ANALYSIS OF GAULT.

| | Dried at 100°C. | | Insoluble Residue. | |
|---|---|---|---|---|
| Insoluble Residue | = 65·01 per cent = | Silica, $SiO_2$ | = 46·43 per. cent. | |
| Ferric oxide, $Fe_2O_3$ | = 7·92 | $Fe_2O_3$ | = 2·05 | ,, |
| Alumina, $Al_2O_3$ | = 3·40 | $Al_2O_3$ | = 15·41 | ,, |
| Maganese oxide, MnO. | = trace | CaO | = 0·88 | ,, |
| Lime, CaO | = 5·90 | MgO | = 0·24 | ,, |
| Magnesia, MgO | = 0·75 | | | |
| Sodium chloride | = 0·05 Soluble | | 65·01 | |
| Phosphoric acid, $P_2O_5$ | = 0·11 in acid. | | | |
| Sulphuric acid, $SO_3$ | = 0·19 | | | |
| Carbonic acid, $CO_2$ | = 6·09 | | | |
| $K_2O$, and $Na_2O$ | = 0·07 | | | |
| Combined water | = 10·48 | | | |
| | 99·97 | | | |

ANALYSIS OF GREENSAND.

| | Dried at 100°C. |
|---|---|
| Silica, $SiO_2$ ... | = 98·80 per cent. |
| $Fe_2O_3 + Al_2O_3$ | = 0·47 |
| Lime, CaO | = 0·09 |
| Magnesia, MgO | = 0·05 Soluble in acid. |
| Sulphuric acid, $SO_3$ | = trace |
| Combined water | = 0·42 |
| | 99·83 |

# NOTICES OF MEMOIRS.

## D. STUR ON BRITISH COAL-PLANTS.

I.—MOMENTANER STANDPUNKT MEINER KENNTNISS ÜBER DIE STEINKOHLENFORMATION ENGLANDS. Von D. STUR. Jahrbuch der k. k. Geolog. Reichsanstalt, 1889, Bd. xxxix. 1 u. 2 Heft. pp. 1–20.

HERR D. STUR, the Director of the Geological Survey of Austria, took advantage of his visit to the International Geological Congress last year, to study in the field and in some of the principal museums, the flora of the British Carboniferous strata, and the present paper contains in a condensed form the results of his observations and his views of the relative age of our different coal-fields, as compared with the beds on the Continent, and more particularly with those of the Moravian-Bohemian-Silesian area. The following are the conclusions arrived at by the author :—

I. In Britain, the first or oldest Culm-flora of the Culm-roofing shales, specially occurs in the great Scotch basin, in the Burdie-House limestones, in the Carboniferous shale of Slateford, and in the Calciferous sandstone. In Devonshire, on the other hand, the Culmdackschiefer is represented by the "Lower Culm-measures" near Bideford, whilst the "Upper Culm-measures" belong to the Lower Carboniferous, and are identical with the Schatzlarer beds.

II. The second Culm-flora, or that of the Ostrauer beds, is probably quite absent in England, and not a single characteristic species was

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met with. It is probable that the great band of the Millstone-grit, which in the Pennystone and Barnsley district is beneath the horizon of the Schatzlarer beds, may represent the Ostrauer deposits, and in this case the second Culm-flora might be looked for in the thin Coal-seams occasionally occurring in the Millstone-grit. It is further possible that the Coal-measures of the Scotch basin may correspond with the Silesian Ostrauer beds.

III. The greater part of the coals obtained in England are from the horizon of the Schatzlarer beds. To this horizon belong the Coal-areas of Newcastle-on-Tyne, Leeds, Pontefract, Barnsley, Sheffield, Derby, Leicester, Dudley, Coalbrook-Dale, Newcastle-under-Lyme, Manchester, Oldham, Lancaster, and of Whitehaven and Wigton.

IV. The Upper Carboniferous horizon of the Bohemian Rossitzer beds occurs in England in the area of the Bristol Channel, near Bristol and Radstock, and in the vicinity of Merthyr Tydvil, over Swansea to Caermarthen; and more to the north the Coal-fields of the Forest of Dean, the Forest of Wyre and near Wigan, belong to this same Upper Carboniferous horizon.

V. It is remarkable that up to the present no trace of the presence of this Upper Carboniferous horizon has been met with to the east of the great band of Millstone-grit, and in this respect there is a striking correspondence with the Coal-fields of Westphalia, Belgium and Northern France, which belong to the Schatzlarer horizon, and in which the Upper Carboniferous Rossitzer beds are not represented.

VI. The Upper Carboniferous, on the other hand, occurs in Central France, Bohemia and Saxony, also in Banate, and frequently unconformably on much older strata. Thus, also in the line from Swansea, Bristol, Forest of Dean to Shrewsbury the Upper Carboniferous beds are in places unconformably deposited on older strata.

VII. Further, there is in England no trace of the horizon of the Schwadowitzer beds of north-eastern Bohemia, of the Saxon beds of Oberhohndorf near Zwickau, nor of the Radnitzer and Zemech beds. These horizons may probably be looked for where the beds of Schatzlarer approach those of the Upper Carboniferous, as at Wigan and at Coalbrook-Dale.

VIII. It may be concluded from the absence of particular beds in the Carboniferous series of England, France, Belgium and Westphalia, that great changes in the configuration of the land took place during the deposition of the Coal and its associated beds; that they were by no means continuously laid down; and that the changes in the flora of the individual horizons indicate enormously prolonged intervals of time for their production.

The author further adds short critical notices of the more important species of fossil plants in the Hutton Collection, now preserved in the Museum at Newcastle-on-Tyne.

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II.—The Geology of London and of Part of the Thames Valley. By William Whitaker, F.R.S.

UNDER the above title there has just been published a Geological Survey Memoir (in two volumes), which gives a very full and detailed account of the geology of the district. Vol. i. Descriptive Geology, pp. xii. 556, folding table, price 6*s.*; and vol. ii. Appendices (well-sections, etc.), pp. iv. 352, price 5*s.* We hope in a future number, after H.M. Government has presented us with a review-copy, to give some account of this important work, which, to say the least of it, offers a large amount of material for study and for reference at an unusually low (official) price.

## REVIEWS.

The Ganoids of the German Muschelkalk. "Die Ganoiden des deutschen Muschelkalks." By Prof. Dr. W. Dames. Palæontologische Abhandlungen, Band IV. Heft 2 (1888), pp. 133–180, pls. xi.–xvi*a*.

TO any one accustomed to the writings of Agassiz, Count von Münster, H. von Meyer, and others, upon the fossil fish remains of the Muschelkalk, Prof. Dames' memoir will come as a pleasant surprise. Instead of a series of scattered teeth and scales, the Professor has brought together from various museums a number of valuable specimens affording some real insight into the characters of the Mid-Triassic Ganoids; and the detailed descriptions and discussion of these fossils are illustrated by seven fine plates. The specimens were almost exclusively obtained from the extra-Alpine Muschelkalk, and are referable to the genera *Gyrolepis*, Agassiz; *Colobodus*, Agassiz; *Crenilepis*, Dames; and *Serrolepis*, Quenstedt.

The reference of *Gyrolepis* to the Palæoniscidæ is confirmed by several fine fossils, and a definition of the genus can at last be attempted. The mandibular suspensorium is very oblique, and the operculum extremely elongated vertically; the teeth are long, slender, and conical; the dorsal fin is smaller than the anal, and situated opposite or in advance of this; there are small fulcra upon each of the fins; most of the pectoral fin-rays are not articulated; and the two infraclaviculars are fused together. This genus is the only Palæoniscid yet described from the European Trias, and Prof. Dames recognizes four species, as follows: *G. Agassizii* (Münster), and *G. ornatus* (Giebel), from the Lower Muschelkalk, *G. Albertii*, Agassiz, from the Upper Muschelkalk, and *G. Quenstedti*, Dames, from the Lettenkohle.

*Gyrolepis Agassizii* has until now been assigned either to *Amblypterus* or *Rhabdolepis*; but a comparison of the well-preserved type-specimen with more recently discovered examples of *Gyrolepis* proper definitely decides its generic position, and the characters of the scale-ornament determine its specific distinctness. *G. ornatus* has also been hitherto referred to *Amblypterus*, and the type-specimen, now figured for the first time, remains unique. *G. Albertii* is no longer

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