

sum approximating 4000l.; even so, it is impossible to estimate its worth to the country, either directly or indirectly; but the editor thinks the saving effected by the campaign may be safely set down as at least a hundredfold. As first of all there is the direct benefit which accrues from the saving of the crops, and, second, the destruction of vast armies of locusts, which will materially lessen if not entirely prevent the recurrence of swarms during the succeeding season.

In comparing the 1909 visitation with that of previous years, it is stated that it was probably the most severe one which has been experienced since 1893, as altogether no fewer than 15,306 swarms were accounted for and tabulated in the monthly returns. These do not, however, take into account the numerous swarms destroyed by the Railway Department or in those districts where there was no locust officer.

The term swarm is of exceedingly vague significance and it is quite impossible to estimate the average size of those which were destroyed. But these may be said to have varied in size from those covering a few square rods to others of such magnitude that they covered hundreds of acres. In the initial stages of the 1909 invasion the insects came down in immense swarms from the Kalahari Desert in March, and subsequently mighty swarms swept the country clean to the coast of the Indian Ocean between Port Elizabeth and East London, the females depositing their eggs more or less all the way from the desert to the sea, where they covered an area of country about 200 miles in width.

The most highly favoured of all the agents used in the destruction of locusts is a mixture of arsenite of soda and treacle. In preparing this the custom is to dissolve 200 lbs. of the arsenite in about 15 gallons of boiling water and then to add water until the bulk is 20 gallons. Half a gallon of this is then poured into an iron drain, specially manufactured for the purpose, and a gallon of the treacle or syrup added; the whole is then thoroughly mixed, the drumhead fixed, and the material is then ready for transport. The dilution of the poison recommended by the department is one part to 66 of water for newly-hatched locusts ("Voetgangers"), and one part to 50 when the insects are about a fortnight old. Mr. C. P. Lounsbury points out, however, that no single means of destruction can be recommended for use in all circumstances, and that spraying with either the arsenical poison or with a soap solution is applicable only where water is available. The soap emulsions make the cheapest spraying solutions for killing the locusts by contact, but if the solution is too highly diluted with water the insects may be stupefied for a few hours and finally recover. On the other hand, the arsenical preparation acts as a stomach poison and kills them more or less quickly, according to the strength at which it is used. When poison is used it is lightly sprayed around or over the swarms, or in front of them if they are on the move. This preparation has unfortunately a deadly effect upon the vegetation, and cattle should not be allowed to graze upon the sprayed areas until after a good rain, or after the dead herbage has been fired. Whole areas of crops under cultivation must not be sprayed, and in such circumstances poisoned baits may be used with excellent results, and the most marked feature of the recent work of locust destruction was due to the vastly increased use of such "baits." Various materials are used, but finely-chopped green forage is claimed to be the best. As a substitute bran, mixed with the poison, is also strongly recommended by the officer in charge of the Caradoc district, but it is thought that this may have a deadly effect upon small birds, and is not generally advocated.

One of the most interesting chapters in this report

is that which deals with locust-eating birds, the species referred to being the white stork (*Ciconia alba*), though other members of the pelargi are evidently included, and small pratincoles (*Limicolæ*). It is stated that these birds practically cleared the country of the swarms of locusts that had escaped being poisoned, and that they are the leading factors in the natural control of these pests. This is not the first occasion that the bureau has published information regarding this destruction of locusts by birds; it may be recalled here that information was given in the previous report, in which it was stated that the swarms of locusts which occurred in the country bordering on the Kalahari were practically exterminated by them.

TOTAL ECLIPSE OF THE SUN, APRIL 28, 1911.

ALTHOUGH the eclipse which is due to occur on Friday, April 28, 1911, will only be visible along a narrow track extending from the south-eastern coast of Australia to the islands about Samoa, it has attracted a strong contingent of both official and private observers. In spite of the comparative difficulty of access, it was considered that this, being the last of the series of long-duration eclipses for some years to come, warranted a special attempt being made to secure the important observations, spectroscopic and topographic, which can as yet only be efficiently made during the period of eclipse.

After very careful consideration of all possible situations, most of the parties have proceeded to a small coral island, Vavau, one of the Friendly Group in lat. $18^{\circ} 39' S.$; long. $173^{\circ} 59' W.$ Three English parties have arranged to observe the eclipse in the vicinity of Neiafu, the chief town of Vavau. The constitution of these, with their instrumental equipment, is as follows:—

(1) *Government Expedition from Solar Physics Observatory*.—Dr. W. J. S. Lockyer, in charge of this party, and accompanied by Mr. F. K. McClean, left London on February 3, 1911, with the necessary gear, and journeyed to Sydney by the Orient s.s. *Otway*. From there the instruments were transhipped to H.M.S. *Encounter*, of the Australian Squadron, and the expedition started for the Friendly Islands on March 25. Their equipment consists of:—

(a) *6-inch prismatic camera*, 7 feet 6 inches focal length, with four large objective prisms of 45° angle. With this instrument it is hoped to photograph the spectrum of the sun's atmosphere at second and third contacts, and also to obtain several records of the coronal spectrum during totality. This will be used in connection with a 12-inch siderostat.

(b) *Concave Rowland Grating Spectrograph*, of 10 feet radius of curvature, arranged as a slit spectrograph for the first-order spectrum. A special plate holder has been provided, carrying six celluloid isochromatic films, 24 inches long, bent to the curvature of the focal curve. A Cooke photo-visual triple objective of 30 feet focal length, receiving light from a 21-inch siderostat, will form an image of the sun about $3\frac{1}{2}$ inches diameter on the slit plate. An endeavour will be made to photograph the spectrum of the cusps and of the corona during totality.

(c) *Cooke Coronagraph*, 4 inches aperture and 16 feet focal length.

(d) *De La Rue Coronagraph*, $4\frac{5}{8}$ inches aperture and 8 feet focal length.

(e) *Doublet Coronagraph*, 5 inches aperture and 30 inches focal length.

(f) *Doublet*, 6 inches aperture and 48 inches focal length.

Two small spectrographs will also be used with Thorp replica diffraction gratings placed in front of the camera lenses. To feed these instruments with light two siderostats, of 21 inches and 12 inches aperture respectively, and a coelostat of 16 inches aperture, have been taken by the expedition. On

arrival at Sydney, this party will be joined by several gentlemen who have had experience of eclipse work with Mr. F. K. McClean in Flint Island (1908) and Tasmania (1910). These are Messrs. J. Brooks, W. E. Raymond, and H. Winkelman.

2. *Expedition from the Joint Permanent Eclipse Committee*.—This party will be under the charge of Father A. L. Cortie, S.J., from Stonyhurst Observatory, who will be assisted by Mr. W. McKeon, S.J., and Father E. F. Pigot, S.J. Father Cortie's expedition also travelled by the *Otway* from London, and proceeded to Varau on board the *Encounter*. The equipment is as follows:—

- (1) Coronagraph of 20 feet focal length.
- (2) Coronagraph of 4 inches aperture.
- (3) Coronagraph of 4 inches aperture and 34 inches focus.

(4) 4-prism quartz train spectrograph for recording the ultra-violet spectrum of the chromosphere and corona.

(5) 6-inch Dallmeyer portrait lens arranged as a prismatic camera with a 7-inch objective prism of 42° angle.

3. A private expedition in charge of Mr. J. H. Worthington, who has had a special equipment made for this eclipse. His main instruments will include:—

(a) Quartz-rocksalt spectrograph of $2\frac{1}{2}$ inches clear aperture and 4 feet focal length. With this will be used two objective prisms of quartz, 60° angle and $2\frac{1}{2}$ inches high. The length of spectrum given by this combination is 8 inches from D to λ 2600.

(b) $3\frac{1}{8}$ -inch coronagraph with amplifying lens giving an equivalent focal length of 20 feet.

(c) $2\frac{3}{8}$ -inch coronagraph of 4 feet focal length.

(d) 3-inch portrait lens coronagraph, 24 inches focal length.

Arriving at Vavau early in April, the various parties will have ample time to get their various instruments into the delicate adjustment which is necessary, provided, of course, that they are not seriously hampered by inclement weather. A telegram received from Sydney brings the welcome news that the officers and men of H.M.S. *Encounter* are enthusiastic in their anticipation of helping in the work of the various expeditions, and this augurs well for the success of the eclipse observations if good, clear weather is experienced.

The eclipse occurs at Vavau about 9.15 p.m. G.M.T. on Friday, April 28, totality lasting $21\frac{1}{2}$ seconds, with the sun at an altitude of about 43° .

CHARLES P. BUTLER.

NOTES.

A COMMITTEE has been appointed for the purpose of raising in Amsterdam a suitable monument to the memory of the late Prof. van 't Hoff.

SIR J. J. THOMSON, F.R.S., has been elected a correspondent of the Paris Academy of Sciences in the section of physics.

THE Queensland Government recently appointed Dr. R. Hamlyn-Harris as director of the Queensland Museum, and has issued to him instructions to reorganise and put the museum on a proper footing.

SINCE the so-called "Daylight-saving" scheme was first put forward, we have pointed out that a change of custom as to the hours of opening of city offices would secure the better use of daylight without legislative action. We are glad, therefore, to see the announcement that in certain departments of the Board of Education the officials arrived at their offices on Monday at 9 a.m. instead of at 10 o'clock, and left at 4 p.m., an hour earlier than usual. The experiment proved such a success last year that the Board of Education authorities have decided to give it a wider trial during the forthcoming summer.

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It is proposed, in memory of the late Dr. Louis Olivier, founder of the *Revue générale des Sciences*, to publish a book, of from 250 to 300 pages, containing contributions from eminent men of science and letters who knew M. Olivier. The volume is to appear next August for the anniversary of the death of M. Olivier, and will be accompanied by a booklet containing his portrait, a biographical sketch, and a bibliography of his works. Subscriptions of 20 francs will secure a copy of both publications on ordinary paper, and 50 francs will entitle to copies on Japanese paper. Subscriptions may be sent to M. Louis Brunet, treasurer of the committee, 18 rue Chauveau-Lagarde, Paris.

THE Decimal Association has issued a circular with reference to the Colonies and the metric system of weights and measures. The most recent instance of the adoption of the metric system by a British colony is that of Malta, where an Ordinance has been passed making the system compulsory as from January 1 next, or such later date as the Governor may fix. It is understood by the Decimal Association that the question of the introduction of the metric system throughout the Empire will be brought forward by the Australian representatives at the forthcoming Imperial Conference. Accompanying the circular is an interesting summary of official reports on the metric system by Mr. J. H. Twigg, late of the Bengal Civil Service.

THE noteworthy flight of Lieuts. Erler and Markenthun from Berlin to Hamburg, and thence to Bremen, has provided a remarkable example of the immediate military value of the aeroplane. The officers started on March 28 soon after eleven o'clock, reaching Hamburg, 142 miles distant, about half-past six. Two halts, each of about two hours' duration, were made, one at Döllen in Mecklenburg, owing to the overheating of the motor, and the second at Ludwigslust. A wireless message was sent from the machine *en route*, which was received at Nauen, near Berlin. The altitude maintained—492 feet to 984 feet—was comparatively small for military purposes, and the flight was aided by a slight following wind. The next day the officers continued the journey to Bremen, covering the distance of 73 miles in a continuous flight of 1h. 15m., aided again by a following wind. The machine used was a biplane built to the designs of the military authorities, with the passenger's seat placed directly behind that of the pilot, but at a higher elevation to enable the observer to obtain an uninterrupted view in all directions. A dual control was fitted, allowing the observer to take charge in the event of the pilot becoming incapacitated from any cause.

A CENTRAL NEWS message from Christchurch (N.Z.) on April 1 states that the *Terra Nova* has arrived safely at Port Lyttelton from the Antarctic. During the meeting of the British party with the Amundsen Expedition cordial greetings were exchanged. As already announced, the *Terra Nova*, while following the Great Ice Barrier from the direction of King Edward Land with the view of landing the eastern exploration party somewhere near what was formerly known as Balloon Bight, found the *Fram* in the Bay of Whales. Captain Amundsen's sole object for the present is to reach the South Pole by way of the Beardmore Glacier, but he hopes, after having done so, to carry out the programme of Arctic exploration originally drawn up by him. His equipment includes 116 Greenland dogs and a sufficient number of sledges and skis. The *Terra Nova* on her return to McMurdo Sound left a message in the *Discovery* hut announcing the meeting with Captain Amundsen, and this message Captain Scott will find when he returns from his depôt-laying expedition.