Chemistry. — "*The allotropy of Zinc.*" II. By Prof. ERNST COHEN and W. D. HELDERMAN.

(Communicated in the meeting of April 24, 1914).

1. In our first paper on the allotropy of zinc [1]) we called attention to the "atomized" metals which may be prepared by the new method of M. U. SCHOOP of Zurich.

We then pointed out that this method forms an ideal way of producing chilled metal. As a result of our investigations on the metastability of the metals as a consequence of allotropy we may expect that "atomized" zinc will contain two or more allotropic forms at the same time.

From a technical standpoint we thought it interesting to prove this more directly: if the "atomized" metal really contains two or more modifications at the same time, it will disintegrate in the long run when stabilisation occurs.

2. Mr. SCHOOP supplied us with one kilo of zinc, which had been "atomized" in the way described in our first paper on the subject. As the material is very finely divided one would expect that an eventual change would proceed in such a way that it could be measured easily. On the other hand much care must be taken to remove air from the very finely divided material after having brought it into the dilatometer.

3. About 750 grams of the metal and a small quantity of glass-beads which had been heated beforehand [2]) were put into a dilatometer. *The material had not been in contact with an electrolyte.* The capillary (bore 1 mm.) was bent horizontally and put in connection with a GAEDE pump. In order to remove the air as completely as possible the dilatometer remained in connection with the pump for 1—$1^1/_2$ hours. After this the paraffin oil was filled in; it had been carefully boiled on the pump at 200° in contact with some "atomized" zinc. In this way the instrument was made perfectly free of air as many experiments proved.

4. In a preliminary experiment we found that a contraction of the metal occurs at 25°.0. We then carried out a fresh one, the "atomized" metal having been kept at 15° in a dry state for three

[1]) These Proc. **16**, 565 (1913).

[2]) These Proc., **16**, 485 (§ 10) [1913].

months. We used a special thermostat, which will be before long described. The temperature was determined by means of a BECKMANN thermometer. It remained constant within some thousandths of a degree.

The results are shown in Table I.

TABLE I.
Temperature 25°.00.

Time in hours	Level of the meniscus (mm.)
0	526
1/3	425
2 2/3	252
4 2/3	219
11 2/3	181

A strongly marked contraction at *constant* temperature occurs.

5. As the metal contains a certain amount of zinc oxide in consequence of its fine state of division, the question might arise whether the contraction observed may be attributed to some chemical reaction between the oxide and the paraffin oil.

In order to investigate this point more closely we filled a dilatometer (100 cc.) with zinc oxide and the same paraffin oil we had used in the experiment described above. After having evacuated it at the GAEDE pump we put it into a thermostat at 25°.00. The meniscus did not show any charge in 24 hours. The contraction observed in our first experiment has consequently to be attributed to a change in the metal. We intend continuing our investigations on the different modifications of zinc present in the "atomized" metal.

Utrecht, April 1914. VAN 'T HOFF-*Laboratory*.

Chemistry. — "*The allotropy of Copper*". II. By Prof ERNST COHEN and W. D. HELDERMAN.

1. We have also continued our investigations on the allotropy of copper in the direction indicated in our second paper on the allotropy of cadmium.

The dilatometer had shown (§ 4 of our first paper) that there is a transition point at 71°.4. We used the same method described in our second communication on cadmium in order to determine if