

## Mineralogical Chemistry.

---

**Analyses of Two New Amalgams and a Specimen of Native Gold.** By W. FLIGHT (*Phil. Mag.* [5], **9**, 146—147).—A specimen of “native silver” from Kongsberg had the composition Ag 75·900, Hg 23·065, insol. 0·490 = 99·455, corresponding almost exactly with the formula  $\text{Ag}_3\text{Hg}$ . The amalgam from Moschelladsberg has the composition  $\text{AgHg}_3$ . Another specimen from the same locality had the composition Ag 92·454, Hg 7·195,  $\text{Fe}_2\text{O}_3$  0·033, CaO 0·055, AgCl 0·088, insol. 1·328 = 101·153, corresponding to  $\text{Ag}_{12}\text{Hg}$  (Ag 92·84, Hg 7·16). Both amalgams appear to be definite compounds. Silver, even when fused at a bright red heat, retains mercury with great tenacity.

A sample of washed native gold, in laminated grains and scales, from Punta Arenas, in the Straits of Magellan, had the composition Au 91·760, Ag 7·466, Cu 0·248,  $\text{Fe}_2\text{O}_3$  1·224 = 100·698.

C. H. B.

**Artificial Formation of the Diamond.** By J. B. HANNAY (*Chem. News*, **41**, 106, and *Proc. Roy. Soc.*, 204, 1880).—According to the author the alkali-metals decompose the hydrocarbons present in paraffin spirit at high temperatures and pressures with separation of

carbon. When nitrogenous compounds were present a portion of the carbon was occasionally observed to separate in the form of diamond. Very strong tubes must be employed; the processes present great difficulties.

The best results were obtained with a mixture of 90 per cent. rectified bone-oil, 10 per cent. paraffin spirit, sufficient to three-fourths fill an iron tube  $20'' \times 4'' \times \frac{1}{2}''$  bore, and 4 grams of lithium.

The tube was kept at red heat for 14 hours. The author is of opinion that the diamond was produced in his experiments from the decomposition of a nitrogen compound, and not directly from the hydrocarbons. M. M. P. M.

**Condition in which Sulphur exists in Coal.** By W. WALLACE (*Chem. News*, **41**, 201).—It has been assumed that sulphur exists in coal chiefly, if not entirely, as iron bisulphide. Crace-Calvert has asserted that in some cases it is partly present as sulphates. The author shows that in some coals the sulphur chiefly exists as an organic compound. The following table shows the relative quantities of total sulphur and that existing as pyrites, assuming all the iron found in the ash to have been present as bisulphide:—

|                                    | Total sulphur<br>per cent. | Sulphur as bisulphide<br>per cent. |
|------------------------------------|----------------------------|------------------------------------|
| Ell coal (Lanarkshire).....        | 0·91                       | 0·11                               |
| Main coal           „       .....  | 0·60                       | 0·42                               |
| Splint               „       ..... | 0·46                       | 0·14                               |
| Pyotshan           „       .....   | 0·68                       | 0·17                               |
| Soft coal from Fife .....          | 0·93                       | 0·49                               |

The estimations of sulphur were made by Pattinson's method, and also by fusion with sodium carbonate and potassium nitrate. The Ell coal was found by Crace-Calvert's method to be free from sulphates, the others were not tested. F. L. T.

**Existence of Zinc in all Primary Rocks, and in Sea Waters of all Ages.** By L. DIEULAFAIT (*Compt. rend.*, **90**, 1573—1576).—Zinc is found in all rocks of the primary formation. In the greater number of the 714 specimens examined it could be detected in 50 grams, and in all cases in 100 grams of the rock. It could also be detected in 50 grams of each of 155 specimens of non-fossiliferous, lustrous palæozoic schists, and in the same quantity of 579 specimens from the lower fossiliferous deposits (silurian, devonian, carboniferous, and permian). In the case of sulphuretted schists, especially if containing coal, zinc could almost always be detected in 5 grams of the rock. It was likewise found in 50 c.c. of the last mother-liquors of the French salt-marshes. Taking into account only the quantity remaining in solution in these mother-liquors the waters of the Mediterranean contain at least 0·002 gram zinc per cubic meter. The muds of salt marshes, of old estuaries, and of estuaries still communicating with the sea, contain the same metal in such quantity that it can be readily detected in 50 grams. It can also be detected in 50 grams, indeed frequently in a much smaller quantity, of saline deposits, which the

author considers to be of estuarine origin, and the specimens of which, 128 in number, were mainly taken from the upper trias, and in a similar quantity of dolomitic rocks.

Blende is found in primary rocks, but especially at the point of contact of these with sedimentary deposits; the carbonate usually occurs in the latter. The deposits of Belgium and of Vieille-Montagne are in the carboniferous formation, those of Silesia are in the trias. Now zinc is readily detected in carboniferous schists and in saline deposits of the triassic period. Probably the zinc-compounds have been extracted from the primary rocks by the action of sea-water, then concentrated in estuarine deposits, afterwards redissolved by other water, and transported in a more or less pure condition to the places where they are now found. If the water contained no dissolved oxygen the zinc would be deposited as sulphide, if it were freely exposed to the air, as carbonate.

The author has, up to the present time, proved the existence in the primary rocks of lithium, strontium, barium, zinc, manganese, and copper, and has shown that these metals are concentrated in muddy deposits, which are always sulphuretted. When water containing dissolved oxygen or carbonic anhydride acts on the deposits, these substances undergo a series of changes terminating in the formation of the most stable compound, which will be different in different cases: for strontium, and especially barium, the sulphate; for manganese, the dioxide; for lead, the sulphide; for zinc and copper, the sulphide or carbonate, according to the quantity of air dissolved. These transformations will not all take place with the same rapidity, consequently the different minerals will be separated, and deposited at different points of the water's course. But the barium tends only to form the sulphate. The formation of this compound will therefore be gradual and continuous; it will be deposited at all points in the course of the water, consequently in company with all the various minerals, and also filling the gaps between the different metalliferous deposits, as we actually find it in lodes. It follows that all minerals having a barytic gangue have been formed from the primary rocks by one series of changes: hence they contain traces of rare metals, such as thallium, indium, and gallium, which also exist in those rocks. According to this view new metals should be sought for, not in mineral deposits having a barytic gangue, but in such rocks as the cupriferous schists of Mansfeld, Russia, and Bolivia, which have undergone but little modification.

C. H. B.

#### **Presence of Iron in the Dust Showers of Sicily and Italy.**

By TACCHINI (*Compt. rend.*, **90**, 1568—1569).—The dust showers which from time to time have fallen in Sicily and Italy contain spherical grains of meteoric iron; similar grains are found in the sand of the Sahara. In all probability the sand rains of Italy and Sicily are purely terrestrial phenomena, the sand being transported from the desert by cyclones.

C. H. B.

**Formation of Sulphuretted Mineral Waters.** By E. PLANCHUD (*Chem. News*, **41**, 236).—Under the microscope the long delicate

threads usually supposed to be sulphur, found clinging to the stones in the neighbourhood of sulphur-springs, were found by the author to be composed of hollow cylindrical tubes matted together. Most of these tubes were filled with spores, which, when liberated, moved about with a rapid motion, finally came to rest, and developed hair-like processes similar to those from which they had been discharged.

The author filled three flasks with a solution of calcium sulphate; into one he put dead organic matter, into the other two hair-weeds from a sulphur-spring; one of the latter was boiled to destroy any life in it. All three flasks were then sealed hermetically, and left at rest under similar conditions; on opening it was found that only the flask containing the living hair-weeds gave off sulphuretted hydrogen. At the end of six months, however, the flask containing the dead organic matter had a faint smell of sulphuretted hydrogen, and hair-weeds were found in it on examination. Hence the author concludes the hair-weeds are the cause and not the effect of sulphuretted mineral waters.

F. L. T.

---