Tails of Rats and Mice

IT is, I believe, pretty generally supposed that rats and mice use their tails for feeding purposes in cases where the food to be eaten is contained in vessels too narrow to admit the entire body of the animal. I am not aware, however, that the truth of this supposition has ever been actually tested by any trustworthy person, and so think that the following simple experiments are worth publishing.

Having obtained a couple of tall-shaped preserve bottles with rather short and narrow necks, I filled them to within three inches of the top with red currant jelly which had only half stiffened. I covered the bottles with bladder in the ordinary way, and then stood them in a place frequented by rats. Next morning the bladder covering each of the bottles had a small hole gnawed through it, and the level of the jelly was reduced in both bottles to the same extent. Now, as this extent corresponded to about the length of a rat's tail if inserted at the hole in the bladder, and as this hole was not much more than just large enough to admit the root of this organ, I do not see that any further evidence is required to prove the manner in which the rats obtained the jelly, viz., by repeatedly introducing their tails into the viscid matter, and as repeatedly licking them clean.

However, to put the question quite beyond doubt, I refilled the bottles to the extent of half an inch above the jelly level left by the rats, and having placed a circle of moist paper upon each of the jelly surfaces, covered the bottles with bladder as before. I now left the bottles in a place where there were no rats or mice, until a good crop of mould had grown upon one of the moistened pieces of paper. The bottle containing this crop of mould I then transferred to the place where the rats were numerous. Next morning the bladder had again been eaten through at one edge, and upon the mould there were numerous and distinct tracings of the rats' tails, resembling marks made with the top of a penholder. These tracings were evidently caused by the animals sweeping their tails about in the fruitless endeavour to find a hole in the circle of paper which covered the jelly.

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NEWCOMB ON THE URANIAN AND NEPTUNIAN SYSTEMS.

WHEN the 26-inch equatorial, with an object-glass "nearly perfect in figure," was mounted at the United States Naval Observatory, Washington, it was resolved that its great powers should be first devoted to systematic observations of the satellites of the exterior planets, with the view not only to the better determination of the elements of their orbits, but, more especially, of the masses of their primaries; previous attempts in this direction, from the great difficulties attending observations, having led to very discordant values. Accordingly all the minor arrangements of the instrument were completed with this particular object in view, and no other regular work of dissimilar character was attempted while the satellite-observations were in progress.

In the memoir (Washington Observations, 1873, Appendix I.) to which allusion was made in this column last week, Professor Newcomb describes generally his method of observation; and with respect to his measures of the inner satellites of Uranus, which he thinks may fairly be regarded as the most difficult well-known objects in the heavens, he expresses surprise at the degree of precision with which he was able to bisect them with the faintly-illuminated wire of the micrometer, an examination of the individual measures having shown that they were not more discordant than those of the outer satellites.

In discussing the observations of the satellites of Uranus, extending from January 1874 to May 1875, circular elements are assumed for the formation of equations of condition, and by the usual methods elliptical orbits are obtained for each satellite; but it results that there is but slight evidence of any real excentricity of the orbits, and none whatever of any mutual inclination. Circular elements derived similarly are retained, and Tables for the ready prediction of the positions of the satellites which are most essential for their certain observation are founded upon them, and appended to Prof. Newcomb's memoir. The most probable mean plane of the orbits is found to have the following elements:—

Ascending node on earth's equator ... 165°·10 + 1°·43 (t − 1850)
Inclination ... ... 75°·14 − 0·14 (t − 1850)

Or, as referred to the ecliptic,

Ascending node ... ... 165°·48 + 1°·40 (t − 1850)
Inclination ... ... 97·85 − 0·013 (t − 1850)

(The motion of the satellites of Uranus is direct upon the equator, but retrograde when referred to the ecliptic.)

Other elements are:—

	Mean Longitude	Radius of orbit.	Period of Revolution. Days.
Ariel ...	... 21°·83	... 13″·78	... 2·52038
Umbriel	... 136°·52	... 19″·20	... 4·14418
Titania	... 229°·93	... 31″·48	... 8·70590
Oberon	... 154°·83	... 42″·10	... 13·46327

Mean noon at Washington, 1871, December 31, is taken for the epoch of mean longitude, which is reckoned from the point where the orbit intersects the plane parallel to the earth's equator and passing through the centre of the planet. The arc values of radii of orbits are for the distance [1·28310]. If we assume the mean solar parallax, 8″·875, and adopt Clarke's equatorial semi-diameter of the earth, we find from these values the following distances of the satellites from Uranus, expressed in English miles.

Ariel ...	... 118,100	Titania	... 269,800
Umbriel	... 164,550	Oberon	... 360,800

It may be mentioned that Sir W. Herschel's observations between the years 1787 and 1798 are brought to bear upon the determination of the periods of Oberon and Titania.

For reasons which are given, Prof. Newcomb thinks it "extremely improbable that the masses of the satellites exceed $\frac{1}{15000}$ of that of the planet," in which case the Uranocentric perturbations due to mutual action will be "incapable of detection with any instrumental means yet known." He mentions that, seen with the 26-inch telescope, the brighter satellites, Titania and Oberon, shine with about the brilliancy of a fourth magnitude star to a single unassisted eye.

We must not omit to state that the discovery of the inner satellites, Ariel and Umbriel, is distinctly assigned by Prof. Newcomb to Mr. Lassell; indeed, there appears every reason for believing that these excessively minute objects have not yet been recognised with any instruments except the Washington refractor and the reflectors which Mr. Lassell has constructed: the discovery of these satellites may be dated from the definitive announcement made by Mr. Lassell to the Royal Astronomical Society in November 1851. Prof. Newcomb remarks that "where any difficulty whatever is found in seeing the outer satellites," he would not hesitate to pronounce it impossible to see the inner ones, and thus it is not likely that the Bothkamp and other observations can have referred to the latter.

Though no systematic search was made for additional satellites, Prof. Newcomb believes "he may say with considerable certainty that no satellite within 2′ of the planet and outside of Oberon, having one-third the brilliancy of the latter, and therefore that none of Sir William Herschel's supposed outer satellites can have any real existence."

In the Washington refractor the planet has always presented a sea-green colour, no variations of tint being ever noticed. Markings upon the disc were not especially looked for, but if any had been visible they would hardly have escaped remark.

The observations of the satellite of Neptune are treated in a very similar manner to those of the satellites of Uranus. No certain amount of ellipticity is exhibited,