is then given on "The Effect of Neglect in the Past," "Remedying the Neglect," "The Basis of Research," and "Research: What it is not."

It is to be regretted that the report shows a certain lack of appreciation of the conditions under which scientific research and investigations may be conducted. The appointment of a director who comes fresh and unbiased to the wool industry is an experiment well worth watching in view of future developments. But how comes it that the actual laboratories are to be divorced from the Yorkshire University of Leeds? This action appears all the more strange when it is noted that of the seven researches and investigations undertaken, five have been carried out in the University of Leeds; of the four appointments made to the staff, three are from the University of Leeds; and of the two large researches conjointly undertaken, both originated in the University of Leeds, the second being started by drawing upon the University's unique flock of Soay sheep.

It is further somewhat strange to read that "in the simplest matters it is not possible to find information in a correct and authoritative form," in view of the fact that the country which has been specially commended in the report for its highly developed research activities (the United States of America) adopts a Yorkshire text-book as its standard work of reference, and that Australia similarly regards Yorkshire publications on wool. We hope that the tendencies here indicated are only a passing phase, and that ultimately credit will be rendered to those institutions, particularly the University of Leeds and the Bradford Technical College, and individuals who by their labours in the past have made possible the development of this association.

Research work on wool presents such remarkable difficulties that apparently the only possibility of sound progress in the future lies in the closest and most amicable association of all institutions and individuals specially qualified to assist in introducing science and scientific method to the greatest possible extent throughout the wool industries. It may be that the secrecy insisted on by this association is essential in the interests of subscribing members, but the broader interests of research are represented by an approximately equal Government contribution, and it is obvious that these broader interests can best be fulfilled by a well-considered scheme of association between the educational institutions in question and the Research Association.

Climatology of North-west Russia and France.[1]

SINCE the withdrawal of the British Forces from Archangel and Murmansk, the climate of North-west Russia has become a matter of less interest to the average Englishman than was the case six months ago, but to the meteorologist the district remains one of importance. The climatic features of the area in winter must be considered in relation to its intermediate position between the relatively warm waters of the Arctic Ocean and the intense cold of Central Asia. The effect of these two influences is seen in the approximate equality of temperature in January at Alexandrovsk, near the mouth of the Kola River, in the north, and Petrograd in the south, notwithstanding a difference of nearly 10° in latitude between the two stations.

[1] (1) "The Climate of North-west Russia." Pp. 26+4 plates. (London: Meteorological Office, 1919.)
(2) "Études sur le Climat de la France." Deuxième Partie: "Région du Sud-Ouest et du Sud." By A. Angot. Pp. 114+13 plates. (Régime des Pluies.)

The comparative warmth of the Arctic coast is likely to become a matter of considerable economic importance, as it enables the recently developed port of Murmansk to be used for navigation throughout the year. The dates of the forming and breaking-up of ice on the Nova, Dvina, and Onega Rivers and on Lake Onega are shown in a table in the work under notice, where are given not only the mean date, but also the periods within which the date will occur on the average, (*a*) once in two years, and (*b*) once in five years, thus indicating the degree of variability experienced. This may be a matter of nearly as much importance as the actual mean value.

The climatic conditions of North-west Russia are presented in a series of tables giving data for seven stations, while letterpress directs attention to the more important features. It may cause surprise to learn that a temperature of 85° F. has been recorded at Archangel, while the average highest reading for July is 80° F. The percentage of cloudy skies in North Russia is high even in the summer—a feature which is well brought out by diagrams of a novel type, which show the frequency of fog, precipitation, and overcast, cloudy, and clear skies for Archangel and Kola.

Upper-air temperatures are presented for Petrograd, where trustworthy means are available, and also for Kiruna, in Swedish Lapland, where the number of observations is less satisfactory. In the two tables in which these data are set out, increasing height runs in one case up the page, and in the other down. It seems desirable that one or the other of these methods should be standardised. There is much to be said for reversing the older method and following the more natural way by running increasing heights up the page, so that the greater heights are above the smaller. The paper does not aim at being a complete treatise upon the subject of the climate of North-west Russia, but within a small compass a good deal of interesting information is put together.

The second of the two publications under notice is of a different and more specialised type, dealing with but one branch of climatology, namely, rainfall, for the southern and south-western districts of France. This forms the second part of a larger work which is to cover the rainfall of the whole of France, and, as the discussion of the data is left over until the publication of the whole is complete, the present volume contains little but tabulated matter. The region embraced is bounded by the Rhone on the east and by the Pyrenees on the south, while northward it stops somewhat short of the Loire.

The thirty Departments included in the area are represented by some 950 rainfall stations, the mean "density" varying in general in the different regions from ½ to 1 station per 10 km. square. In the main tables each Department is dealt with separately in the following manner:—First are set out brief particulars of the different stations giving height above sea-level and the period covered by the observations. Next are given the mean monthly and annual fall in millimetres for each station reduced to the common period 1851–1900. Finally, for selected stations the proportionate fall in each month of the year is shown. The means from these selected stations show the annual march of rainfall for the Department as a whole, and in this case correction is made for the unequal lengths of the months.

At certain stations, more numerous in some Departments than in others, the rain-gauge is placed upon a roof, which leads to an unsatisfactory exposure. It is pointed out that the errors introduced by such an exposure are proportionately greater in winter than in summer, so that the annual curve is distorted. It is worth noting that the normal height of the rim

of the gauge above the ground is 1·5 to 1·8 metres in France, so that a correction would be necessary before making comparison of the results with British records.

An excellent series of charts at the end of the volume indicates the rainfall distribution in each month and in the year as a whole. In the study of these charts one misses a contour map of the country. The annual fall varies from 500 mm. in two small areas on the shores of the Mediterranean to more than 1500 mm. in the mountainous regions. It is noteworthy that, after the Mediterranean seaboard, parts of the Atlantic coast take a high place among the driest regions of southern and south-western France. This is particularly the case in the summer months. A wise discretion has evidently been used in rejecting stations of doubtful accuracy in the preparation of the district means, and in other ways it is evident that trouble has not been spared to render the results as trustworthy as possible. J. S. D.

Volumetric Testing of Scientific Glassware.

ACCURATE work in the chemical and physical laboratory depends not only on the worker, but also to a large extent on the trustworthiness of his glass measuring apparatus, such as burettes, pipettes, and calibrated flasks. Whilst it is no doubt true that every operator who is master of his craft should be able, on occasion, to verify the accuracy of his measuring instruments, it is also true that both time and practice are required to do it well, to say nothing of the fact that special equipment is necessary for some of the verifications. Hence it is important, both to makers and to users, that facilities should be available for the testing of such instruments by experts, upon whose testimony reliance can safely be placed.

At the National Physical Laboratory apparatus of the kind in question has been tested, in respect of its accuracy, for the past fifteen years, but on a small scale only. Such instruments were mainly obtained from abroad in pre-war days, and it is only within the last two or three years that the making of them has developed appreciably in this country.

With the growth of the industry here it became necessary to make arrangements for testing and certifying glass volumetric apparatus on a larger scale than heretofore. Facilities were therefore provided and regulations drawn up, in co-operation with manufacturers and users of scientific glassware, for carrying out systematically what are known as "Class A" tests—that is, tests on apparatus required to be of the highest degree of accuracy. A pamphlet describing the arrangements and regulations was issued in July, 1918, and a new building has just been completed, with special equipment for dealing with this class of work on a large scale.

Instruments required to be only sufficiently accurate for commercial purposes are designated as "Class B." A permanent scheme for commercial testing of such articles by State institutions, or by other approved bodies, is now under the consideration of the Government. Pending the settlement of this scheme, manufacturers may note that the National Physical Laboratory is prepared to undertake "Class B" tests, which for the present will be carried out at Teddington. It is hoped eventually to arrange for this work to be done at local centres.

A full account of the methods of testing, limits of error allowed, details of construction, and fees charged is given in a new edition of the laboratory pamphlet, "Volumetric Tests on Scientific Glassware." Copies of this pamphlet may be obtained free of charge on application to the Director.

The "Class A" tests are designed for instruments intended to possess the highest degree of accuracy required in scientific use. Whilst the "Class B" tests are less stringent, the limits of error assigned are such as all graduated apparatus of good commercial quality should comply with, and are necessary for obtaining satisfactory results in ordinary routine analysis.

It is very desirable that the scientific glass-making industry developed in this country during the war should remain as a permanent asset. To attain this end the graduated apparatus produced should be not only well made, but trustworthy in respect of accurate calibration. From the maker's point of view, the advantage of having apparatus guaranteed by an impartial institution is invaluable for establishing a reputation for accuracy. As regards users, they will no doubt be glad to know that it is now possible to obtain apparatus the correctness of which has been impartially verified. The monogram of the National Physical Laboratory is the hall-mark of British scientific glassware so far as accuracy of measurement is concerned.

University and Educational Intelligence.

ABERDEEN.—Mr. W. G. Craib, formerly assistant at Kew, and now of the botanical department, Edinburgh University, has been appointed to the chair of botany vacant by the death of Prof. J. W. H. Trail.

BIRMINGHAM.—Mr. A. A. Dee has been appointed an assistant lecturer in physics.

CAMBRIDGE.—The governing body of Emmanuel College offers to research students commencing residence at the college in October, 1920, two exhibitions, each of the annual value of 50*l.* and tenable for two years and, on the recommendation of the student's director of studies, for such longer period as the degree course may require. The governing body may also make additional grants to students whose means are insufficient to cover the expense of residence at Cambridge or whose course of research may entail any considerable outlay in the provision of apparatus or materials. The exhibitions will be awarded at the beginning of October, and applications should be sent so as to reach the Master of Emmanuel (The Master's Lodge, Emmanuel College, Cambridge) not later than September 18.

The new statute authorising the degree of Doctor of Philosophy for Research has been approved by his Majesty the King in Council, and regulations giving effect to the new statute will be offered for acceptance at the first Congregation in the Easter term.

Mr. F. B. Smith, of Downing College, has been appointed reader in estate management.

Vacancies are announced in the Cayley lectureship in mathematics and in the University lectureships in physiology and zoology. Candidates must apply to the Vice-Chancellor by April 20.

EDINBURGH.—In consequence of the appointment of Mr. W. G. Craib, of the botanical department, to the chair of botany in the University of Aberdeen, it has been arranged as a matter of urgency that Sir George Watt, formerly professor of botany in the University of Calcutta, deliver the course of lectures on Indian forest trees during the summer term.

Mr. James Templeton has been appointed lecturer in botany in succession to Mr. Pealling (resigned), and Dr. Bella D. MacCallum full-time assistant in the same department.

With the assistance of the Scottish Committee of the Royal Aeronautical Society, the services of four lecturers had been obtained to give a series of lectures