to the action of the heat recuperator in the regenerative gas furnace. The fundamental conditions are :—

1. That aqueous vapour and carbon compounds are present in stellar or interplanetary space.

2. That these gaseous compounds are capable of being dissociated by radiant solar energy while in a state of extreme attenuation.

3. That these dissociated vapours are capable of being compressed into the solar photosphere by a process of interchange with an equal amount of reassociated vapours, this interchange being effected by the centrifugal action of the sun itself.

If these conditions could be substantiated, we should gain the satis-faction that our solar system would no longer impress us with the idea of prodigious waste through dissipation of energy into space, but rather with that of well-ordered self-sustaining action, capable of per-petuating solar radiation to the remotest future.

March 9, 1882.

THE PRESIDENT in the Chair.

The Presents received were laid on the table, and thanks ordered for them.

The Right Hon. Anthony John Mundella, whose certificate had been suspended as required by the Statutes, was balloted for and elected a Fellow of the Society.

The following Papers were read :—

I. Experiments to Determine the Value of the British Associa-tion Unit of Resistance in Absolute Measure." By LORD RAYLEIGH, F.R.S., Professor of Experimental Physics in the University of Cambridge.   Received February 15, 1882.

(Abstract.)

This paper contains an account of a repetition by Dr. Schuster, Mrs. Sidgwick, and myself, of the British Association experiment on the unit of resistance with an improved apparatus.   Three distinct series of observations were taken, of which the two first were more or less imperfect.   In the third series an extraordinary concordance in the results obtained on different occasions at the same speed of rotation was arrived at, but the numbers corresponding to the four speeds

could not be perfectly harmonized on the basis of an *à priori* calcula-
tion of the self-induction.

Table VII.—Third Series.

Number of teeth	60.	45.	35.	30.	Mean.
Resistance of standard at 13°, uncorrected........	23·619	23·621	23·630	23·638	23·627
Correction proportional to square of speed	0·006	0·011	0·018	0·025	
Resistance of standard at 13°, corrected..........	23·613	23·610	23·612	23·613	23·612

Table VII gives the results of this series. The " number of teeth "
in the first row is inversely as the speed of rotation. The second
row gives the resistance of a certain platinum-silver standard at 13°
in absolute measure, as calculated with a value of the self-induction
derived from evidence independent of the spinnings. The simple
mean of these numbers is 23·627 ($\times 10^9$ C.G.S.), but they exhibit a
well-marked tendency to rise with the speed. In the third row are
numbers proportional to the squares of the speeds, by subtraction of
which a practically perfect agreement is arrived at. The mean
23·612 thus represents the result of the investigation, if the effect of
self-induction be determined from the spinnings themselves, and is to
be preferred for reasons explained in the paper to the simple mean
23·627. The difference is, however, less than one part in a thousand.

The resistance at 13° of the same coil in terms of B.A. units is
23·935, from which we find

$$1 \text{ B.A. unit} = \cdot 98651 \, \frac{\text{earth quadrant}}{\text{second}}.$$

This number is somewhat lower than that which we obtained
(·9893) with the original apparatus,* but it agrees with that required
to reconcile Dr. Joule's thermal determinations. Rowland's value is
distinctly higher (·9911), while Kohlrausch obtained 1·02. No satis-
factory reconciliation of these results is arrived at, but some remarks
are made upon the relative merits of the various methods.

* " Proc. Roy. Soc.," vol. 32, p. 141.