On September 20, 1901, similar experiments required much more time to bring about similar results. Since then I have repeatedly killed half-grown toads in the same manner, while in a number of instances I was unable to kill any.

On October 5, 1903, while carrying 22 cotton boll weevils over a cotton plantation in a vial of 30 c.c. capacity three specimens of *Euschistus fissilis* were suddenly introduced. The secretions were powerfully ejected by these bugs when in the bottle, and in ten minutes the weevils were dead. This experiment was repeated the same day with equal success.

On October 14 and 18, 1903, repeated trials of the preceding experiments resulted in complete failures.

On December 2 four specimens of *Brochymena annulata* were put in a bottle of 45 c.c. capacity, and these killed a blow fly and three stable flies in nine minutes, and quieted a centipede in fifteen minutes, but the latter recovered.

On December 6, 1903, a repetition of the experiments of December 2 showed that twenty minutes more time was required to obtain similar results.

On December 9, 1903, the experiments of December 6 were failures.

On December 13, 1903, four fine specimens of *Brochymena annulata* were found hibernating under kindling wood. With these many experiments were made. They were put in the same vial used December 6 and 9, and when introduced in a warm room the secretions were discharged with much greater effect than in any of the above experiments. Two blow flies and two stable flies, each introduced separately, were killed in five minutes. After twenty minutes a centipede was introduced. Although motionless after eight minutes, the specimen recovered. After this time no more specimens could be killed, although many were introduced.

In all the experiments above referred to the vial was kept tightly corked except when specimens were introduced. Although other insects could be killed, the bugs themselves suffered, apparently, no inconvenience.

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Agricultural College,
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December 15, 1903.

NOTES ON INORGANIC CHEMISTRY.

Mendeléef's conception of the ether.

The *Chemisches Centralblatt* contains the abstract of a paper by Mendeléef published in the journal *Prometheus* on the subject of an attempted chemical explanation of the ether. From a realistic standpoint it is not satisfactory to ascribe to the ether the properties of weight and chemical individuality. It can not consist of matter now known, disseminated in an exceedingly attenuated condition, because it penetrates all matter, nor can it be the 'Urstoff,' since this would involve the possibility of the annihilation and evolution of atoms. It must rather be considered as a definite chemical substance so light that its molecular velocity is great enough to overcome gravitation; it is without chemical affinity; its power of diffusion is so great that it can penetrate all bodies, and hence can not be weighed, although it actually possesses an extremely small weight. Mendeléef would thus consider the ether to be the first member of the argon group in the periodic system, or what he calls the zero group, and places immediately before the alkali group. By extrapolation he posits an element in this group immediately before hydrogen, with an atomic weight of about 0.4. This he considers possibly identical with coronium. The ether must have a still smaller atomic weight, whose value, owing to this double extrapolation, is extremely doubtful, but certainly can not be over 0.17. For this ether as an element he proposes the name *Newtonium*. That the ether molecule can escape the attraction of the largest bodies of the universe its velocity must be, according to the kinetic theory of gases, at least 2,240 kilometers per second, and from this its atomic weight would be about one millionth that of hydrogen.

By means of this conception, it becomes possible to account for radio-activity, without

having recourse to what Mendeléef denominates the metachemical and vague ('verschwommene') theory of electrons. The radioactive atoms, with their high atomic weights, possess, as large centers of mass, the power of holding a relatively large number of ether atoms, though there is no chemical combination. The entrance and exit of these ether molecules from the groups is accompanied by those disturbances of the ethereal medium which cause the rays of light. The phosphorescence of bodies immersed in liquid air is caused by the increased absorption and condensation of ether molecules at low temperatures. The original article contains many other suggestive thoughts, such as the probability of a fifth halogen element, with atomic weight of about three, corresponding to the fifth metal of the alkalies.

ATMOSPHERIC CORROSION OF ZINC.

A STUDY of the action of the atmosphere upon zinc has recently appeared in the *Proceedings* of the Chemical Society (London), by G. T. Moody. Strips of thin sheet zinc were exposed for five months to the action of the atmosphere, with the result that the metal became completely covered with a half-crystalline coating of a basic carbonate, of formula $ZnCO_3, 3Zn(OH)_2$. From this it appears that the corrosion is to be ascribed, not to a direct oxidation, but to the action of the atmospheric carbonic acid. A confirmation of this was found in the fact that zinc dissolved in a saturated solution of carbon dioxid, the acid carbonate of zinc being formed, and on spontaneous evaporation a precipitate of basic carbonate was formed, of the same composition as that occasioned by atmospheric corrosion. While commercial hydrogen peroxid has a very rapid action on zinc, converting it into the hydroxid, pure hydrogen peroxid, even of thirty per cent. strength, is entirely without action, and the same is true regarding iron. Lead, on the other hand, is rapidly acted on by this reagent, being converted superficially into lead peroxid. Thus the action of the atmosphere on lead may be due to the presence of hydrogen peroxid, but this can not be the case with the corrosion of zinc and iron. That zinc is less corroded in the atmosphere than iron is attributed by Moody to the fact that so much of the carbonic acid is retained by the zinc in the form of basic carbonate, while in iron the carbonic acid is set free as soon as it has done its work, and thus keeps on in its attack upon the iron.

J. L. H.

CURRENT NOTES ON METEOROLOGY.

METEOROLOGICAL PHENOMENA OF THE MONT PELÉE ERUPTION, JULY 9, 1902.

IN the *Popular Science Monthly* for January, Professor T. A. Jaggar gives an account of the eruption of Pelée on July 9, 1902, in which several of the meteorological phenomena associated with the eruption are noted. One of the most striking features of the explosion was a great column of steam observed at 8 A.M. on July 11. "A vertical puff from the volcano rose 10,000 feet into the air, showing at first superb gray-brown cauliflower surfaces, and later taking on smooth outlines, with a funnel-shape and a feathery fringe." A similar steam column was observed on July 16, and a fine photograph was taken of it. The height of this latter column was between four and six miles. As clearly seen in the photograph, the upper part of the cloud was turned towards the east, showing the effect of the anti-trades. On July 9 the tops of a number of *cumulus* (? cumulo-nimbus) clouds were seen to be far below the black dome of volcanic dust. The dust in the air gave the moon a dim reddish-yellow appearance. No strong indraft of air towards the volcano was noted.

DEMTSCHINSKY'S LONG-RANGE FORECASTS.

IN the journal *Climat*, the publication of which was begun in 1901, and to which reference has been made in these notes, Demtschinsky, a Russian engineer, has been making public long-range weather forecasts, based chiefly on supposed lunar influences. These forecasts and the method used by Demtschinsky in making them, have lately been subjected to a critical study by Professor Klossovsky, of Odessa, the director of the Meteorological Service of southwestern Russia