burgh. Dr. Robert T. Hance, of the Rockefeller Institute of Medical Research, has been appointed professor and acting head of the department of zoology. Professor F. L. Bishop retires as dean of the Schools of Engineering and Mines to devote full time to the department of physics. Dr. W. E. Baldwin, instructor in chemistry, goes to the Johnstown Junior College of the university as assistant professor and director of the department of chemistry.

DR. G. L. FOSTER, assistant professor of biochemistry in the University of California Medical School, at Berkeley, has resigned to become associate professor of biochemistry in the Medical School of Northwestern University.

R. B. GREEN, who has held the position of lecturer in anatomy at the College of Medicine, Newcastle-on-Tyne, for the past five years, has been elected professor of anatomy in the University of Durham, in succession to Professor R. Howden.

DR. WILHELM TRENDELENBURG, who was recently called from the professorship of physiology at Tübingen to the University of Berlin, has been succeeded at Tübingen by Dr. Armin Tschermak von Seysenegg, of the German University at Prague.

DISCUSSION AND CORRESPONDENCE

ARSINE FROM FUSED GLASS

RECENTLY while drawing a large tube of borosilicate glass to capillary size a very pronounced garlic-like odor was observed. After a number of failures to duplicate the conditions it was found that the odor could be noticed only during the process of drawing the glass and thus while continuously forming a fresh surface.

The experimental procedure was as follows. The center portion of a short length of tubing was fused to a thick mass in an oxygen-natural gas flame. If the fused mass was held close to the nose no odor could be detected until the glass was stretched when at once the odor of garlic was noticed.

The experiment was repeated with a second lead-free borosilicate glass. This glass had a somewhat higher melting point and the odor could not be detected in this case unless the fused glass, after removing from the flame, was allowed to cool until it could be stretched only with difficulty. Several samples of so-called soft glasses gave negative results.

The odor was so striking that it was compared with that of arsine from an arsine generator. Several observers agreed that the odors from the fused glasses and of the arsine were identical. Since the two glasses giving positive results were found on analysis to contain in one case 0.5 per cent. and in the other 0.8 per cent. of arsenic oxide, one might safely conclude that the odor from the glass is due to arsine were it not for the fact that arsenic vapor is itself supposed to have a garlic-like odor.

When arsine is heated in the air it is largely oxidized to As_2O_3, the equation for the main reaction being as follows:

$$4As + 3O_2 = 2As_2O_3. \quad (1)$$

Water vapor which is always present in the air may aid in the oxidation according to equation (2),

$$2As + 3H_2O = As_2O_3 + 3H_2. \quad (2)$$

Arsenic oxide, As_2O_3, has no odor either in the solid or gaseous phase and since hydrogen is odorless it would appear, unless there are other products of the oxidation, that gaseous arsenic is responsible for the garlic odor which accompanies the heating of arsenic in the air.

There is another possible product not of the oxidation, but of the reduction of arsenic, namely, arsine. The hydrogen formed according to equation (2) might reduce some of the arsenic to arsine as follows:

$$2As + 3H_2 = 2AsH_3, \quad (3)$$

or better still, the effect of water vapor on arsenic vapor might be considered as a single reaction:

$$4As + 3H_2O = As_2O_3 + 2AsH_3. \quad (4)$$

Here part of the arsenic acts as an oxidizing agent and is reduced to arsine while the remainder is oxidized to As_2O_3.

The analogous reaction between water vapor and phosphorus has been shown to take place[1] very readily at high pressures and temperatures thus:

$$4P_2 + 12H_2O = 3H_3PO_4 + 5PH_3. \quad (5)$$

If reaction (4) takes place only to a very slight extent when arsenic is heated in air we can readily explain the similarity of its odor to that of arsine. In dry air reaction (4) may even be delayed until contact of the arsenic vapor with the moist mucous membrane of the nostrils.

It is therefore suggested, first, that the odor of arsenic vapor is due to the presence of arsine; second, that under the proper conditions arsine is formed in the fusion of glass containing arsenic compounds.

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[1] Ipatier and Nikolajev, Ber. 59 (B), 595 (1926).