and this process in the follicle cells of *Hydrophilus* sp., the common large water-scavenger beetle of our ponds and stream pools, as I have observed it. In the first place, amitosis is not confined to the lowest egg-chamber; unfortunately I can not say from my present preparations how far up the tube, *i. e.,* toward its germinal chamber, amitosis may be found among the follicle cells, but it is found above the last (lowest) chamber. In the second place, there is no well-defined single nucleolus. So the phenomenon of such a nucleolus surounded by a clear zone and regularly dividing before the nucleus (described for *Gryllus*) is wholly wanting in the follicle cells of *Hydrophilus.* Each nucleus of these cells contains a large number of spherical, strongly staining (chromatin) masses or grains gradating in size from a point up to conspicuously large nucleolus-like balls. The larger of these structures might be looked on as nucleolar masses, if one wanted to use the name nucleolus at all; but if so, from half a dozen to a score of nucleoli would have to be accepted and their only distinction (from the many smaller masses) would be the arbitrary one of size. Fig. 1 shows this disposition and relative massing of the staining (chromatin) substance in the nuclei. No sign of chromatin thread (linin or skein) is apparent. There is absolutely no sign of a division of these nucleoli or chromatin balls accompanying the nuclear division. The nuclei simply seem to be senescent structures with their chromatin content segregated into many small globular masses which vary in size, with all intermediate gradations from small to large. About each of the larger masses a narrow clear zone is apparent.

Fig. 1 shows also the various stages in the simple division of the nucleus and the great size of the nucleus compared with the cytoplasm body containing it. In some cases a cell wall appears between the daughter nuclei after division, but in others the cytoplasm does not seem to effect a clean division, both nuclei then lying, it may be said, in one cell. The actual size of the nuclei averages .04 mm.

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VARIATIONS IN THE PROTECTIVE VALUE OF THE ODORIFEROUS SECRETIONS OF SOME HETEROPTERA.

WHEN on a collecting trip near College Station, Texas, early in October, I examined the stomach contents of a half-grown toad. In this mass I found two stink-bugs (*Euschistus fissilis*). This seemed very interesting on account of the great amount of apparently more palatable insects available here; and especially interesting in connection with the fact that the examinations of the contents of 152 toads' stomachs since the summer of 1901, made to determine what rôle the common squash bug played in the toad's diet during a season when these bugs were exceptionally abundant, revealed less than three per cent. hemipterous material. Mr. Kirkland, in Bull. 46, Mass. Agric. Coll., p. 16, estimated the percentage of hemipterous and dipterous food, after careful examinations of 149 toads stomachs, below two per cent of the whole.

There are variations in the protective efficiency of the secretions of some heteroptera, and this may be an important factor in governing the percentage of diet such insects form with some animals. Many experiments with the common black squash bug were made during the summer of 1901 while at the New Hampshire Experiment Station, and the results there obtained showed that with constant use for a short time the secretions become weaker, and after fifteen minutes are decidedly less effective. Although toads in confinement were witnessed to eat squash bugs, it was only after the secretions were partially exhausted or where the bug was snatched before discharging the liquid. The greatest number a hungry toad would eat was three. In no case was this done in the face of a discharge from the secretion glands.

After twenty-four hours' rest under natural conditions the glands apparently regained maximum strength. This does not apply to hibernating specimens of heteroptera.

On September 15, 1901, half-grown toads were repeatedly killed from the full effects of the fresh discharges from several specimens of squash bugs.

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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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