

(2) The nearest possible approach to a purely genetic classification of ore deposits is believed to be found in their geological relationships, as determined by the great geological processes and not in their direct chemical formation, or physical shapes.

(3) The chemical reactions so widely used as criteria of ore classification are to be regarded as general agencies and therefore they are not available in the specific determinations of the various groups of ore bodies.

(4) In the discovery and exploitation of ores, structure is of first importance; not so much the structure of the individual ore body itself as the geological structure of the enclosing country rocks.

(5) The primary groupings of ore bodies appear to be best indicated when based upon their geological occurrence, as governed by the nature of geological processes operating.

(6) The secondary groupings appear to be best based upon the general form of the ore-bodies as geological formations produced by

the grander categories of geological agencies.

(7) The ternary groupings are best based upon the specific phases of the geological processes involved in the formation of ores as ore bodies.

(8) The source of the ore materials is an unessential factor in their classification; the great practical question is, how are ores best exploited? In this connection it matters little what was the original condition of the ores. Nor have we to do very much with the detailed, complex, and usually theoretical reactions that are supposed to take place before the final stage of the ore, as we find it, is reached.

(9) Very similarly appearing ore-bodies may be formed by very different methods, a fact which, while apparent in all classifications, does not necessarily vitiate any.

(10) The present scheme is merely suggestive. It is the barest outline of what is believed to be capable of much further expansion and development into a comprehensive, rational and practical general plan.

#### CLASSIFICATION OF ORE DEPOSITS.

GROUPS.	CATEGORIES.	MINERS' TERMS.
I. HYPOTAXIC (Mainly Surface Deposits.)	Aqueous transportation. Residual cumulation. Precipitative action.	Placers, beds. Pockets (in part), some breccias. Bog bodies, bedded veins, layers.
II. EUTAXIC (Chiefly Stratified Deposits)	Emponded amassment. Selective dissemination. Fold filling. Crevice accretion. Concretionary accumulation. Metamorphic replacement.	Some masses, segregations (in part). Impregnations (in part). Saddle-reefs. Gash veins, some stock-works Nodules, some bands. Fahlbands (in part).
III. ATAXIC (Largely Unstratified Deposits.)	Magmatic secretion. Metamorphic segregation. Fumarole impregnation. Preferential collection. Shearing saturation. Fault occupation.	Masse (in part), some lenses Stocks. Contact veins, some impregnations Chambers (in part), some pockets, linked veins. Attrition veins, some disseminations. True veins, some linked veins, lodes.

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#### NOTES ON INORGANIC CHEMISTRY.

THE work of H. Brereton Baker on extremely dry gases is continued by a paper on the vapor densities of dried mercurous chlorid and dried mercury, read before the Chemical Society (London). It is found that perfectly dry mercurous chlorid at 443° in an atmosphere of nitrogen shows a density of 217.4 which cor-

responds to the formula  $\text{Hg}_2\text{Cl}_2$ . The undried substance gives a deeper density of 118.4° showing that the dissociation of mercurous chlorid like that of ammonium chlorid is dependent on the presence of water vapor. The density of dry mercury on the other hand was found to be 108.1 at 448° showing that at this temperature the molecule of mercury is monatomic.

The same evening two papers were read by A. Scott, one on the preparation of pure hydrobromic acid in which the employment of sulfurous acid is recommended in the place of amorphous phosphorus. It is very difficult to free the phosphorus completely from chlorine, and arsenic is almost always present, which gives rise to arsenious bromide in the hydrobromic acid and arsenites and arsenates in the bromides made from this acid. When sulfurous acid is used, the hydrobromic acid is easily freed from the sulfuric acid formed by two or three distillations, the last over barium bromide.

THE second paper by Mr. Scott was on a new sulfide of arsenic, which is obtained in the process of purifying phosphoric acid from the small quantity of arsenic derived from the impurity in the phosphorus used. The new sulfide has the formula  $As_2S_3$ , and unlike the other sulfides of arsenic is insoluble in ammonia and ammonium sulfide, but is soluble in ammonium polysulfide, and is decomposed by caustic potash.

IN the last *Berichte* of the German Chemical Society, L. Vanino and O. Hauser call attention to an interesting reaction of lead peroxide. When it is exposed in a dry or even moist condition to a current of hydrogen sulfide, it glows brightly and the hydrogen sulfide burns with the blue flame of lead. The reaction is not only suitable for a lecture experiment on its own account, but it may be utilized for the ignition of explosive mixtures. Wet gun cotton is instantly exploded, and so are picrate powders, powdered metals such as aluminium, zinc and bismuth burn with brilliancy. Silver and bismuth peroxides act in a similar manner to lead peroxide, cobalt and copper peroxides become much heated in hydrogen sulfide, but do not ignite it, while red lead, pyrolusite, and freshly precipitated peroxide of manganese do not show the reaction.

It has lately been discovered by Moissan that metallic calcium is soluble in liquid sodium. On cooling the calcium separates out in brilliant white hexagonal crystals of the pure metal. The mass of sodium and calcium is put in absolute alcohol at  $0^\circ$  when the sodium is gradually dissolved out and the crystals of calcium remain. The metallic calcium is obtained by

the action of metallic sodium on calcium iodide and the whole process carried out in a closed iron crucible in one operation. Crystals of calcium may also be obtained by electrolyzing fused calcium iodide at a low red heat.

A PAPER has recently appeared in the *Bulletin* of the French Chemical Society, by A. Gautier, on the normal occurrence of arsenic in animals, including man. It appears to be always present in the thyroid gland, in lesser quantities in the thymus and the brain, while traces are always present in the skin and hair. It does not appear to be in any other organs of the body, and consequently would play little part in the toxicology of arsenic, as these organs are rarely used for the detection of arsenic; the brain, however, is sometimes examined. The arsenic appears to be in the form of nucleins.

J. L. H.

#### TOBACCO, TOBACCO-PIPES AND SMOKING.

PERHAPS the most American of all implements and practices, the above have been described and figured hundreds of times, but never in so scientific a spirit as by Joseph D. McGuire, the archaeologist, residing in Ellicott City, Maryland. His monograph appears among the octavo publications or 'Reports' of the United States National Museum, Smithsonian Institution, under the title: 'Pipes and Smoking Customs of the American Aborigines, based on material in the United States Museum,' 1897, pp. 351-645, and last year also appeared as a separate volume. Numerous illustrations give us an idea of the richest and most curious finds of sundry tribes, partly of stone or wood, partly of terracotta and clay, a large number of them having been found in the mounds of the Ohio and Mississippi valleys. The shape of the bowls are of all descriptions; some represent birds, heads of birds, mice and other rodents, toads, frogs, lizards, men in a recumbent, sitting or squatting posture, human hands and faces, etc. The tubular shape was widely in use in ancient America, though it looks very inconvenient to us; Mr. McGuire figures stone tubes with bone mouthpiece, sandstone tubes, pottery tube pipes, red pottery tube and bowl pipes, steatite tubular pipes, cop-