysis had been the dominant method for investigating late quaternary vegetational and climatic development but it was also used in the investigation of older deposits and had even figured in modern legal cases in the courts of law. Pollen analysis was not used alone—the macrofossils and condition of the peat in which they were embedded were also taken into account. Archaeological finds in peat were also made use of as a means of dating the level at which they were found and, when sufficient pollen diagrams were available throughout a region, the reverse process could be carried out, namely, the archaeological objects may be dated by their position in the pollen diagram. Material for pollen investigation is best obtained from lake bottoms but as most of our lakes have been affected by drainage operations at one time or another, with consequent re-deposition of material bearing fossil pollen, they were unsuitable for the pollen analytical method, therefore we made use of the peat deposits. The pollen grain was formed in the male part of the flower and the portion which remains preserved in bogs or lakes was formed of one of the most extraordinary resistant materials in the organic world. Recent pollen grains would be heated to nearly 300 degrees centigrade or be treated with concentrated acids or bases with little effect. The form of pollen grains varied greatly with the subsequent possibility of identification, even as far as species in most cases. Pollen dispersal could take place in water or on insects or by wind. The latter was the most important for pollen analysis. Only a small percentage of the pollen produced ever reaches its goal, the balance falling as the so-called "pollen rain". It was these enormous quantities of pollen which become very evenly distributed by the wind over large areas of land and water with which we were here concerned.

Dr. Murray quoted the following figures from a text book by two well-known pollen analysts, Messrs. Faegri and Iversen. A ten year old branch of beech shed 28 million pollen grains. Spruce and oak (a ten year old branch) 100 million pollen grains. Pine (a ten year old branch) 350 million pollen grains. One male plant of *Rumex acetosa* 400 million pollen grains. The spruce forests of south and mid Sweden produce ca. 75,000 tons per annum when flowering freely. The general distance which pollen was carried was from 50-100 kilometres, though distances of 1,700 kilometeres had been recorded and pollen had been trapped from the air the whole way across the Atlantic.

We were then shown the sites where two borings in peat had been made. The first referred to on a map of the bog and was called Clansast D. This boring was made in deep peat. The point was situated in Trench 2. The depth of this boring was 370 cm.

On a complicated pollen diagram Dr. Murray explained the following facts. In the basal sample, just above the grey sandy clay, were found numerous traces of *Pinus* grains with small amounts of *Corylus, Quercus* and *Ulmus.* At 360 cm. level *Pinus* decreases but *Corylus, Quercus* and *Ulmus* had increased. At 350 cm., where *Ulmus* had decreased in value, we found the first trace of *Plantago lanceolata,* showing for the first time some form of agricultural interference. According to Van Zeist's dating, this 350 cm. depth dated to approximately 3,000 B.C. At the 300 cm. level there was more evidence of man.

From 270-260 cm. the value for *Quercus* fell then rose to a maximum. *P. lanceolata* appeared at 280 cm. and was then present throughout the remainder of the diagram indicating greater or lesser intensity by man right up to modern times.

From 270 to 210 cm. we passed through a period where wetter weather conditions prevailed and *Sphagnum* pollen grains became more numerous. Two more agricultural horizons appeared at 240 cm. and 210 cm. The Ericaceous pollen curve reached a peak at 130 cm. At 145 cm. *Ulmus* fell and *Corylus* was at a minimum and *Alnus* and *Quercus* started to rise from low values.

The *Taxus* peak at 100 cm. coincided, more or less, with the drier period when pine colonized the bog. It was interesting to note that *Pinus,* though low in value, was present right to the top of the diagram.

The party then moved on to another site. This was an incomplete profile situated in the face of a truncated peat bank on the east side of Drainage Trench 2; the profile was referred to as Clonsast G.

This profile was situated on higher ground which had long remained above the influence of the enlarging bog. At the base of the profile, *Taxus* and *Quercus* were growing on a dry soil as was shown by the extensive root systems of the oak in the boulder clay. Some time later peat covered the rise and conditions became increasingly difficult for trees, though *Taxus* and *Quercus* survived the change over for some time. A gradual change from an alkaline to acid condition took place. During the period a fen community with *Phragmites, Carex* and *Juncus* flourished.

The most striking feature of the pollen diagram we were told was the high value of 37% for *Taxus* pollen found at the base.

With the increasing acidity of the bog *Rumex* left the area and a layer of *Oxycoccus palustris* spread itself extensively. The fast rise in the Ericaceous pollen curves were doubtless due to this species.

The advent of *Calluna,* shown by the presence of its seeds, indicated a progressive drying of the bog surface. The Ericaceous curve at this period rose to a maximum. It was during, and as a result of this drying out that *Pinus* started to colonize the bog. The layer of pine remains resulting from this colonization can be traced over a large area of the bog and is contemporaneous with carbon—14 dated wood from a pine tree growing about A.D. 365.

Dr. Murray concluded by thanking Bórd na Móna and Mr. Finnegan for their permission in letting the Society visit the bog.

After tea we visited Trench 14 where Mr. O. V. Mooney and Mr. N. O'Carroll brought us up to date on their latest research work here.

Mr. McNamara, the President, thanked the speakers for what he described as one of the most interesting day excursions he had been on. He felt that those present would all agree with this.

M.J.S.