- The Journal of Agriculture, and the Transactions of the Highland and Agricultural Society of Scotland. N. S., No. 52. 8vo.
—*From the Society.*
- Journal of the Asiatic Society of Bengal. N. S., Nos. 5 & 6. 1855. 8vo.—*From the Society.*
- Bulletin de la Société de Géographie. 4^{me} Série. Tome x. 8vo.
—*From the Society.*
- Verhandlungen der Kaiserlichen Leopoldinisch-Carolinischen Akademie der Naturforscher. Bd xxiv., Supp. Bd xxv., Heft 1. 4to.—*From the Academy.*
- Smithsonian Contributions to Knowledge. Vol. vii. 4to.—*From the Smithsonian Institution.*
- Abhandlungen der Kaiserlich-Königlichen Geologischen Reichsanstalt. Band 2, 1855. Fol.
- Jahrbuch der Kaiserlich-Königlichen Geologischen Reichsanstalt, 1855. No. 1. 8vo.—*From the Institute.*
- Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Classe. Bd xvii., Heft 3. 8vo.—*From the Academy.*
- Coup d'œil Géologique sur les Mines de la Monarchie Autrichienne. Par Fr. de Hauer & Fr. de Fœtterle. 8vo.—*From the Authors.*

Monday, 21st April 1856.

SIR DAVID BREWSTER, K.H., V.P., in the Chair.

The following Communications were read :—

1. On the Prismatic Spectra of the Flames of Compounds of Carbon and Hydrogen. By William Swan, Esq.

While the prismatic spectra of the blue portions of an oil-lamp or coal-gas flame, exhibit a number of bright lines, separated by dark intervals, the spectra derived from the bright light of these flames are perfectly continuous. Apparently inconsistent results are in like manner obtained when the flames of different compounds of carbon and hydrogen are compared. Thus, lines are easily seen in the

spectrum of the flame of alcohol, which are invisible in that of the flame of oil of turpentine.

These discrepancies are shown, in the present paper, to arise from the predominance of the light of incandescent solid carbon in some flames, and its comparative absence in others: and it is also proved that in order to obtain uniform results from the flames of the various compounds of carbon and hydrogen, it is sufficient, in cases where the body contains much carbon, to convert the carbon into carbonic acid, without its previous separation in a solid form, by means of an artificial supply of air. This is conveniently effected for coal-gas by means of the Bunsen gas-lamp, which burns a mixture of gas and air; and, for other bodies, by directing a stream of air from a table blow-pipe through the flame.

When thus treated, all the compounds of carbon and hydrogen which have been submitted to experiment, were found to produce identical spectra; that of the Bunsen lamp serving as a standard of comparison.

In these spectra five principal bright lines were observed, accompanied by several smaller ones, and separated by dark intervals. One of the lines, the well known R of Fraunhofer, has been long known to coincide with the line D of the solar spectrum. Two other extremely close coincidences were discovered. One between a brilliant green line of the lamp spectrum, and the remarkable triple line *b* of Fraunhofer; and another, between a bright purple line, and the conspicuous line G of the solar spectrum.

It follows, from these experiments, that all bodies whose composition is expressed by the general formulæ

produce, in burning, perfectly identical spectra; the nature of the light being always the same, notwithstanding variations in the relative proportions of carbon and hydrogen, and the occasional presence of oxygen in the body.