under present conditions. Many of the publications named in Professor Oldenburg's list will have to be bought, the costs of transmission will be considerable, and accordingly the undersigned have formed themselves into a small committee for the collection and administration of a fund for the supply of scientific and literary publications, and possibly, if the amount subscribed permits of it, of other necessities, to these Russian *savants* and men of letters.

We hope to work in close association with the Royal Society and other leading learned societies in this matter. The British Science Guild has kindly granted the committee permission to use its address.

We appeal for subscriptions, and ask that cheques should be made out to the Treasurer, C. Hagberg Wright, LL.D., and sent to the British Committee for Aiding Men of Letters and Science in Russia, British Science Guild Offices, 6 John Street, Adelphi, London, W.C.2.

Montague of Beaulieu,
Ernest Barker,
E. P. Cathcart,
A. S. Eddington,
I. Gollancz,
R. A. Gregory,
P. Chalmers Mitchell,
Bernard Pares,
Arthur Schuster,
C. S. Sherrington,
A. E. Shipley,
H. G. Wells,
A. Smith Woodward,
C. Hagberg Wright.

SPECIAL ARTICLES

STAR-TIME OBSERVATIONS WITH AN ENGINEER'S Y-LEVEL

Desiring a check on a pendulum clock belonging to the Physics Department of the University of the Philippines. independent of the time-ball of the Manila Observatory, I have been led to use the following makeshift device.

In Fig. 1, O is the objective of an engineer's Y-level; B_1 a wooden block fitted over the objective, with a hole bored through; B_2 a small piece of board nailed to the block B_1; P is a 45° 1-inch prism fastened to B_1; L is

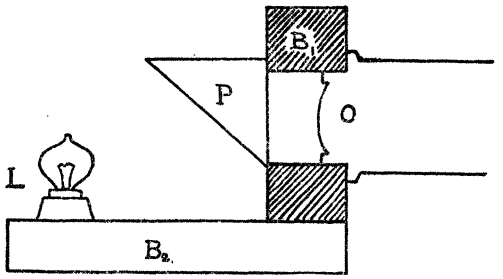

Fig. 1.

a small electric lamp. The whole attachment is tilted forward a little so that when the axis of the telescope is horizontal axial rays do not come by reflection from the zenith, but from a point about 2°or 3° from the zenith. Stray light from the little lamp L illuminates the fields so that the cross hairs are clearly seen. Two somewhat stale dry cells on the floor give enough light, but not so much as to drown the image of a fourth magnitude star. A small switch is included in the circuit.

When the instrument is set up and levelled, with no current on, the images of stars about 2° to 4° from the zenith are seen in different parts of the field; if the telescope is rotated about the vertical axis these images describe arcs of circles across the field, Fig. 2. If these arcs have horizontal chords from side to side of the circular field, Fig. 3, the prism is adjusted, *i.e.*, the rays coming down to the prism, their reflections into the telescope, and the vertical axis of rotation are in the same

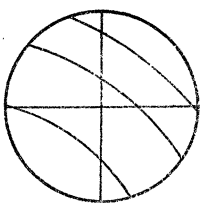

Fig. 2.

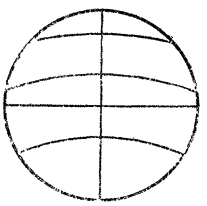

Fig. 3.

plane. This adjustment is convenient, but can not be made very exact; it is done by

twisting B_1 around the objective mounting, and noting the results. As the field is dark, quite faint stars serve.

Before use the level was carefully calibrated.

An observation is made by setting the telescope, pointing east, so that the image of a known star passes the intersection of the cross-hairs, starting a stopwatch, stopping the watch by a clock, reading both ends of the bubble; then pointing west and repeating. This gives the instants of two passages of the star across a small horizontal circle of about 2° or 3° radius; the mean of these is the clock time of transit over the meridian. If there is a change in level reading, this is allowed for by the formulas for the method of equal altitudes, *e.g.*, Comstock's "Field Astronomy," par. 64, equations (108) and (109). As but one star is used, the correction terms depending on declination vanish. Of course the best results are obtained with stars which pass very near the zenith, they being very near the prime vertical. The computations are almost as simple as those with a meridian transit instrument. With the arrangement used, the interval between upward and downward passages is about 16 minutes.

At Manila ten or twelve of the ten-day stars in the American Ephemeris are bright enough and culminate near enough to the zenith for this apparatus. I have made a good many trials, of which a large number were unsatisfactory, the concrete sidewalk on which the tripod stood, and on which I had to move about from one sighting or reading position to another, not being stable enough. However, a position was found where the bubble moved from this cause only an uncertain fraction of a division, and the results in the table were there obtained.

The columns marked "corrections for star time—time-ball time" give the corrections to be added to the time-piece reading, found as above, to give the standard mean time (E. 120°), computed from the geographical position (known to 0.1 sec.), and the star tables, or the same interpolated from the noon-time fall of the Manila Observatory time-ball. As is to be expected, the latter correction is generally found to be smaller, for the time-ball has to drop a short distance for its motion to be perceived.

Taking into consideration the clumsiness of the attachment, the uncertainties of stopwatch readings, the instability of the platform and the inexperience of the observer, the table indicates that under better conditions the method would be exact. It has the great advantage that highly accurate adjustments of collimation axis, etc., are unimportant. It can be extended by observing pairs of stars to give latitude as well as time.

TABLE I

		Correction for		Dif.
		Star Time	Time-ball Time	
1919, XI., 4 ..	γ Pegasi	− 6.95	− 7.5	+0.55
1919, XI., 4 ..	η Piscium	− 6.7	− 7.3	+0.6
1919. XI., 5 ..	γ Pegasi	− 6.4	− 8.2	+1.8
1919, XI., 5 ..	η Piscium	− 7.0	− 8.2	+1.2
1919, XI., 8 ..	γ Pegasi	−10.1	−10.7	+0.6
1919, XI., 9 ..	α Pegasi	+16.8	+16.1	+0.7
1919, XI., 9 ..	γ Pegasi	+17.1	+16.1	+1.0
1919, XI., 9 ..	η Piscium	+16.7	+16.1	+0.6
1919, XI., 9 ..	σ Arietis	+16.1	+16.1	+0.0

WILLARD J. FISHER
THE UNIVERSITY OF THE PHILIPPINES,
MANILA, P. I.

THE AMERICAN SOCIETY OF NATURALISTS

THE thirty-eighth annual meeting of the American Society of Naturalists was held in Ida Noyes Hall and Mandel Hall, University of Chicago, December 30 and 31, 1920.

At the business meeting the treasurer's report was read, showing a balance of $514.09 in the treasury.

On recommendation of the executive committee, the constitution was amended by adding a sentence to the end of Section 1 of Article II. This section now reads:

Section 1. Membership in this society shall be limited to persons professionally engaged in some branch of natural history, as, instructors in natural history, officers of museums and other scientific institutions, physicians, and others, who have essentially promoted the natural history sciences by original contributions of any kind. Any member may present to the executive committee of the society, through the secretary, names of candidates