where Peary used to go when he turned his face towards the then unconquered Pole. Geologists have good evidence that these icy lands once had temperate climates, with at times even sub-tropic conditions. "May it not be that the nursery of the redwoods was in a lost polar paradise, now buried under the groaning glaciers of Greenland, or perhaps even sunk beneath the Arctic Ocean?"

Some idea of the climate of Manchuria of this geological period is obtained. The redwood fossils found were like the Californian coast redwoods, rather than the 'big trees' of the more inland mountains. The present Californian coastal forest enjoys an equable climate, without freezing temperatures, a rather humid atmosphere, and a rainfall of from forty to fifty inches, distributed fairly evenly throughout the year. This is a much milder climate than Manchuria has had during historic times, and probably than it has had since the Pleistocene, or glacial period. The existing Manchurian forests consist of oaks, maples, elms, and other species, but nothing resembling the redwood forests.

This investigation has opened up a most fascinating chapter in former tree distribution, and the results of Dr. Chaney's further researches will be awaited with interest.

Electrical Heating of Metals.

THE increasing interest which is being taken in electrical heating in connexion with heat-treatment of metals is exemplified by a pamphlet received from the Integra Co., Ltd., 183 Broad Street, Birmingham, as agents for the Leeds and Northrop Co., of Philadelphia, Pa., U.S.A. The necessity for the accurate heat treatment of expensive engineering steel parts is emphasised, the advantages of electric heating for this purpose, coupled with the exact control which is thus rendered possible, being probably ideal. The specific advantages possessed by electrical heating for hardening tools, dies, and similar articles are, in many cases, an increase of life due to accurate control of the time of heating and of the quenching temperature, reduction to a minimum of tools broken in the hardening and in distortion, and the possibility of treating the steel under conditions which do not lead to decarburisation. The equipment is flexible in the sense that it can be added to from time to time, and possesses the very marked industrial advantage that, since little heat escapes from the furnace into the room, the hardening plant can be put in the "line of production." The working conditions can also be made very much more pleasant than is often the case with other methods of heating. Electrical heating lends itself to accurate pyrometric, and often automatic, control, with a decrease in the amount of skilled labour required.

These advantages are possessed by Messrs. Leeds and Northrop's apparatus, but are, of course, inherent in electrical heating generally, when the apparatus is well designed, and are not possessed uniquely by the plant under review.

A pamphlet, also issued by the Leeds and Northrop Co., dealing with the electric furnace tempering of steel, describes their 'homo' furnace, which is suitable for the tempering of hardened steel parts. The outstanding feature of this apparatus is the reversible air current which is passed through the charge during the whole time that it is being heated up to the tempering temperature. The steel to be treated is contained in a basket which is lowered inside a cylindrical wall that forms the inner surface of the furnace. The basket is open at the top, and is closed at the lower end by a heavy grid. Below the basket is a fan driven by an external motor that reverses automatically, driving the heated air alternately up through the charge and down through an angular space between the basket and the wall of the furnace, and then in the opposite direction. Between the inner wall of the furnace, which closely surrounds the basket and the heavily insulated outer wall, is this air space in which the heating coils of nickel chromium wire are situated. A very uniform heating is claimed for the method, together with the impossibility of over-heating the charge in the basket.

The Relationship of Crop Yield and Weather.

IN the *Monthly Weather Review* for February last, Messrs. J. B. Kincer and W. A. Mattice give examples of the practical application of a method of showing the relationship between the yield of a crop and various meteorological factors affecting it during its period of growth. The figures relate to wheat in North Dakota and Ohio. The method may be described as a modification of ordinary partial correlation suitable to cases where so many factors are involved that full treatment by the ordinary methods of partial correlation would involve an excessive amount of computation. The final result takes the form of a regression equation between the yield x and a limited number of such weather factors as are found to have significant simple correlation with x. In each of the examples given these factors combined are equivalent to a single meteorological variable giving a correlation coefficient of 0·93 with x.

The method of calculation is as follows:

(1) Correlation coefficients are worked out between each weather factor and x. These are lettered in the order of their absolute magnitude, a being the largest.

(2) The partial correlation coefficient (or 'multiple coefficient' as it is called here) between a and x, eliminating the influence of b, is worked out, and similarly for c, d, e, etc.

(3) From the highest of these partial correlation coefficients the value of x for each year is computed from the appropriate regression equation.

(4) The quantity so obtained is designated a, and if we suppose that e is the weather factor that was eliminated in the partial regression equation, then e and a are not considered any further, the cycle of operations being repeated with a_2 in place of a, and the remaining factors b, c, d, f, etc.

(5) A fresh set of calculated values of x, arrived at from a_1 and another weather factor, give the values of the new quantity a_2, and, as before, another weather factor (c, say) drops out of the cycle, leaving a_2, b, d, f, etc.

(6) Up to a certain point the value of the highest partial correlation coefficient increases with each application of the process. When this point is reached a partial regression equation is formed involving the various factors used in the partial regression equations for a_1, a_2, a_3, etc., and the remaining factors are rejected.

The coefficients found indicate that about 86 per cent of the standard deviation of the yield is accounted for by the weather factors, which referred to temperature, sunshine, rainfall, and humidity, for the period April to July in the case of North Dakota, and late April to late September for Ohio. It is evident that the method may be applied to any variables, and could be used for forecasting. E. V. N.