The winter which followed was marked by comparatively high and uniform temperatures. Consequently many summer-visitant birds do not seem to have quitted some of the southern and western districts, while others were recorded as returning at unusually early dates. The spring immigration proper is stated to have lasted from March 6 until June 6, reaching its height between April 14 and May 11.

Attention is directed to the very long period covered by the immigrations of certain species as contrasted with those of others. On one hand we have swallow (March 8 to May 20), sand-martin (March 13 to May 15), chiff-chaff (March 6 to May 8), and wheatear (March 12 to May 12). On the other we have the reed-warbler (April 18 to May 5), wood-warbler (April 9 to May 11), and nightingale (April 13 to May 5).

A special feature of the report is the long list of records emanating from the Caskets Light in the Channel Islands. This station is exceptionally favourably situated, and was expected to furnish very important data. Unhappily, the committee had formerly been unable to induce the light-keepers to take the matter up. The desired result has been brought about, however, by the transfer to the Caskets of an enthusiast in the work, Mr. R. E. Wilson. His contributions to the present report are very valuable. A special summary of the records relating to this station is promised for the next report.

The publication under discussion is even bulkier than its recent predecessors, but the data are set out in the same clear and orderly manner. As usual there are numerous charts and a useful summary of the meteorological conditions prevailing during the period covered by the migration records A. L. T.

THE INSTITUTE OF METALS.

IN spite of the war, both the number and quality of the papers presented at the annual meeting of the institute on March 18 and 19 were well up to the average. Naturally, in the circumstances, the contributions were furnished mainly by what may be termed the "academic" workers in non-ferrous metallurgy. Moreover, although the attendance of members was small, the discussions were always interesting and well-sustained. Unfortunately the president of the institute, Engineer Vice-Admiral Sir Henry Oram was prevented by his onerous official duties at Whitehall from presiding at the proceedings, and his place was filled at the last moment by one of the vice-presidents.

The paper by Prof. A. C. Huntington, on the effects of heat and of work on the mechanical properties of metals, gave rise to an interesting debate, and a spirited reply by the author. It describes a machine devised by him several years ago for the purpose of investigating these effects while the metals are being subjected to alternating bending stresses, such as occur in the firebox of a locomotive. No attempt was made to reproduce the somewhat complicated movements which occur there, but the metal or alloy was held rigidly at one end, and "subjected to a to and fro movement at the other end in a single plane at right angles to its axis." Both as regards the extent of the movement and the range of temperature investigated, the experiments were made to conform broadly to the kind of conditions that obtain in locomotive fireboxes. Various kinds of commercial copper, and a copper alloy containing upwards of 5 per cent. of nickel and iron, were tested in this way. The outstanding feature of the curves, the co-ordinates of which are temperature and the number of revolutions required to crack and break the specimens, is the large number of maxima and minima which the author interprets from his data. For copper he gives five maxima and five minima. The fact, however, that these do not by any means always correspond to observed points gave rise to considerable criticism in the discussion and to a variety of alternative interpretations. From the fact that annealing greatly reduces the maxima and minima the author concludes that work plays an important part in emphasising transformation points, and goes so far as to say that "except in the case of phase changes in alloys, mechanical tests are to be preferred to heating and cooling curves as a means of studying changes of state with temperature." Even if this claim is admitted, it limits the application of such methods to ductile alloys, but not unnaturally objections were voiced to a statement which has certainly not been proved.

Dr. Rosenhain, in his paper, entitled "Some Appliances for Metallographic Research," described an optical instrument for the levelling of metallographic specimens, a new method of taking thermal curves, and a plotting chronograph, the last-named having been devised with the help of the Cambridge Scientific Instrument Co. These appliances have been originated by Dr. Rosenhain at the National Physical Laboratory. Great interest was expressed in them, particularly in the design of furnace for taking thermal curves. In order to obtain as nearly as possible a constant rate of heating or cooling of the metallic specimen a tubular furnace is erected vertically in which a "regular temperature gradient is established and steadily maintained while the specimens whose heating and cooling curves are to be taken are moved at any desired rate from the cold to the hot end of the furnace or *vice versa*." Heating and cooling curves obtained in such a furnace and in conjunction with the plotting chronograph show that very satisfactory results have been obtained. The power consumption with the hot end at 1000° C. is a kilowatt. No figures for higher temperatures have been given, and it will be interesting to have those stated when they have been determined.

With regard to the plotting chronograph, the author's endeavour has been to originate an instrument which shall furnish an inverse rate curve "plotted to an adequately open scale." The apparatus is not as yet entirely self-recording, but represents a considerable step in this direction, and it gives the curve obtained with no other human intervention than the periodic tapping of a key.

The paper by Prof. Read and Mr. Greaves, of University College, Cardiff, contains an account of their investigations on nickel-aluminium and nickel-copper-aluminium alloys, more particularly the light alloys of the last-named group, and is a continuation of their earlier work on the heavy alloys of the same metals. They find that, as regards the ternary alloys, copper and nickel can replace each other without the resulting properties being affected, and, in fact, that certain characteristics of the alloys are determined by the total percentage of copper and nickel present. As they point out, this is intelligible in view of the fact that the two metals possess almost identical densities and very similar atomic volumes. Moreover, micrographic analysis shows that the internal structure of the alloy scarcely alters when the one metal replaces the other. Inasmuch as nickel costs about three times as much as copper, and its melting point is nearly 400° C. higher, it is clear that it cannot compete with it economically in the case of such alloys, except perhaps in a few instances where the need for resistance to corrosion in certain liquids is sufficiently imperative to outweigh considerations of expense.

A very useful compilation of etching reagents and their applications to metallography was presented by

Mr. O. F. Hudson. This work had been undertaken at the request of the Publication Committee of the institute, and in preparing it Mr. Hudson received and incorporated methods adopted by well-known workers both in America and this country. The paper deals more especially with the final stage in the preparing of specimens for microscopic examination, but as the author points out, the effects of previous operations must always be borne in mind. There is now an increasing consensus of opinion among the most skilled metallographers that grinding on mechanically-driven discs produces too severe an alteration in the surface structure of a metal or alloy, which is likely to create difficulties in their microscopic interpretation after etching, and that hand grinding, although slower, is much more trustworthy. This is neither more nor less than a return to the technique of the late M. Osmond, whose skill in the preparation of a specimen for microscopic examination has never been surpassed. The discussion on Mr. Hudson's paper was in a high degree illuminating, and showed the institute members at their best. When the complete paper and discussion are published they will certainly be a standard work of reference.

Four other papers were submitted. Of these, that by Mr. Whyte, on the microchemistry of corrosion, and that by Mr. Haughton, on the constitution of the alloys of copper with tin, were read and discussed. The remaining two were taken as read, and will be discussed by written communications.

H. C. H. CARPENTER.

SUPPLIES OF LABORATORY AND OPTICAL GLASS APPARATUS.

REPORTS OF THE BRITISH SCIENCE GUILD.

THE British Science Guild has just issued two reports dealing with matters of national moment at the present time. One is concerned with the provision of glass apparatus for educational purposes, and the other with optical glass and the position of technical optics generally in this country. The reports are here reprinted, and it will be seen that they are both informative and helpful. First, with regard to laboratory ware, it appears that, as the result of an inquiry instituted by committees of the guild, working in co-operation with the Association of Public School Science Masters, about three-quarters of the schools or other bodies requiring laboratory glassware have undertaken to use British glass during the war, and for a period of three years after, provided that the price is not prohibitive. As explained in a letter to NATURE of February 18 (p. 670) the British Laboratory Ware Association has made arrangements for the supply of laboratory glassware and similar materials from British manufacturers. The British Science Guild has, by its action, presented the association and British glass manufacturers generally with an assurance of support which should be of the greatest value to them.

The report of the Technical Optics Committee of the guild should cause serious attention to be given to the establishment of a British Institute of Technical Optics. In the last annual report of the guild it was pointed out that this necessity had been impressed upon the education department of the London County Council continuously during the past twelve years. Scientific experts, leading members of the optical industry, and educational experts have combined to urge the paramount importance of the definite proposals which have been formulated, but the scheme still hangs fire. Meanwhile our scientific and industrial rivals on the Continent, taking note of successful developments on a small scale which have been originated here, have gone forward to new developments with increased vigour and with highly successful results.

(1) PROVISION OF GLASS APPARATUS FOR EDUCATIONAL PURPOSES.

In the past practically all the glass and procelain apparatus used in chemical laboratories in this country has been manufactured in Germany and Austria. As the supply is now cut off and the stocks held by British dealers are almost exhausted, the problem of obtaining apparatus for educational and technical purposes has become a serious one.

The Joint Committee is informed that efforts are now being made by several firms to introduce the manufacture of glass apparatus into this country, and being in hearty sympathy with these efforts, it has considered in what way the British Science Guild may best assist. In these efforts the committee has co-operated with the Association of Public School Science Masters, and has taken action along two main lines, viz. :—

(A) Endeavouring to obtain assurances of support for British makers of educational glass ware after the war as well as now.

(B) Obtaining information from educational institutions respecting the principal types and sizes of glass apparatus in greatest demand.

(A) *Assurances of Support for British Makers of Scientific Glass Ware.*

It is understood that the efforts during the last three months by certain British glass manufacturers have been attended with satisfactory results as regards the quality of the products. Economic and manufacturing conditions have prevented British glass apparatus being sold at so low a price as has been paid in the past for German material. As these conditions will probably remain unchanged, British manufacturers have been naturally disinclined to expend the necessary capital in establishing the proposed new industry here while there is every likelihood that they will be undersold in the British market by their competitors when the war is over. The Joint Committee is informed that this has acted as a strong deterrent to British glass manufacturers contemplating the production of scientific glass apparatus.

The Joint Committee therefore has endeavoured to ascertain how far it is probable that educational institutions would undertake to buy only British-made glass and porcelain apparatus during the war, and for a period of three years after.

Inquiries were made in this direction by the hon. secretary of the Association of Public School Science Masters, who is a member of the Joint Committee, from the headmasters of all schools represented on the Headmasters' Conference. Out of the hundred and ten (110) schools so represented, no fewer than seventy-eight (78), *i.e.*, 71 per cent., have definitely promised to authorise their science staffs to purchase, as far as possible, only British-made glass apparatus during and for a period of three years after the conclusion of the war. As these promises have been received from almost all the largest schools, both boarding and day, it may be assumed that manufacturers as well as dealers will receive adequate support from the "conference schools."

The guild also issued about 750 letters of inquiry to—

(*a*) Local education authorities.
(*b*) Governors of secondary schools.
(*c*) Governing bodies of technical institutions.
(*d*) Senates of universities and university colleges,

and has received a very large number of replies.