

their rights to the International Association, which is composed of the two committees before mentioned. The Association obtained international recognition at the Berlin Conference, which met last November, and which was attended by representatives of Germany, Austria, Belgium, Spain, the United States, France, Great Britain, Italy, Holland, Portugal, Russia, Sweden, and Turkey.

An interesting article in the *Toronto Mail* of the 9th inst., to which we are indebted for the above figures, concludes as follows:—

"It is impossible to estimate the commercial advantages which will arise from the founding of this new State. In a discourse delivered by Chief Justice Daly, President of the American Geographical Society, before the New York Chamber of Commerce, the speaker said:—'Being called upon to express my views about the importance of the future commercial relations of this country with Central Africa, and the necessity of adopting such a national policy now as the nature of our future interest may demand, I feel very much like one arising in a body of merchants in London, say about the year 1621, to impress upon them the importance of a settlement that had just then been made on the coast of North America at a place called Plymouth, who, had he suggested the possibility that that infant settlement, in connection with those previously made on the Island of Manhattan and at Jamestown, might in less than 250 years increase to a great nation of fifty millions of people, he would probably have been regarded as a fit subject for an institution which a few years before had been established in London called Bedlam.' The Upper Congo section of the Congo Basin comprises from 5,500 to 6,000 miles of uninterrupted navigation, its waters flowing through an unsurpassedly fertile region of over 1,000,000 square miles, peopled by about 43,000,000 persons, of whom at least 1,000,000 have proved themselves amenable to reason and kind treatment. It has been estimated that, if steamers and ships can be sent to the Upper Congo, they can obtain three times more of the West African trade than is obtained from the whole West African coast, from the Gambia to St. Paul de Loando, a coast line of 2,900 miles. The value in Liverpool of this produce is put at £50,000,000, consisting of palm oil, palm kernels, ground nuts, india rubber, ivory, precious woods, cotton and cotton seed, red gum, copal, beeswax, rattan cane and many more articles of commerce.

The one thing wanting is a railway to connect the portions of the river interrupted by cataracts, namely, from Vivi to Isangila, 52 miles, and from Manyanga to Stanley Pool, 95 miles. With this want supplied, an uninterrupted highway will be opened into the heart of Central Africa, and it may not be many years before 'The Free State of the Congo' will rank as a civilized country."

Special.

ELEMENTARY CHEMISTRY.

CHAPTER II.—(Continued.)

SECTION II.

OZONE.

Symbol, O_3 . Molecular Weight 48.

PREPARATION.

63. Formed in Cases of Slow Oxidation or Combustion.

Exp. 13.—Carefully scrape a stick of phosphorus until quite clean, under water, place it in a wide mouthed bottle, pour in

enough water to half cover it, and place a glass plate upon the mouth of the bottle; white flames of phosphorus trioxide, P_2O_3 , will arise from the phosphorus, but will soon be absorbed by the water, at the same time Ozone will be formed. The phosphorus combines gradually with part of the oxygen of the air in the bottle, while some of the remainder is converted into ozone, $3O_2$ becoming $2O_3$. Put a piece of starch about the size of a large shot into a test-tube, and quarter fill with water, shake up and then boil; add a fragment of about the same size of potassium iodide, KI, and allow it to dissolve. Dip some pieces of white paper in the solution, and, after the phosphorus has been in the jar for twenty minutes or half an hour, introduce the paper; it will immediately become blue. This is the ordinary test for the presence of Ozone.

Ozone can also be formed by the passage of a series of electric sparks through air or pure oxygen; and it may be recognized by its odor whenever an electric machine is worked. The quantity of oxygen thus changed is small, but if a *silent electric discharge* be passed through the gas, care being taken to avoid sparks, a much larger proportion of oxygen undergoes this transformation.

PROPERTIES OF OZONE.

64. Heavier than Air.

Exp. 14.—Lay a piece of test paper in the bottom of a tumbler and gradually invert a bottle of Ozone, prepared as in Exp. 13, over it, the test-paper will immediately become blue.

65. Oxidizing Power.

Exp. 15.—Suspend a bright silver coin in a bottle of ozone; in a few minutes it will be covered with a grey deposit of silver oxide.

66. Bleaching Power.

Exp. 16.—Into a jar of air ozonized by phosphorus pour a little dilute solution of indigo; it is at once decolorized. Moistened litmus-paper is immediately bleached when introduced into a bottle of ozonized air.

The bleaching and disinfecting of bodies by ozone are owing to their oxidation. Strips of test-paper exposed to the air, and shaded from the sun, for a few hours will frequently be found to have turned blue, especially in country places.

When substances are oxidized by ozone no diminution of the volume of the gas takes place. The density of ozone is found to be 24($H=1$), that of oxygen being 16, so that ozone is half as heavy again as oxygen; therefore the molecule of ozone must contain three atoms. At a temperature of about $260^\circ C$. it is reconverted into ordinary oxygen, the gas returning to its original volume; thus:— $2O = 3O$.

CHAPTER III.

HYDROGEN.

Symbol, H. Atomic Weight, 1. Molecular Weight, H_2 .

PREPARATION.

67. By Decomposing Water by the Galvanic Current.

We have already seen (Chapter I) that hydrogen may be obtained from water by sending a galvanic current through it, when it is resolved into its constituent gases. This method, however, is by far too costly to be employed on a large scale.