

Ohle) that when fructose goes into solution, an equilibrium is established between its normal form and the γ form. This would take place in acetic anhydride as in any other solvent and each of these forms would then be acetylated on its own account. Under the conditions of our experiment, the equilibrium would appear to be approximately 97 parts of normal fructose and 3 parts of γ -fructose.

It would have been easy to prove the γ nature of the new acetate by methylating it, and then saponifying the product; the methyl- γ -fructoside prepared by Irvine should thus have been obtained. But there was another method, more simple still, and that was to combine it with glucose tetracetate: it should then, if really derived from γ -fructose, give rise to the octacetate of saccharose.

Glucose tetracetate + γ -fructose tetracetate = saccharose octacetate + water.

This experiment was carried out by dissolving in chloroform equal weights of our tetracetate and that of glucose (prepared according to the method of E. Fischer and Delbrück), and this solution was shaken for 15 hours with phosphorus pentoxide. On evaporation in a vacuum, it left a syrupy residue, which, taken up in warm alcohol, deposited fine crystals on cooling. These presented the principal characters of saccharose octacetate

Melting-point of our crystals	70° C.
" " of saccharose octacetate	70° C.
" " of their mixture	70° C.
Rotatory power in chloroform solution	+ 59°·4
" " of saccharose octacetate	+ 60°·0

It may be noted that the same substance was obtained in two series of experiments, in one of which a fructose prepared by inversion of saccharose was the starting-point, and in the other a fructose extracted from inulin.

The saponification of the synthetical octacetate, carried out by Zemplén's method, finally gave an anhydrous, non-reducing disaccharide, of crystalline structure and very sweet taste. The comparison of its principle properties with those of cane sugar gave the following figures:

Analysis (per cent.)	C 42·3, H 6·6 (calculated for $C_{12}H_{22}O_{11}$: 42·1 and 6·5).
Cryoscopy in water	Molecular weight found: 344 (calculated 342).
Melting-point of our sugar	183° C.
" " of saccharose	184° C.
" " of their mixture	184° C.

Rotatory power in aqueous solution	
of our sugar (C = 5·07)	+ 66°·3
of saccharose at the same concentration	+ 66°·5
of our sugar after inversion	- 20°·6
of saccharose after inversion	- 20°·7

From the concordance of these figures the identity of these two substances must be regarded as proved.

We still have to clear up certain points concerning the intermediate products of this synthesis, and to give an account in greater detail of the whole of our operations. These results will be published in due course.

The Development of Cyclonic Depressions.

IN the *Monthly Weather Review* for November 1927, two articles by W. J. Humphreys appear, both of which deal with the growth of cyclonic depressions in the United States and Canada.

The first article gives an explanation of the great increase in size and intensity of a depression that so often takes place when it moves north-east across the eastern parts of the United States or of Canada. Since such an increase of intensity with increasing latitude is not a world-wide phenomenon, the idea that it may be due to change with latitude of the deflective force of the earth's rotation is rejected. If, on the other hand, contrast of temperature is regarded as essential for cyclonic development, an obvious explanation is afforded by the fact that the farther north the depression goes, the shorter is the distance through which the incoming supply of polar air has to pass, and the colder that air will be on arrival, while the high temperature of the equatorial air is largely maintained by latent heat set free by condensation of its water vapour, even when the distance travelled from equatorial regions is very great, the result being an increase of temperature contrast between the parts of the depression fed, respectively, by these two supplies of air. Such opportunities for increasing temperature contrast as exist over eastern North America and the western part of the North

Atlantic are available in few if any other parts of the world.

The second article seeks to explain why depressions moving north-eastwards across the United States in winter increase in size and intensity more rapidly by night than by day. Thermal considerations are again made use of: it is pointed out that the cold portions of the depression have as a rule clearer skies than the relatively warm portions, and consequently are far more strongly cooled by radiation at night, an increase of temperature contrast due to this effect being added to the general effect of latitude mentioned above. During the daytime, on the other hand, not only is the polar air with its clearer skies warmed more than the equatorial air, so as to reduce the contrast of temperature, but also, being so warmed, thermal convection will normally set in and obstruct to some extent the simple cyclonic wind-system.

It may be pointed out that the effect dealt with in this second article is not generally regarded as characteristic of depressions crossing the British Isles. This is not surprising, however, when we consider how comparatively small the nocturnal fall of temperature is in polar air that has been charged with water vapour, if not with cloud, during a long passage across the North Atlantic, as generally happens with polar air reaching the British Isles.

Earthquakes in the Crimea in 1927.

PROF. A. V. VOZNESENSKY in *Priroda* (No. 12, 1927) gives the preliminary results of observations on the Crimean earthquakes of last summer. The data on which the account is based are admitted to be somewhat fragmentary and inexact, since the Crimea was considered not to be subject to earthquakes and there was no seismological station there before, though

one is established now in Feodosia. Apart from that, observations on the spot during the earthquakes were not organised properly and have been made without system or knowledge.

The first tremor occurred on June 26, when many buildings were partially destroyed, and afterwards slight tremors were experienced for five months, until

November; during this period the second great earthquake occurred, on Sept. 12, which was still more destructive than that in June. The strength of the earthquake was estimated by local observers as 8, but the author is inclined to regard this figure as exaggerated and not exceeding 6, since not more than 20 per cent. of buildings were damaged, and those only partially and owing to their unsatisfactory state. The area of the June earthquake covered by the isoseist 6 occupied the south-western extremity of the Crimean peninsula; the area covered by the isoseist 2 is more or less triangular in shape and stretches from Kiev to Batum (1280 km.). The axis of the September earthquake was almost perpendicular to that of the June one, and the area of the isoseist 2 was about half as long again, but the epicentre could be determined as practically in the same spot, while the strength increased more than twice.

A comparative study of records from seventeen Russian and foreign observatories permitted the author to determine the epicentres in a preliminary way, for the June earthquake at $44^{\circ} 30' N.$ and $35^{\circ} 50' E.$, for the September one $44^{\circ} 30' N.$ and $35^{\circ} 10' E.$ Both these points are in the Black Sea; the first 53 km. from the shore south of Cape Tchauda; the second 43 km. south of the mouth of the River Otusa; both at the depth of 1.5 km. The depth of the epicentres is suggested by the author as about 25 km. Preliminary data of a hydrographical survey of these areas showed considerable alterations in the state of the sea bottom, since instead of soft mud found on previous occasions the survey discovered stony bottom. The probable cause of the earthquakes was purely tectonic, since there was absolutely no indication of volcanic action, though some vague rumours to that effect circulated amongst the panic-stricken population. Losses of life were negligible, which was explained by the fact that strong tremors were preceded by slighter ones and nearly everybody left buildings. On the other hand, the moral sufferings of the population were great, owing to the enormous number of successive tremors keeping the people in permanent suspense. During the first month as many as 265 tremors were registered, or 8.2 tremors daily, while on the first day their number was 41, and it is easy to understand the assertions of inhabitants that there was an incessant trembling for many days.

University and Educational Intelligence.

GLASGOW.—At the Ceremony of Graduation held on April 21, the degree of doctor of science (D.Sc.) was conferred on Dr. R. C. Smith, for a thesis on "The Stability of Emulsions, with Additional Studies in Rates of Reaction."

NOTTINGHAM.—In our issue of Feb. 4, p. 190, reference was made to the opening of the new buildings by H.M. the King in July next. It is now announced that the opening ceremony will take place on July 10.

Sir Jesse and Lady Boot are making further contributions to the new buildings. Sir Jesse will bear the cost of the great hall, and Lady Boot the expense of a women's hall of residence.

DR. W. B. CROW, lecturer in botany at the University College, Cardiff, has been appointed head of the Department of Biology at the Technical College, Huddersfield, in succession to Dr. T. W. Woodhead, president of the British Ecological Society, who, at the end of the present session, will be retiring from the headship after thirty-two years' service.

FOLLOWING upon the Hackett bequest of about £550,000 to the University of Western Australia, the

Government has resolved to celebrate the centenary of the State in 1929 by erecting such buildings as will enable the entire University to be moved to its 165-acre site at Crawley. The Departments of Engineering, Biology, and Geology are now in their permanent buildings, and a building for physics, to be erected at a cost of about £32,000, should be completed by August 1929. The Anglican Church has commenced the erection of St. George's College—a residential college for students—the foundation stone of which was laid on Mar. 8. The central Winthrop Hall, with its adjoining administrative buildings and Students' Union, is being erected in accordance with a design by Messrs. Alsop and Sayce of Melbourne, whose plans were awarded the first prize last August in an Empire-wide competition. The late Mr. R. J. Gledden, who died towards the close of 1927, left his entire estate to the University for the promotion of the study of applied science, and this bequest will, when the property is realised, amount to nearly £100,000.

THE eighteenth annual report of the University of Leeds on adult education work gives particulars of thirteen university extension lecture courses and forty-five tutorial classes, which cost £373 and £4931 respectively. Among the tutorial class subjects the natural sciences were represented by biology only. In this subject there were five classes with ninety-five members. As an indication of the interest aroused, mention is made of two public exhibitions of their work arranged by the students. The tutor in biology, Mr. Norman Walker, has demonstrated by the continuance of his classes for more than three years the effectiveness of his methods, an account of which is given in the recently published Report on Natural Science in Adult Education by the Board of Education's Adult Education Committee. He insists, above all, on the teaching being practical and never losing contact with life. "This aspect possesses great inspiration and is effective in mind training, while the intellectual satisfaction obtained secures the adult student's devotion and attention over several years, if not for a lifetime."

THE Carnegie Trust for the universities of Scotland has published its twenty-sixth annual report, which gives particulars of grants made during 1926-27 as follows: grants to universities, £39,700; grants to other institutions, chiefly colleges, £8345; grants in aid of post-graduate study and research, £16,829; assistance to students by way of payment of class fees, £58,664. Among the new buildings for which some of the largest grants to universities were made are students' hostels and a students' union. Apart from a research lectureship in Scottish history, the assistance rendered to research by the Trust is in three forms: research fellowships, scholarships, and grants; the laboratory of the Royal College of Physicians; and teaching fellowships. A pleasing feature of the report regarding assistance to students is the unprecedentedly large amount (£2575) of voluntary repayments of their class fees by former beneficiaries. Of the total amount thus repaid since the trust began its operations, nearly half has been contributed by former students of the faculties of medicine. The policy of the trustees in dealing with applications for admission as Carnegie students has recently been modified. Instead of accepting without question declarations by applicants and their parents or guardians purporting that without the assistance of the Trust university education would be impossible, the Trust now inquires into the financial circumstances of the family. It finds that the circumstances of the great majority of applicants clearly justify any assistance which can be rendered to them.