observations in Brazil *. In this connection computations have been made of the expected variation of ionization of the E layer during this eclipse, which, when compared with the results of observations, will allow the recombination coefficient to be determined with greater precision.

As is known computations in this case are reduced to the graphical integration of the equation

$$\frac{dN}{dt} = J_0 f(t) \cos\chi(t) - \alpha N^2$$

which describes well the course of ionization of the E layer.

In the equation N is the degree of ionization of the layer, J_0 — the number of newly formed electrons per 1 cm³ of the layer at midday at the equator, $f(t)$ — the ratio of the area of the uncovered part of the sun's disc to its total area, $\chi(t)$ — the zenith distance of the sun, and α—the effective coefficient of recombination.

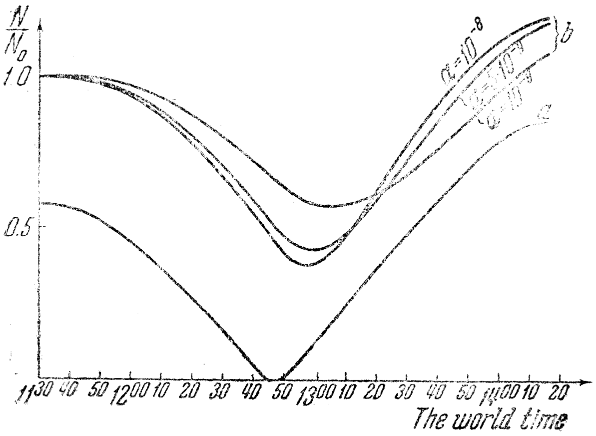

Fig. 1. J_0=150—250

We have carried out a graphical integration of the equation for different values of α and J_0. The computed results are presented in Fig. 1. The curves a in the figure show the course of variation of $f(t)\cos\chi(t)$ for the latitude $\varphi = -12°57'9$ S and longitude $\lambda=38°41'$ W in the region of S. Salvador (Bahia) in Brazil at the altitude h=110 km. The curves b characterize the relative variation N/N_0 of the ionization during the solar eclipse for different values of α and J_0 (N_0 is the degree of ionization of the layer at the moment of the beginning of the eclipse).

From the curves it is seen that owing to the considerable duration of the totality of the eclipse, which at the above indicated place lasts for 260 sec., an essential variation of ionization of the E layer should be observed, permitting a more precise measurement of the coefficient α than during previous eclipses.

It should be noted that observations during the forthcoming eclipse will evidently be very favourable for the explanation of the problem of the ionization processes in the F_1 and F_2 layers, as well as of the corpuscular radiation of the sun for various velocities of particles.

* We take the opportunity of expressing our sincere gratitude to Prof. Michailov for admitting to us the results of astronomical calculations of this eclipse.

1 A. Higgs, Monthly Not. Roy. Astr. Soc., **102**, 24 (1942).
2 Я. Альперт и Б. Горожанкин, Изв. АН СССР, сер. физ. (J. Alpert, a. B. Gorozhankin, Bull. Acad. Sci. URSS, série phys.), **8**, 85 (1944).

INVESTIGATION OF METALS AT TEMPERATURES BELOW 1°K

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Only a few metals where investigated at temperatures below 1°K. It is, therefore, of great interest to perform similar investigations with other metals.

The temperatures were obtained by means of the method of adiabatic demagnetization. The corresponding apparatus was of a simplified construction, it did not possess any vacuum jacket and its main part consisted of a thin-walled glass ampulla within which a globule pressed of the investigated metal together with the iron-ammonium alum was placed. The globule had a diameter which was less by 1—2 mm, than the inner diameter of the ampulla and thus could be placed within it without touching the walls. The upper and the lower ends of the ampulla were freely filled with powdered salt, which during the demagnetization "evaquated" the space between the ampulla walls and the globule, located in the middle part of the ampulla. The ampulla was filled with helium at a low pressure and was sealed off.

The time of heating from 0.06 up to 1.2°K could be varied as desired and usually was equal to 70—80 min. The measurements were performed by means of ballistic method. In this case the appearance of superconductivity was characterized by a change of the sign of the deflection on the heating curve.

Control experiments carried out with cadmium showed the values of T_c, H_c and dH_c/dT, which were in a good agreement with the data otbained by Kürti and Simon (1).

By means of such an apparatus six metals were investigated: Si (0.073°K), Cr (0.082°K), Sb (0.152°K), W(0.070°K), Be (0.064°K), Rh (0.086°K). In brackets is shown the lowest temperature at which the metal was investigated. All these metals did not become superconducting (2).

Also uranium was investigated and found to be superconducting below 1.3°K. The negative results of Shoenberg are to be ascribed to the insufficient purity of his specimen. Our experiments with insufficiently pure uranium also failed to detect superconductivity, whereas with pure metal superconductivity was found for three different specimens.

All the metals used were of a higher purity than the usual chempure metals.

1 Kürti a. Simon. Proc. Roy. Soc, (A), **151**, 610 (1935)
2 D. Shoenberg, Proc. Cambr. Phys. Soc., **36**, 84 (1940).