

502 MATTHIESSEN ON THE ACTION OF ACIDS ON ALLOYS.

XLVI.—*Note on Messrs. Calvert and Johnson's paper "On the Action of Acids upon Metals and Alloys."*

(November, 1866, p. 434.)

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IN most of the tables given in this paper (Tables 6—12) there will be found a column headed "Loss calculated according to the composition of the alloys." The numbers given under this heading are, however, all faulty, as the authors have calculated these

values from the weights of the metals composing the alloy, using the co-efficients, as they may be called, of the action of the acid on their surface as the co-efficients of the action of the acid on their weights; thus, in Table 7, p. 445, they give the following:—

| Metals and composition of alloys. | Loss on 1 c.c. | Calculated loss on 1 sq. metre. | Loss calculated according to composition of alloy. |
|-----------------------------------|----------------|---------------------------------|----------------------------------------------------|
| Copper .....                      | 0·000          | 0·000                           | 0·000                                              |
| Zinc .....                        | 0·200          | 333·33                          | 333·33                                             |
| 1st alloy.<br>Zn <sub>3</sub> Cu  |                |                                 |                                                    |
| Zn .. 83·70                       | 0·155          | 258·334                         | 279·00                                             |
| Cu .. 16·30                       |                |                                 |                                                    |
| 100·00                            |                |                                 |                                                    |
| Last alloy.<br>ZnCu <sub>5</sub>  |                |                                 |                                                    |
| Zn .. 17·05                       | 0·000          | 0·000                           | 56·83                                              |
| Cu .. 82·95                       |                |                                 |                                                    |
| 100·00                            |                |                                 |                                                    |

Now 100 grms. of the first alloy consist of  $\frac{83.7}{7.15} = 11.7$  c.c.

zinc (for 1 c.c. weighs 7.15 grms.) and  $\frac{16.3}{8.95} = 1.8$  c.c. of copper (for 1 c.c. copper weighs 8.95 grms.); or 1 c.c. of the alloy consists of 0.86 c.c. zinc and 0.14 c.c. copper.

The loss on 1 c.c. zinc by the action of hydrochloric acid being 0.200, on 0.86 c.c. it will be 0.172, and that of the acid on copper being 0.000, the calculated loss on 1 c.c. alloy is 0.172; or the calculated loss on the square meter, deduced from the composition of the alloy, will be 287, instead of 279, as given in the table.

Similarly the calculated loss on the alloy ZnCu<sub>5</sub> will be 68 instead of 56.83.

The authors' method of calculation is, as stated, the use of weight instead of surface; thus their calculated values are found by multiplying the weight-percentages by the co-efficients, and dividing by 100; for  $83.7 \times 3.3333 = 279$ ; and

$$17.05 \times 3.3333 = 56.83.$$

The whole of these results, therefore, need recalculation.

It would have been of interest had the authors stated how they made the copper-zinc alloys in exactly their combining proportions, as they must have had great difficulty in doing so, owing to the volatility of zinc.

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