

2. On the Knowledge of Distance given by Binocular Visions.
By Sir David Brewster, K.H.

The following Gentleman was duly elected an Ordinary Fellow
of the Society :—

Dr Thomas R. Colledge, Fel. Roy. Coll. Phys. Edin.

The following Donations of Books to the Society's Library
were announced,

The Electrical Magazine. Conducted by Mr Charles V. Walker.
Vol I., No. 2.—*By the Editor.*

Literarische Sympathien oder industrielle Buchmacherei: Ein Beitrag zur Geschichte der neueren Englischen Lexicographie, von
Dr J. G. Flugel.—*By the Author.*

Fifty-Fifth Annual Report of the Regents of the University of the
State of New York.—*By Dr Christison.*

Journal of the Asiatic Society of Bengal. Nos. 136, 137, 138,
and 139.—*By the Society.*

Travels through the Alps of Savoy, and the other parts of the Parisine Chain, with observations on the phenomena of Glaciers.
By James D. Forbes, F.R.S.S.L. and E., &c. &c.—*By the Author.*

Monday 6th May 1844.

Dr ABERCROMBY, V.P., in the Chair.

The following communications were read :—

1. On the Conversion of Relief by Inverted Vision. By Sir David Brewster, K.H.
2. On the Geology of Cockburn-Law and its Neighbourhood.
By William Stevenson, Dunse. Communicated by David Milne, Esq.

The author, in the first part of his paper, described the nature of the formations, and in the last part offered his views in explanation of the appearances.

In describing the formations, he enumerated, first, those of *aqueous*, and last those of *ligneous* origin.

I. The former consist of the greywacke, the old red sandstone, and the coal-measure formations.

(1.) The *greywacke* strata form the summit of Cockburn-Law, having a strike about NE. and SW. nearly vertical. There appears to be no decided evidence of any organic remains in these strata ;—there are curious markings which are most probably only concretionary. At Hoardwheel, situated to the eastward of Cockburn-Law, two varieties of copper ore are found in the greywacke, the green and the grey, the former of which is the most plentiful, and imparts a beautiful hue to the rocks. The oxide of manganese is also widely diffused.

(2.) The *old red sandstone* strata lie over the upturned edges of the greywacke, and have therefore been deposited at a more recent epoch. At a distance from the hills they are generally horizontal, or dip away at a gentle angle ;—but at the sides of the hills they are highly inclined,—a circumstance probably caused by an upheaval of the hills, which took place after the date of this formation. These old red sandstones are extensively developed in Preston Haugh. The lowest bed consists of pebbles or fragments of rocks, both angular and rounded, derived from the wearing down of the greywacke and porphyritic rocks. The colour of this formation is, especially towards its base, of a red colour.

It is in this formation, that the bones, teeth, scales, and spines of the *Holoptichius nobilissimus*, a large ganoid fish, described by Agassiz, were found by the author in 1840. These are remains of the same kind of fish which have been found in Perthshire, England, Russia, and in other parts of the globe, and which abounded at the epoch of the old red sandstone formation ; for wherever it is found, these particular rocks prevail. The nature of the strata in which it is found—a coarse, gritty sandstone—seems to indicate that the *Holoptichius* swam about in waters near the shore ; another proof of which is afforded by the ripple marks on the sandstone slabs near their place of sepulture. These interesting relics are very abundant in the strata opposite to Cockburn Mill, and also about half a mile below it, on the right bank of the Whitadder.

(3.) The *coal-measure* strata lie above the old red sandstone rocks, but are not disconformable to them in dip. They are to be seen in the Whitadder, below Preston Bridge, and consist of the ordinary sandstones, shales, and strata of ironstone. The only fossils prevailing in them are those of terrestrial vegetables, which probably had been drifted by rivers.

II. The *Igneous* rocks were divided by the author into two classes—one of which he described as the Felspathic, the other as the Augitic.

(1.) The *Felspathic* rocks comprehend all those igneous rocks associated with the greywacke strata, consisting of the granites, and syenites, and old porphyries of Cockburn-Law, the Staneshiel, the Knock Hill, Blackerstone Hill, &c. The central parts of these igneous masses present the most crystalline appearance, consisting there of pyramidal and wedge-shaped blocks. In those parts approaching to and in contact with the greywacke strata, a rhomboidal paralleliped structure prevails,—which also characterises the aqueous rocks when in contact with the igneous. It is interesting to notice the effect produced on the greywacke strata, by the outburst through and among them of these igneous rocks. Where the two kinds of rocks are immediately in contact, all signs of stratification in the greywacke have been obliterated; and, indeed, these strata appear to have been metamorphosed into syenite.

(2.) The *Augitic* trap-rocks exist almost entirely among the more recent aqueous rocks, viz. the old red sandstones and coal-measures. They are seldom or never seen within the range of the greywacke formation, at least in this neighbourhood.

These augitic traps exist both in the form of narrow dykes, and in that of great masses constituting hills. Of the former, the Cumledge trap-dyke is a good example. It is seen in the bed of Oxendean Burn at Cumledge House, and there forms in amygdaloidal greenstone, abounding in veins of zeolite, steatite, and other minerals. The width of the dyke at this place is about ten yards. The average direction of the dyke is NN.W. and SS.E. It has had the effect, as usual, of hardening the strata on each side of it. This dyke has been traced by the author for a considerable distance, running through both the old red sandstone and coal-measure formations. It appears also to reach into the granite of the Staneshiel and Cockburn-Law.

An overflow of amygdaloidal trap is to be seen on the left bank of the Whitadder, below Cockburn Mill, forming a bed of about four feet thick, and lying above the old red sandstone strata. There are large accumulations of greenstone at Borthwick and Castle Mains. Dunse-Law is also composed of basalt.

In the *second* part of his paper, the author shewed that the outburst of the granite and other felspathic rocks had taken place simultaneously with the upsetting of the greywacke formation, and before the deposition of the old red sandstones. He also stated, that when, after the deposition of the coal-measures, a new outburst of igneous rocks took place, the Lammermuir chain probably received an ad-

ditional upheave,—as the considerable dip of the old red sandstone from that chain could not otherwise be very well accounted for. The colour of the old red sandstones he attributed to the wearing down of the greywacke and porphyritic rocks of a red colour. The reason why the outburst of the porphyritic rocks took place before the augitic traps, he supposed might be the smaller specific gravity of the former.

Mr Stevenson's paper was illustrated by a geological map, as well as by numerous sections.

3. Notice regarding The Indian Grass Oil, or Oil of Andropogon Calamus-aromaticus. By Thomas G. Tilley, Phil. D. Communicated by Dr Christison.

The oil known as Indian Grass Oil, has been referred by Dr Royle to the *Andropogon Calamus-aromaticus*, a plant which he conceives to be identical with the *Καλαμος αρωματικός* of the Greeks. It has been used in medicine as a stimulant embrocation in rheumatism, &c.

The oil, which was green, became yellow when heated. It acquired a steady boiling point at 440° , between which temperature and 442° , a transparent colourless oil distil over. This, after rectification by chloride of calcium, was analysed, and found to have the following composition.

	Found.	Atoms.	Calculated.
Carbon	88.10	10	88.46.
Hydrogen	11.29	16	11.54.

from which data, it appears that the oil of grass contains, and chiefly consists of a carbo-hydrogen, in which the proportion of the carbon is to the hydrogen, as 10 to 16, as in the case of oil of turpentine, and other volatile oils of the same class.

The following Donations of Books to the Society's Library were announced :—

Mémoires présentés par divers Savants à l'Académie Royale des Sciences de l'Institut de France. Tome viii.—*By the Royal Academy.*

Mémoires de la Société de Physique et d'Histoire Naturelle de Genève. Tome x., Part 1.—*By the Society.*

Annales des Sciences Physiques et Naturelles d'Agriculture et