other two lines, however, agree in position satisfactorily with Fraunhofer lines of unknown origin. These Fraunhofer lines are undoubtedly true solar lines, because on negatives made at Johns Hopkins University they show by their shifting the motion of the Sun's limbs in the line of sight. This proof of the presence of oxygen in the Sun I would regard as conclusive, if the lines in this part of the solar spectrum were not so closely set. The evidence of a real coincidence is inversely proportional to the density of the lines, and therefore it is much more convincing in the red part of the spectrum.

The proof would be conclusive if it were shown that the three red lines shift on the limbs of the Sun, and we hope that some one better equipped for this kind of work than we are will take up the subject and will once for all settle the question.

C. RUNGE.

EFFECT OF PRESSURE ON WAVE-LENGTH.

Increase of pressure about an electric arc increases the wave-lengths of the spectral lines so produced. This increase is very different for different elements and also for different series of lines of the same element, but the results of the investigation can be expressed fairly well by the simple equation:

$$\Delta \lambda = a \beta \lambda (p - p_0)$$

where $\Delta \lambda$ is the increase of wave-length λ of any given line produced by the increase of pressure $p - p_0$, β a constant for any series of lines and a a constant for any element. That is β for any series of a given element is the same as β for the corresponding series of any other element, while a for any series of a given element is the same as a for any other series of the same element. If we write β_0 for the principal series, β_1 for the first subordinate, and β_2 for the second subordinate, then, approximately, $\beta_0 : \beta_1 : \beta_2 = 1 : 2 : 4$.

By suitably choosing β, a may be replaced in most cases by $\frac{1}{T}$, where T is the absolute temperature of the melting point of the element in question, or by $e\sqrt[3]{V}$, where e is the coefficient of linear expansion of the substance in the solid state and V the atomic volume, or finally, for either half of a Mendelejeff group, by $\sqrt[3]{W}$, where W is the atomic weight. From this last expression it is evident that a, and therefore $\Delta\lambda$, is a periodic function of atomic weight, and consequently the shifts of spectral lines may be compared directly with any other phenomenon which itself is a periodic function of atomic weight.

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