selves naturally under the law of universal gravitation, I have undertaken a work which I propose to submit to the Academy so soon as it may be in a sufficient state of forwardness to merit serious attention from them.

Comptes Rendus, Sept. 20, 1847.

On the Anomalous Specific Heat of certain Alloys, and their spontaneous Increase of Temperature after Solidification. By M. C. C. PERSON.

TRANSLATED FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

M. Regnault has discovered, in alloys fusible at about 212° F., a specific heat much greater than the mean of the metals composing them, and proposes to examine whether this anomaly does not disappear at lower temperatures. The experiments reported in my memoir show that it does, in effect, disappear. Thus, in the alloy of d'Arcet,* I have $c = 0.069$ from 201.2° , and $c = 0.037$ from 122° ; as the calculated mean is 0.036 , it will be perceived that the difference is very trifling. The principal difficulty in these researches was to heat the alloys to exact temperatures below 212 degrees; for this purpose I used a stove of simple construction, of which a drawing is annexed to the memoir.

This point being explained, I make it appear that the excess of heat observed in this alloy, near its melting point, is not owing to the commencement of fusion, as might be imagined, but to a new kind of latent heat of which the following experiment shows the evolution. A glass bulb, filled with the alloy in question, is isolated in such manner that the cooling may be observed; and for that purpose there is fixed in the alloy a thermometer, of which the changes may be noted with an eye-glass and stop-watch. Suppose the glass vessel to contain 150 grammes of the alloy of d'Arcet, the thermometer, which, at about 266 degrees, takes five or six seconds to fall two degrees when the alloy is in a liquid state, takes more than 400 seconds to fall 3.6° degrees between 204.8° and 201.2° . This is very simple: the latent heat of fusion is being disengaged during this interval. The solidification being completed, the thermometer resumes a regular rate, falling one degree in five or six seconds, until about 134.6 degrees, where it suddenly stops, and even rises two or three degrees. At the same time, the glass bulb is broken by a considerable expansion of the whole mass, and this expansion continues after the cooling, so that the thermometer, which was before strongly pressed, becomes free and movable. There is, therefore, in this, a change of constitution in the alloy, and the heat which was disengaged during this modification was sufficient to sustain the thermometer between 136.4 and 132.8 degrees for more than 400 seconds; but it then immediately fell one degree in five or six seconds. The disengagement of heat afterwards

* This alloy is composed of bismuth, 8 ; lead, 5 ; and tin, 3 . It is known as "Newton's Fusible Metal," and melts at a temperature below that of boiling water.—*Com. Pub.*

continues for a long time, of which we have proof by the extraordinary slowness of the cooling.

In order to measure the heat, I employed a process which was used by Rudberg on another occasion; but I availed myself of a means of verification which, I hope, will remove the uncertainty for which he was reproached by M. Despretz. I observed, comparatively, with a chronograph, the cooling of the alloy and that of another body as identical as possible, and placed in the same circumstances. The heat lost by this body at each degree being known, I had, approximatively, that lost by the alloy; but, moreover, I measured, with a calorimeter, the heat lost by the alloy between certain temperatures—the measure by cooling must necessarily have shown the same figures. I therefore had, as has been said, a means of verification and correction. The tabular statement of cooling, thus corrected, gives the heat lost by the alloy at each instant; the changes which take place in its specific heat are also shown, and the latent heat of fusion is also measured, as well as that which results from change of constitution—this last is about three calorific units per gramme, for the alloy of d'Arcet. There is another mode of measuring it which is less exact, but which leads to a curious result. After having melted the alloy, I allowed it to become solid, and then to cool down only, for example, to 201·2 degrees, in order that the heat of decomposition should not be disengaged. Then passing it into a calorimeter, it gave 7·4 cal.—but on reheating again to 203 degrees, I could only obtain 5·2 cal.; so that I arrived at this paradoxical result: that the same body contains least heat when it is the hottest. The difference, 2·2 cal., arises from the fact that the alloy, in reheating to 203 degrees, has only in part suffered a change of constitution.

If, after having melted the alloy, it be suddenly cooled by plunging it into water, and then withdrawn as soon as it may be safely handled, it will, in a few moments, become again so warm as to burn the fingers. Here, the sudden cooling is at first opposed to the change of constitution; but a moment arrives at which the disposition of the molecules ceases to be compatible with so low a temperature, and then the new arrangement takes place. And, on account of having been thus retarded, it recurs with much more energy, that is, in a much shorter time—it is not only a slower cooling which is observed, but a reheating which may carry the mass to 158 degrees.

To recapitulate: the excess of caloric given out by alloys when heated nearly to their melting point, does not proceed from the latent heat of fusion; nor should it be considered as being simply specific heat—it is heat due in a great measure to change of constitution, which may take place in an alloy completely solidified and considerably below its melting point.

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Artificial Minerals.

The experiments of M. Ebelmen, to produce minerals artificially, communicated to the Academy of Sciences, Paris, are thus given in