

If this be so, all mystery as to the nature of the life of the marsupial young is at an end.

The Committee (Right Rev. Bishop Potter, Dr. Demmè, and Dr. Bethune), to whom had been referred Prof. Tucker's paper upon Cause and Effect, read 5th March, 1847, reported, recommending that the thanks of the Society be presented to Prof. Tucker for his paper, and that he be requested to prepare a copy, to be placed in the archives of the Society: which recommendation was adopted by the Society.

Mr. Ord announced the death of Mr. Charles A. Lesueur, of Havre, on the 12th December, 1846, in the 68th year of his age: whereupon Mr. Ord was requested to prepare an obituary notice of our late member, Mr. Lesueur.

The nominations for membership were then read and discussed, and the candidates balloted for.

On motion of Dr. Patterson, the project for the amendment of the By-laws, proposed by the Committee, was postponed until the next meeting.

The business of the meeting being finished, the ballot boxes were examined, and the following gentlemen declared to have been duly elected members of this Society:—

- M. A. T. KUPFFER, of St. Petersburg.
- M. U. J. LEVERRIER, of Paris.
- Mr. J. Y. MASON, of Virginia.
- Mr. RICHARD A. TILGHMAN, of Philadelphia.
- Prof. Wm. PROCTER, Jr., of Philadelphia.

Stated Meeting, May 7.

Present, twenty-two members.

Dr. PATTERSON, Vice-President, in the Chair.

Letters were announced and read:—

From l'Institut Royal des Sciences, Belles-Lettres et Arts des Pays-Bas, dated Amsterdam, 25th January, 1847, announcing

the transmission of the 3d Part of Vol. XII. of their new Memoirs:—

From the Corporation of the University in Cambridge, Mass., dated Cambridge, 1st December, 1846, acknowledging the receipt of No. 35, Vol. IV. of the Proceedings of this Society: and,—

From Wm. Procter, Jr. acknowledging the receipt of notice of his election to membership in the Society.

The following donations were announced:—

FOR THE LIBRARY.

Flora Batava, ou Figures et Descriptions de Plantes Beligiques. Par Jan Kops, et J. E. Van der Trappen. Nos. 142 to 146, inclusive. Title and Index to Vol IX. 4to.—*From H. M. the King of the Netherlands.*

Nieuwe Verhandelingen der Eerste Klasse van het Koninklijk-Nederlandsche Instituut van Wetenschappen, Letterkunde en Schoone Kunsten te Amsterdam. The 3d Part, and the completion of the XIIth Vol. 4to.—*From the Royal Institute of the Netherlands.*

Bulletin de la Société de Géographie. Troisième Série. Tome VI. Paris, 1846. 8vo.—*From the Geographical Society of Paris.*

Journal Asiatique, ou Recueil de Mémoires, d'Extraits et de Notices relatifs à l'Histoire, à la Philosophie, aux Langues et à la Littérature des Peuples Orientaux; et publié par la Société Asiatique. Quatrième Série. Tome VIII. No. 39. Novembre, Décembre, 1846. 8vo.—*From the Asiatic Society of Paris.*

Boletin de la Sociedad Economica de Amigos del Pais de Valencia. Año 7º. Tomo 4o. Noviembre, 1846. 8vo.—*From the Society.*

Boston Journal of Natural History, containing Papers and Communications read before the Boston Society of Natural History, and published by their direction. Vol. V. No. 3. Boston, 1847. 8vo.—*From the Society.*

Proceedings of the Academy of Natural Sciences of Philadelphia. Vol. III. Jan. and Feb. 1847. No. 7. 8vo.—*From the Academy.*

Proceedings of the Providence Franklin Society. Vol. I. April, 1847. No. 2. 8vo.—*From the Society.*

The African Repository and Colonial Journal. Vol. XXIII. May, 1847. No. 5. 8vo.—*From the American Colonization Society.*

The American Journal of Science and Arts. Conducted by Prof. B.

- Silliman, B. Silliman, Jr., and James D. Dana. Second Series. No. 9. May, 1847. 8vo.—*From the Editors.*
- The Medical News and Library. Vol. V. May, 1847. No. 53.—8vo.—*From Messrs. Lea & Blanchard.*
- Journal of the Franklin Institute of the State of Pennsylvania. Vol. XLIII. No. 257. Third Series. Vol XIII. May, 1847. No. 5. 8vo.—*From Dr. Patterson.*
- Critical and Miscellaneous Essays. By Alexander H. Everett. Second Series. Boston, 1846. 12mo.—*From the Author.*
- Catalogue de la Bibliothèque de M. Libri. Belles-Lettres. 1re Partie. Paris, 1847. 8vo.—*From M. Hector Bossange.*

ADDITION TO THE LIBRARY BY PURCHASE.

- Annales de Chimie et de Physique. Troisième Série. Tome XVIII. Décembre, 1846. 8vo.
- Mr. Ord made a donation for the Cabinet of a Model of a Temporary Rudder, invented by Captain Edward Pakenham, and for which the Society instituted at London for the Encouragement of Arts, Manufactures and Commerce, presented their Gold Medal. An account of this invention appears in the Transactions of the said Society, Vol. VII., 1789.

The Committee (Prof. Henry, Dr. Patterson, Mr. M'Culloh,) to whom had been referred the paper of Prof. Norton upon the Imponderable Agents of Nature, reported the following resolution, which was adopted :

Resolved, That it is inexpedient, at this time, to take action upon the Memoir of Prof. Norton, read to the Society on the 4th of December last, and that the same remain in charge of the Committee, awaiting the further communications of the author upon the same subject; subject always, however, to the author's control.

Prof. Tucker made an explanation upon the subject of the paper recently presented by him to the Society.

Prof. M'Culloh read to the Society, the following letter from Mr. Sears C. Walker:—

Washington, D. C. May 3d, 1847.

Dear Sir,—I have just completed Elements V. of the planet Neptune, as follows:—

Perihelion point,	$\pi =$	1° 45' 32".90	m. eq. Jan. 1, '47.
Node,	$\Omega =$	129 51 13 .53	„
Inclination,	$i =$	1 45 38 .10	

Eccentricity,	$e = 0.005052917$
Mean distance,	$a = 30.145119$
Epact Jan. 1, 1847,	$M = 326^{\circ} 2' 1''.34$ m. noon Greenwich
M. daily sidereal motion,	$\mu = 21.437,843$
Period in Trop. years,	$T = 165^y.51330$

I do not hesitate to pronounce them the most probable elements of the present disturbed orbit of Neptune, that can be deduced from a discussion of all the observations of Neptune extant to this date. These have already accumulated to 479: viz. 113 American and 366 European. All have been compared with an ephemeris which I computed from my IV. Elements of Neptune. Thirteen normal places have been thus obtained, and the corrections of Elements IV. computed from these normal places by the method of least squares. In forming the equations of condition, I carried into effect the plan sketched out in my former letter. The variations of the radius vector were made a function of the ascending powers of the intervals from a date assumed for the origin of time.

The variations of the true anomaly were derived from those of the radius vector, by means of Laplace's formulæ for mechanical quadrations, on the condition that equal areas should be described in equal times. This mode of forming the equations of condition, for the purpose of deducing an orbit from direct observation, is new, as far as I am informed. I send you the comparison of the Ephemeris from Elements V. with the thirteen normal places in geocentric longitude and latitude:

DATE.	Observation less theory.	
	$\Delta \alpha$	$\Delta \delta$
1846, Aug. 9,	— 0".22	— 0".72
Sept. 28,	+ 0 .08	+ 0 .37
Oct. 8,	+ 0 .17	+ 0 .28
18,	— 0 .06	+ 0 .09
28,	— 0 .20	— 0 .71
Nov. 7,	— 0 .13	— 0 .42
17,	+ 0 .25	— 0 .27
27,	— 0 .25	— 0 .05
Dec. 7,	— 0 .49	— 0 .08
17,	+ 0 .29	+ 0 .25
27,	+ 0 .14	+ 0 .33
1847, Jan. 16,	+ 0 .35	— 0 .93
April 6,	— 0 .10	+ 0 .65

You will notice that the two elements left indeterminate in my former direct solution II. are now completed. They confirm my former conclusions respecting the smallness of the eccentricity.

They exhibit, moreover, an unexpected coincidence between the perihelion points of Elements III. and V.—thus :

Elements III.	$\pi = 0' 12' 25''.51$	hypothesis of identity with Lalande star.
„ V.	$\pi = 1 45 32.90$	deduced from direct observation.

When we consider the difficulty of deducing the perihelion point of an orbit so nearly circular, from an apparent arc of less than two degrees, it must be admitted that the close agreement is *accidental*. Yet we cannot with propriety refuse it some weight in favour of the affirmative of the hypothesis.

You will, doubtless, wish to know what modification the present disturbed elements V. require in order to represent the present path of the planet, and locate it, May 10th, 1795, where the Lalande star (now missing) was observed. I would answer that the node should be increased about $927''$, and the inclination one tenth of that amount ($92.7''$), and the planet should be supposed to have had its average daily orbital motion increased, by the perturbations of the other planets, $0''.02061$, during the last fifty-two years. In other words, the actual period must have been oscillating from a value, 165.668, nearer the double of that of Uranus, towards one more remote, viz: 165.513.

Such is the residual quantity to be explained, before pronouncing conclusively on the question of identity. It is probable that it might be reduced in amount, by using intermediate values of the elements modified so as to represent the planet's recent path: but in my examination of the question, I was disposed to borrow nothing from the hypothesis itself towards its confirmation.

The members of the American Philosophical Society must be gratified to learn that one of their number, Prof. Peirce, has, so far as we are informed, anticipated the Europeans in applying Laplace's analysis to the remarkable inequality of $(2 \mu' - \mu)$ between the motions of Uranus and Neptune. Prof. Peirce has shown under what conditions we must have 0 for the permanent value of $(2 \mu' - \mu)$, by the same course of reasoning as that by which Laplace demonstrated that we must have the same value for the expression $(2 \mu - 3 \mu' + 2 \mu)$ for the three innermost satellites of Uranus.

The researches of Prof. Peirce generally, on the problem of finding the mathematical planet or planets, that satisfy the residual perturba-

tions of Uranus, will be looked for with much interest. This field of research, though entered with such splendid genius by Leverrier and Adams, it would seem is by no means exhausted.

Yours, truly,
SEARS C. WALKER.

To ROBERT M. PATTERSON, M.D.

Vice-President American Philosophical Society.

Dr. Boyè reported verbally, in behalf of himself and Mr. Eckfeldt, to whom had been referred the "*Fixed Mercury*," forwarded by Mr. Sartori, of Leghorn, that upon examination the first specimen proved to be an amalgam of tin and mercury; the second, pure tin; and the third an arseniuret of copper: neither of the latter contained mercury.

The project for the amendment of the Laws, postponed at the last meeting, was called up, and the amendment, as proposed by the Committee, adopted, as follows:—

Chap. I. Sect. 2, shall be amended to read as follows:—

"It shall be the duty of the Officers and Council to nominate to the Society, from time to time, such persons as they shall judge worthy of becoming members therein: and any member of the Society may at any meeting nominate, in writing, a candidate for membership; and the nomination so made may, in like manner, be seconded by another member."

Dr. Elwyn presented Vol. IV. No. 36, of the Proceedings of the Society.

Stated Meeting, May 21.

Present, nineteen members.

Dr. CHAPMAN, President, in the Chair.

Letters were received and read:—

From the Literary and Philosophical Society of Manchester, dated Manchester, 9th February, 1847, announcing a donation to the Library of this Society: and,—