Dr. I. Thomas (Plant Pathology Laboratory, Harpenden) noted that methods of assessing plant disease loss had been initiated by research workers, but in assessing losses due to pests, methods had had to be improvised. It was essential to avoid the pitfall of ascribing losses to pests when nutrition and soil factors were primarily responsible. Dr. Thomas again stressed the need for a generous measure of co-operation and goodwill to ensure the successful development and application of methods of assessment.

R. W. MARSH

¹ Moore, W. C., *Bull. Min. Agric.*, No. 126 (1943) and No. 139 (1948), and earlier bulletins.

² Large, E. C., *Plant Path.*, 2, 1, in the press (1953).

³ Large, E. C., *Plant Path.*, 1, 109 (1952).

⁴ Large, E. C., *Plant Path.*, 1, 2, 56 (1952).

⁵ Large, E. C., *Plant Path.*, 1, 23 (1952).

RECENT GEGENSCHN studies IN THE SOVIET UNION

A GOOD deal of work has recently been done, in the Soviet Union, on the Gegenschein or 'counterglow', as a result of which a fairly definite point of view has developed. In particular, the Glydén-Moulton theory is regarded as quite overthrown by mathematical analysis (Moiseyev). The Seeliger reflexion theory may account for some portion of the counterglow luminescence, but not for the main effect. Taking advantage of the extraordinarily good seeing conditions in Central Asia, Soviet astronomers have shown both by visual and by photometric observation that the counterglow is variable in shape, in intensity, and in the spatial distribution of its luminescence; that it has an emission spectrum; and that it has a parallax which places it at a distance of about twenty earth radii. This has resulted in the revival of the theory of a gaseous tail extending from the earth's atmosphere. It is thought that the tail is excited to luminescence by the solar 'corpuscular radiation' at some distance from the earth, presumably after it crosses the boundary of the 'forbidden region' (of Chapman, Martyn, Alfvén).

Some of the Russian papers on this subject¹⁻⁴ have now been translated and issued in full⁵. A short account also appears in the 1952 edition of Mitra's "Upper Atmosphere"⁶, which has just become available.

According to Fesenkov³, the tenuous exterior atmosphere of the earth may have the form of a paraboloid of revolution, convex toward the sun. Nothing is said about the mechanism by which this form is maintained; but presumably it is a combination of radiation pressure, actual escape, and very high 'bounces' of colliding molecules. The density of the gas is halved every 4.7 earth radii; but apparently, in Fesenkov's view, is uniform over any cross-section of the tail (see ref. 2, p. 500). Astapovich¹, on the other hand, describes the tail as a hollow sleeve of gas, driven off from the twilight rim of the earth by radiation pressure, like the tail of a comet.

To the recognized description of the counterglow, a completely new detail has been added by Divari² and Fesenkov⁴, who independently discovered that, as the counterglow descends to the west of the meridian, there appears a broad pyramid of fainter luminescence connecting it to the horizon. To this

phenomenon Fesenkov gave the name "false zodiacal light" (see ref. 6, p. 492).

The false zodiacal light is confined to the western side of the night sky; it does not appear in the east when the counterglow is rising. No satisfactory explanation is given for this remarkable fact. Obviously it cannot be any ordinary atmospheric distortion or superimposed luminescence, at least so long as our model of the atmosphere is symmetrical. It is necessary to postulate some atmospheric asymmetry in the evening twilight zone, and if we accept the gaseous tail hypothesis at all, we are led to suspect that the asymmetry can only be the tail itself.

In a prefatory note to his translation⁵, Mr. Hope has suggested (assuming the gaseous tail really to exist) that the false zodiacal light may be explained by invoking a hitherto unconsidered fact, namely, that the earth's rotation will assist the radiant pressure of the sunlight over the evening twilight zone, but will oppose it on the morning side. The result may be that the gaseous stream is driven off mainly, if not entirely, from the evening side; Astapovich's 'gaseous sleeve' is not complete. If this incomplete sleeve is itself faintly luminous (below the actual counterglow), it will be seen against the western night sky, but not in the east.

A further suggestion is made to account for the fact that the false zodiacal light does not make its appearance before about two o'clock in the morning. This suggestion involves the idea that the fainter luminescence in the incomplete sleeve is generated by atoms or molecules, excited or dissociated in the sunlight, dropping to a lower level of excitation or recombining when they pass into the terrestrial umbra high above the earth. (Incidentally, it seems that the long cone of the earth's shadow, as a possible generator of radiation in the remote exosphere, has been little considered.)

¹ Astapovich, I. S., *Priroda*, No. 1, 25 (1950).

² Fesenkov, V. G., *Priroda*, No. 11, 5 (1950).

³ Divari, N. B., *Astro. Zhur. SSSR.*, 26, No. 6, 355 (1949).

⁴ Fesenkov, V. G., *Astro. Zhur. SSSR.*, 27, No. 2, 89 (1950).

⁵ Hope, E. R., 305 Wilbrod Street, Ottawa 2, Ontario.

⁶ Mitra, S. K., "The Upper Atmosphere" (Calcutta, 1952).

ABSTRACTING AND LIBRARY WORK IN THE U.S.S.R.

THREE articles on the organization of scientific information and abstracting in the Soviet Union have appeared in recent issues of *Vestnik Akad. Nauk SSSR* (22 (8, 9), 41, 46 and 80; 1952). The first of these is by A. V. Kremenetskaya and E. V. Vasilyeva, dealing specifically with abstracting (referata) and the work of the State Scientific Library. This is the largest in the Soviet Union, with about three and a half million books and other publications. Among its main objects are publicity on advanced experimental work in industry and on the achievements of Soviet science and technology, and also information on the work of other countries, especially those of Eastern Europe. Special attention is given to the provision of information in suitable form to students. In fact, the library is under the direct control of the Ministry of Higher Education; but it also has a wider range, and its services are available through two hundred and sixty industrial centres throughout the Union.

It is not clearly stated in what precise form the information is supplied—though leaflets are mentioned later—but apparently more than twelve thousand 'informations' are issued annually, manifolded and distributed to the extent of three hundred and fifty thousand copies.

Up to 1948 'subscribers' filled in questionnaires on matters in which they were interested; but this proved unsatisfactory and was replaced by subject lists and abstracts prepared by the Library. Extreme subdivision of subject-matter is not considered desirable, and many fields that were previously thus divided have now been reconsolidated. At present there are seventeen main classes in the industrial field, including nuclear physics, ultra-short-wave radio technique, tele-mechanics, etc., subdivided into more than a thousand subjects. Methods of scanning both books and journals in the library are described at some length, with special reference to the needs of technical and scientific workers, and to the relative value of so-called popular works on science and technology. 'Capitalist' publications must, of course, be carefully examined, but with a somewhat more critically selective acumen, for which various reasons are given.

More than fifty specialists are employed under an editorial staff to examine books and journals and to prepare abstracts. Nothing is said in this first article of the distinction attempted in the third article between abstracts, annotations and reviews, nor of a critical function discussed therein (see below). Up to 1941 the material collected by the Library was in the form of short 'annotations' printed on the usual library index cards, but to increase efficiency and save the time of specialists "there was a constant urge towards more detailed abstract annotations". Length of abstract naturally depended on a number of factors: material in a foreign language not readily accessible would have to be more detailed; literature from a large central publishing-house in the Soviet Union need have little more than title and date. The abstract is usually in the form of single leaflets, for which various advantages are claimed. Co-operation with other libraries and institutes, a call for suggestions and comments, and a few notes about binding, etc., conclude this first article.

The second article, by Dr. L. I. Gutenmakher, is on the mechanical aspects of information work, though it is a little indefinite. It emphasizes the rapidly accumulating and enormous dimensions of modern scientific literature, and notes the various difficult and complex problems involved.

The president of the Academy of Sciences of the U.S.S.R., A. N. Nesmeyanov, has recently suggested a study of mechanical methods for dealing with information work (*Vestnik Akad. Nauk SSSR*, 22 (2), 16; 1952), so that Stalin's doctrine—only by mechanization can Russian industry hold its place—can be applied here also. No actual machine is described; but certain general principles on which its design might be based are suggested by the author. Information in an abstract should be presented in simplest terms or elements, compressed and uniformly formulated. From one to two hundred such elements may constitute the average abstract. Analysis of material, formulation and record (abstracting) might be done through suitable rules and instructions to authors, or by special staff in one or more institutes; but the selection of information relevant to a given subject or problem should be achieved by mechanical means. Some necessary conditions are discussed,

including the use of auto-cameras (photo-automatas), with examples drawn from chemical kinetics and reactions. Brief and precise systems of record are essential, with the maximum use of mathematical and other symbols and formulæ. Russian patent specifications are said to be a step in the right direction of formulation. Another problem briefly considered is that of classification, though here again the proposals are a little vague and indefinite, including a suggested use of 'addresses' and the modern technique of commutation.

The third article runs to twelve pages and deals in greater detail with abstracting (referata). The authors are K. R. Simon and G. G. Krichevskiya. The former is a well-known writer on the subject in the U.S.S.R., with numerous articles in the *Sovetskaya Bibliografiya* and other journals. A few statistics are presented to begin with. Figures for 1949 show that, in natural science, medicine and technology (engineering) only, published articles in all countries had reached 1,850,000 a year. In chemistry alone they exceeded fifty thousand a year. In the Soviet Union scientific printed publications, including books and official documents, in 1951 amounted to more than a hundred thousand. In the Russian view it is necessary to distinguish abstracts (referata) from annotations, the purpose of which is to disclose in more or less detail the subject-matter (thematics), and from reviews or criticisms. The distinctions appear a little arbitrary: it is shown later that an abstract must, of course, disclose the subject-matter, and also include a critical function.

The importance of a preliminary general survey (*obzor*) is emphasized—a summary or outline, which may also be informative or critical, although its precise nature, purpose and realization are not very clearly given. A short historical survey relates to abstracting in the Western countries (*Chem. Abst.*, *Brit. Chem. Abst.*, *Centralbl.*) and to the work of Unesco, with various points of criticism, such as the neglect of social sciences, absence of critical acumen, the complete omission of books from the general scope and, it is stated, neglect of material other than English, French and German; also a lot of unnecessary duplication. This matter of a critical function has been considered in some detail by K. R. Simon (*Sov. Bib.*, 1-3, 341; 1933).

A detailed account is given of Soviet progress in abstracting, starting with the decree of January 9, 1928, under which a Commission was established to look after "Indexes of Scientific Literature", including abstracts of all Soviet scientific publications. The original grandiose scheme, as the authors term it, of large annual volumes, could not be properly realized, and there were several defects. Many Soviet abstract publications are noted. The real requirements of an efficient abstract service are described in detail. For example, it must be a true organic system, established on a uniform plan, in accordance with a logical classification of the whole field of human knowledge, of which the main classes are indicated, including philosophy—an inclusion which may possibly be questioned.

For each division of knowledge the question arises as to its appropriate independent abstract medium, having regard to its various aspects, sub-divisions, rate of development, relevant literature, etc. It is clear that some of the main divisions cannot be provided for within the limits of one abstract publication—for example, in the sciences of philology and comparative literature—in view "of the brilliant

publications of I. V. Stalin in these fields". But as regards chemistry, long experience with abstract journals has convinced the authors of the paramount need for some single but authoritative and comprehensive chemical abstract journal in the U.S.S.R., for both the theoretical and practical domains.

There is only space here to indicate the other points discussed—for example, choice of material to be abstracted, which should include not only periodicals and patents but also books, etc. (even the general press and popular magazines); linguistic scope of abstracts (what countries and languages, for there are already ten different languages in the Soviet Union itself); nature and value of the information provided, with critical evaluation; what the abstract should contain; and one or two miscellaneous considerations. W. G. CASS

THE TURKISH EARTHQUAKE OF MARCH 18

THE recent earthquake in Turkey was not one of the greatest of that region, but it happened in a moderately well populated area and consequently the casualties have been relatively great.

Provisional readings of the Edinburgh east-west component seismogram indicate the initial time for the earthquake as 20 hr. 06 m. 16 s. G.M.T. The epicentre appears to have been near Çan in the province of Çanakkale, Western Anatolia (lat. 40° N., long. 27° E.), and the depth of focus normal. The Edinburgh Milne-Shaw seismograph has a magnification of 250, and the maximum surface waves, which are pronounced in this shock, measure 7.1 cm. amplitude (mean to extreme) on the record.

The earthquake was experienced chiefly in the Provinces of Çanakkale and Balıkesir, bordering the Aegean Sea, and south of the Dardanelles. The area between Yenice and Gonen suffered severely. In this district more than six hundred houses were destroyed and many more were damaged; fire added to the damage. Çan is a centre of routes in the area, the railway lines from Çan going respectively south-east to Baya, north-north-east to Biga and Karabiga and west-north-west to Çanakkale. All these communications were interrupted and telephone and telegraph lines were down. Reports from fifty-seven villages in the epicentral area were still awaited two days after the earthquake. The shock was felt in Istanbul as strongly as any earthquake since 1906, and some apprehension was felt. Some buildings were damaged in Istanbul, including the Dolmabahçe Palace, where walls cracked and plaster fell off the ceiling of the famous reception hall. Damage has been reported from the Aegean Islands of Chios and Lesbos and the tremor was felt throughout northern Greece. The full list of damage and casualties cannot yet be assessed, but reported damage two days after the event is estimated at a quarter of a million pounds sterling, deaths at more than five hundred and injured at more than a thousand. Ankara observatory reported sixty-five aftershocks on March 19 and fourteen more to noon on March 20.

In Turkey there are annually some hundred to hundred and fifty earthquakes which are felt but which do no damage. Some others do damage only in the immediate vicinity of their epicentres; but since 1938, excluding the present shock, there have

been thirteen disastrous earthquakes. These have been: (a) in Central Anatolia—Kırşehir-Yerköy, 1938 (19 Nisan 1938 Orta Anadolu yer depremi. Ed. Paréjas and Hamit N. Pamir. Istanbul Üniversitesi Jeoloji Enstitüsü Neşriyatı, No. 5, 1940); (b) in Seprionale Anatolia—Erzincan (magnitude 8), December 27, 1939 (27 Birinci Kânun 1939 Erzincan yerdepremi. Ed. Paréjas, I. H. Akyol, E. Altinli. I.U.J.E.N., No. 10, 1942, also *Nature*, January 6, 1940), Erbaa-Osmancık (magnitude 7.5) 1942, Adapazari 1943, Amasya-Tosya (magnitude 7.5) 1943, Bolu-Gerede (magnitude 7.5) 1944, (c) in south-east Anatolia, Ceyhan-Misis 1945, Van 1945, Varto 1946, Bingöl 1949; and (d) in the Aegean area in which the present epicentre is situated, Dikili 1939, Ayvacık 1944 and Çesme-Karaburun 1949. In the course of these thirteen earthquakes, fifty thousand people have been killed and a hundred thousand houses destroyed or seriously damaged. Since 1938 earthquake damage has probably cost the Turkish people 100 millions of Turkish pounds.

Tectonically, the area around the Marmara basin consists of faulted synclines, and the area adjoining the Aegean Sea consists of faulted depressions. In between these synclines or depressions there are anticlines with palaeozoic cores, 'plis de fond' or 'massifs'. The elements have been orogenically active throughout geological time, but since the end of the Neogene the general movement has been an upward (epirogenic) one. This rise is shown by the altitude of Neogene lacustrine deposits and by the quaternary terraces. To-day it is still continuing and is evidenced by the sudden changes of equilibrium between sections with faulted contact. Earthquakes accompany the faulting. ERNEST TILLOTSON

THORNTHWAITE FOREST, CUMBERLAND

THORNTHWAITE was one of the first forests to be established by the Forestry Commission in Cumberland, which took over eleven hundred acres of land around the Whinlatter Pass in 1920 and began planting the same year. Other land has been added from time to time, the latest acquisition being in 1947, and, since planting has proceeded continually, all ages of trees up to thirty-two years are represented. A short record of this forest has now been published by the Forestry Commission in a booklet entitled "Britain's Forests—Thornthwaite"*. The bulk of the work on the larger sections—Whinlatter, Wythrop and Dodd—was finished by 1931, and thus most of the plantations are more than twenty years old. Formerly, the young trees for planting were raised at a small forest nursery near Thornthwaite village; but nowadays they are brought from larger nurseries near the Scottish border. The forest lies three miles from Keswick, two and a half miles from Cockermouth, and twenty-three miles from Carlisle. Its greatest length from north to south is seven miles, and its greatest breadth six miles, including outlying plantations. The distance around Bassenthwaite Lake by road, which touches on most of the plantations, is eighteen miles.

Soon after the Commission commenced planting in the beautiful Lake District, there was a considerable

* Forestry Commission. Britain's Forests—Thornthwaite. Pp. 20. (London: H.M.S.O., 1952.) 1s. net.