(1) November 26, Department of Agriculture and Natural Resources.

(2) November 27, Department of Agriculture and Natural Resources. Respectfully forwarded to the Secretary to the Governor-General, requesting transmittal.

(3) December 4, Office of the Governor-General of the Philippine Islands. To the Chief, Bureau of Insular Affairs, War Department, Washington, D. C.

(4) January 6, War Department, Bureau of Insular Affairs, Washington, D. C. Respectfully transmitted.

Considering all this, the package came through fairly promptly, and I do not suggest that these various offices, organized as they are, are not efficient. I do suggest, however, that all this overhead is senseless and wasteful, and foreign to the spirit which I have come to regard as characteristic of this country.

T. D. A. COCKERELL

UNIVERSITY OF COLORADO,
JANUARY 10, 1930

QUOTATIONS

THE NEW PLANET

AT a meeting of the Royal Astronomical Society on March 14 the report from the Lowell Observatory of the discovery of a new planet was discussed.

The following summary is given in the London *Times:*

Dr. A. C. D. Crommelin, who presided at the meeting, said the occasions when a new major planet was added to the members of the solar system were exceedingly rare and very important. Apart from the "small vermin of the heavens," as the minor planets had been called, there had been only two cases of discovery of new primary bodies in the system—those of Uranus and Neptune. Thursday was the one hundred and forty-ninth anniversary of the discovery of Uranus by Sir William Herschell and that anniversary was marked in a very appropriate way by news of the discovery of another planet.

The telegram, which had been received by the society from America, through the Bureau of the International Astronomical Union at Copenhagen, was as follows (explanatory words interpolated in square brackets):

Lowell Observatory search for trans-Neptunian planet revealed an object of fifteenth magnitude, for seven weeks in rate of motion and path conforming to approximate distance [the late Professor Percival] Lowell assigned. [The position on] March 12 3h. 7 time-seconds west [of] delta Geminorum, agreeing with Lowell's longitude.—SHAPLEY.

The society's foreign secretary had prepared the following telegram, which had been approved by the council:

President, council and fellows of the Royal Astronomical Society, in meeting assembled, send the Lowell Observatory their heartiest congratulations on the great discovery of the trans-Neptunian planet.—TURNER, *foreign secretary.*

Those whose memories extended back over half a century would remember the efforts made both on theoretical and observational lines to find the trans-Neptunian. On the theoretical side a lot of time and great care had been spent in determining the position of a body that would account for the small residuals in the motion of Uranus. Neptune was not used much because it had not been observed long enough to get an exact mean orbit. Lowell thought there were two possible positions, 180° apart, either of which would account for the small residuals he found. The latter of the two, which he probably looked upon as the least likely, now proved to be the one which agreed with the present position. All observers had had great faith in Lowell's prediction, and those at his observatory had spent a long time observing the new planet without saying anything about it. They had been taking photographs along the ecliptic, showing very faint stars, and studying them for changes of position. At last, in the middle of January, they found a body moving slowly in the constellation Gemini. They followed it for seven weeks, and now they had got an orbit sufficient to show that it was outside Neptune and within Lowell's orbit.

Such a planet had been conjectured to exist by a good many people besides Lowell. The study of comet orbits had led to the conjecture of a planet with a period of about three centuries. Another telegram gave an estimate of the size of the body. It was said to be of the fifteenth magnitude and intermediate between that of the earth and Uranus. The exact mean of the two would give a diameter of 19,000 miles, but it was too small for its dimensions to be measured with any accuracy. There was a hope that images of the planet might be found on past photographs. When once the approximate orbit of this body was made out there was very good hope that on the Franklin Adams chart and on the photographs taken at Heidelberg and elsewhere when searching for minor planets this planet would be found.

Professor H. H. Turner, director of Oxford University Observatory, said it was hard that Professor Lowell should have died before verification of the discovery which he felt sure would come had been obtained. His confidence was shown in the fact that he left a legacy for the observatory which he founded to continue the search he had instigated and formulated. It was specially pleasing to find that the discovered planet came out so close to the prediction he made. The honor of the prediction must be shared to some extent with their old friend Professor W. H. Pickering, who, when he was working for Harvard in 1919, made a prediction which was very near to the place.

Dr. J. Jackson, chief assistant at the Royal Observatory, said that, at a rough calculation, the planet in seven weeks should have moved something like half a degree in its geocentric orbit. Now it should move about 30 seconds a day. It was now in the position 7 hours 15 minutes. Lowell's figures for 1914 placed it in longitude 84. That was deduced entirely from the perturbation of Uranus. On that basis its predicted position to-day

would be longitude 100; actually it had been found on longitude 107. Lowell's work was worthy of considerable attention. He thought the discovery would explain a good deal of the perturbation of the planets.

Professor A. S. Eddington, of Cambridge, remarking on the closeness of the prediction, said that if one had had faith and had given a long exposure with a reasonably large lens, the planet must have been picked up. Many of them had been much impressed with the thoroughness, caution and honest work at Lowell Observatory.

Captain Ainslie, president of the British Astronomical Association, asked if the planet had been seen or only photographed.

The chairman said that as the size was given he assumed it had been seen visually.

Professor Turner thought this might rather be a calculation from its brightness.

Dr. Jackson said they were going to make a search of the Franklin Adams plates at Greenwich, but if the planet were there it would be very near the edges of the plates.

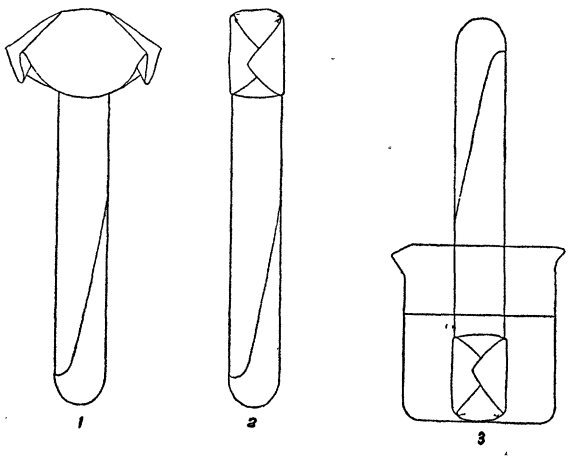
Summing up, the chairman said this planet would probably have an effect on Halley's Comet that would alter the period of each return by as much as a couple of days, so that some of the unaccounted for days in the last two returns might meet with an explanation. In the course of time, when they had got a good enough orbit, it would involve the preparing of new tables of Uranus and Neptune. In the case of Neptune, the mass was very quickly got by the discovery of a satellite; there was very little chance of discovering a satellite of this body, and the only way to get its mass would be by getting the perturbations of Uranus and Neptune, and that would only give a rough result. Finally, every book of descriptive astronomy from that day was out of date.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A CONVENIENT METHOD OF REDUCING DESICCATION IN SLANT CULTURES

IT is often desirable to reduce desiccation in slant cultures of fungi or bacteria, or in tubed media. The time-honored method of sealing cultures by dipping the stoppered end of the tube in paraffin presents some unsatisfactory features. When cotton stoppers are permeated with the wax they are difficult to remove and somewhat unwieldy. When replaced they do not fit tightly, and are not then proof against contamination. When the cotton is filled with wax the exchange of gases through the stoppers may be so reduced as to limit the growth of the culture, or alter the appearance of the organism.

Folding a piece of tinfoil over the mouth of culture tubes is a convenient means of reducing desiccation and has the advantage that the tubes of culture media may be sterilized after the foil caps are in place. Since vapor may readily escape between the foil cap and outer wall of the culture tube a greater reduction in the rate of desiccation is often desirable. In this paper is described a method of reducing desiccation in slant cultures that seems to possess certain advantages.



Paper disks of a convenient size for folding over the end of culture tubes are cut from thin, tough and pliable paper. These disks are stacked up and submerged in melted paraffin just deep enough to cover them. After the papers are thoroughly saturated with the wax they are lifted out of it one at a time with needles or fine-pointed tweezers. They are held vertically for a few seconds to allow the excess of wax to drain off and are then dropped into cold water. The wax should be kept hot enough to allow the excess to drain from the paper before solidification occurs. The waxed paper disks may be used as soon as they are removed from the water or may be stored until needed.

Before a tube is sealed the open end is warmed slightly and the end of the cotton stopper is singed. A waxed paper disk is warmed until the wax becomes plastic, a condition that is obtained just before the melting-point is reached. It is then folded over the end of the tube (Fig. 1) and pressed firmly against the outer wall, and the folded edges are pressed down firmly. This procedure gives a waxed paper cap (Fig. 2) that permits an exchange of gases along the line of the folds, reduces the desiccation materially and keeps the cotton stoppers free from wax. The caps may be removed by giving them a firm twist or by unfolding the paper. When a perfect seal is desired, the tubes are inverted and dipped one or more times into paraffin, to a point just above the waxed paper cap (Fig. 3). For this purpose the tempera-