

carbonado. The diamond is rapidly dissolved when heated to a high temperature with carbonates of the alkalis, carbonic acid being given off, but no hydrogen, and hence M. Moissan concludes that diamonds contain no hydrogen or hydrocarbons.

Treated with hydrofluoric acid, and then with aqua regia and finally washed, dried and burnt in oxygen, the diamonds yielded an ash consisting in all cases but one chiefly of ferric oxide. Cape bort contained also silica, calcium and magnesium, and Brazilian carbonado, silica and calcium, with a trace of magnesium. One specimen of green transparent bort from Brazil left a minute quantity of ash, which contained silica, but no iron.

#### Preparation of Pure Alumina.

The preparation of pure alumina from bauxite, which is always accompanied by more or less silica and oxide of iron, has commonly been carried out as follows: Taking advantage of that property of alumina, which enables it to act as either base or acid, according to its environment, the bauxite is fused with sodium carbonate, the resulting products being sodium aluminate and sodium silicate. The mass is then extracted with water and the sodium aluminate passed into solution. The silicate of soda, owing to a deficiency of base, is but little acted upon by the water and with the ferric oxide is left in the residue. From the solution of the sodium salt the alumina is precipitated by passing carbonic acid gas, carbonate of soda being regenerated at the same time.

This process has lately been improved by first precipitating a portion of the solution of aluminate by the gas in the cold, producing a small quantity of crystallized alumina hydrate of the same composition as Gibbsite,  $\text{Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ . This, then, is added to the main bulk of solution, and a complete separation of the whole is secured, the soda being left in the caustic state. The reaction which takes place has been investigated by M. A. Ditte, and is explained as follows: A solution of sodium aluminate may be regarded as amorphous hydrated alumina dissolved in caustic soda. The form in which a body crystallizes from a solution is largely determined by the character of the crystal introduced to start crystallization. Hence in the process described above the tendency of the whole is to crystallize in the form of the several crystals first introduced, and as the crystalline form of alumina is less soluble than the amorphous in alkaline solutions, there is a gradual complete precipitation. Stirring facilitates the separation of the crystals by bringing those already formed into contact with fresh portions of solution. There is finally left only that proportion of alumina corresponding to the solubility of Gibbsite in caustic soda under the conditions existing.

#### Silk from Wood.

At the Paris Exposition in 1889 M. de Chardonnet gave to the world his process for the manufacture of silk from wood and received the highest honors from the jury of award. Since that time the process has been further developed and has presumably attained a practical success; silk is being manufactured at Besançon from wood pulp such as is used in the fabrication of certain kinds of paper. According to F. B. Loomis, U. S. Consul at St. Etienne, the following process is used: The pulp is carefully dried in an oven and plunged into a mixture of sulphuric and nitric acids, then washed in several water-baths and dried by alcohol. The product thus prepared is dissolved in ether and alcohol with the production of collodion similar to that used in photography. This collodion, which is sticky and viscous, is enclosed in a solid receptacle furnished with a filter in the lower end. An air-pump supplies air to the receptacle, and by its pressure forces the collodion through the filter, removing all impurities. The collodion flows into a horizontal tube armed with three hundred cocks having glass spouts pierced by a small hole of the diameter of the thread of a cocoon as it is spun by the silkworm. The spinner opens the cock and the collodion issues in a thread of extreme delicacy. This thread, however, is not yet fit to be rolled upon spools on account of its viscosity and softness, being still collodion and not "silk." To obtain the necessary consistency the thread as it issues is passed through water, by which means the ether and alcohol are washed out and the collodion solidified

and transformed into an elastic thread as brilliant and resisting as ordinary silk. The dangerous inflammability of this substance, as prepared above (two centimetres per second), has been reduced, according to the inventor, by passing the spun thread through a solution of ammonia, thus rendering it as slow of combustion as any other like dress material.

Up to January of this year none of the more important silk manufacturers of St. Etienne or Lyons had invested heavily in this enterprise, but all express confidence in the process and believe it is destined to figure largely in the commercial world.

#### New Method for Melting Points.

A. Potilitzin is the author of a new method for the determination of the melting points for substances melting below  $450^\circ$ , this being the highest temperature which a nitrogen-filled mercury thermometer can indicate. One end of a hard-glass tube, 5 mm. bore and 500-600 mm. in length, is drawn out to capillary fineness and the other is bent at right angles. The capillary is dipped into the molten substance, the melting point of which is to be determined, so that on cooling the tube is closed by a solid plug of the substance 3-4 mm. long. The other end is connected with a manometer by means of which a pressure exceeding that of the atmosphere is maintained within the tube. The tube, along with the principal thermometer and also one for stem correction, is inserted into a wide test-tube, which is then immersed in a bath of fusible metal. When the melting-point is reached the plug softens and is expelled by the internal pressure, so that the sudden equalizing of the pressure in the manometer indicates the moment when the substance melts, the thermometers being then read off. Potassium nitrate was found by this method to melt at  $336.57^\circ$  (mean of eight experiments); by immersion of the thermometer direct into a large mass of the salt the melting point was found to be  $336^\circ$ .

#### Pigments Used in Some India-rubber Toys.

India-rubber has been generally, and correctly, accepted as a suitable material for children's toys; but investigation into the manufacture of the latter reveals the fact that many as placed upon the market contain harmful ingredients. A. Bulowsky has recently called attention to several dangerous ingredients as, for instance, in black dolls, which are often colored "in the mass" with lead pigments. Red articles are also most usually colored in mass, the pigment being antimony sulphide, which, however, being unattacked by the saliva may be considered innocuous. Grey rubber goods generally contain zinc oxide, and hence particularly when, as is sure to be the case, the toy is brought to the child's mouth, an element of danger is introduced. Superficial coloring is frequently accomplished by means of poisonous pigments. These remarks are applied in particular to foreign manufactures, and though, doubtless, the same coloring matters are used in this country, I have yet to learn of a case of poisoning from coloring in mass. Superficial pigments, from their disposition to flake and from the greater quantity brought into contact with the mouth, are certainly to be avoided. It is difficult, moreover, to estimate the amount of damage done by these toys owing to the many petty ills and derangements of infancy, the poison received by the child very likely is insufficient to develop well-defined symptoms or to direct suspicion, but at the same time may be the cause of an indisposition which itself brings on crying, wakefulness, and general wear on the little body struggling for existence.

#### NOTES AND NEWS.

PROFESSOR E. W. DORAN has been elected president of Buffalo Gap College, Buffalo Gap, Texas, and has resigned his position at College Park, Md.

—C. H. Turner has resigned his position at the University of Cincinnati and accepted the Chair of Natural History at Clark University, Atlanta, Ga.

—P. 21, line 9, from below: "registration," read "registration;" p. 22, line 15, from below: "possible," read "impossible;" and p. 22, column 2, line 31, from above: "understood," read "understand."