

needle ( $75\frac{1}{8}^\circ$ ), is  $74^\circ 28'$ . Hence the agreement is quite satisfactory. We can probably say that the magnetic dip in London in 1720 was  $74^\circ 5' \pm 0^\circ 5'$ .

The invention of this new method of determining dip, led to still more important results. In making the dip observations with the long needle in 1720, for the purpose of his second chart, he at the same time observed the time of one horizontal vibration of the same needle, with the express purpose of determining the distribution of the force. These vibration-times are tabulated on his second chart.<sup>11</sup> From them the distribution of relative intensity can be determined. *These observations of Whiston's are undoubtedly the earliest relative terrestrial magnetic force observations ever made.* It is usually believed that the earliest relative intensity observations are the defective ones of Mallet (1769), or the more successful ones, but lost in shipwreck, of Lamanon (1785-87). The absolute value of these Whistonian intensity observations can, of course, not be checked; however, the relative value admits of some control. Thus the writer in his paper has reduced the observations, taking the value of the horizontal force at London as unity, and, with the aid of the reduced values, has roughly sketched the isodynamics (the broken lines in the figure) as prevailing over southern England in 1720. It will be seen that these lines of equal magnetic horizontal force have the same general trend as the isoclinics, as, indeed, they roughly should. Again, taking two stations (London and Saltfleet), which are practically in the same meridian and are distant from each other  $2^\circ$  in latitude, through which, consequently, the same isodynamic would not be likely to pass, it is found that the difference of the vibration-times— $60\frac{1}{2}$  and 66 seconds respectively, is in the right sense, *i.e.*, since the force varies inversely as the squares of the vibration-times, *the more northerly station, Saltfleet, gives the smaller horizontal force*, as it should. To be sure these early intensity observations are affected with a large probable error; they may, however, not deserve to be assigned to utter oblivion.

Upon the presentation of the writer's paper before the Washington Philosophical Society, Prof. Abbe became interested in the matter, and kindly called the author's attention to a later book<sup>12</sup> of Whiston's, a copy of which was likewise found in the Royal Library of Berlin. Whiston, in this book, gives an account of dip-observations made in various portions of the earth, with the aid of most liberal means furnished by King George and others, for the purpose of testing his magnetic method of determining geographical position. He sent "four several Dipping-Needles to Sea," and "with proper Instructions to the Masters of the Vessels" to observe the dip with both methods (direct and indirect), "to discover the State of Magnetism in the several parts of the Globe." Thus Captain James Jolly set out in July, 1722, for Archangel with one of Whiston's dipping-needles. Owing to a defect of the instrument he could observe only horizontal vibrations. Whiston says (p. 84), "he made me twenty-eight very good Horizontal Observations from the Latitude of  $65$  quite to Archangel." . . . "In

<sup>11</sup> The only thing that Whiston says with respect to the method employed, is the following Passage on page 112, *viz.*: "The Difference of this *Strength* of the Magnetick Power, from its *Direction*, is most visible in my Second Map hereto prefix'd. Where I have all along set down the 'Seconds' wherein my Needle perform'd a single horizontal Vibration, at about 120 Degrees from the Magnetick Meridian, in most Places, whose Squares, when Allowance has been made for the different Obliquity of the several Directions as to our Horizon, will give us the different *Strength* of that Magnetick Power at those several Places; as does the angle of dip give us the different *Direction* of the same power there. Now, at first Sight, the former there appears to be irregular, and the latter regular; as is the Case also of our Terella." Why Whiston should have observed the vibration time  $120^\circ$  from the magnetic meridian, instead of across the magnetic meridian, the writer has not been able to ascertain. Whiston does not appear to have made any further use of his observations.

<sup>12</sup> "The Calculation of Solar Eclipses without Parallaxes . . . with an Account of some late Observations made with Dipping-Needles, in order to discover the Longitude and Latitude at Sea." (London, 1724.)

this Space the Needle altered its Velocity very greatly, as I expected it would: And 5 Vibrations which at first were perform'd in about  $280''$ , beyond the North Cape, came to  $250''$ ; till towards Archangel it gradually returned to about  $177''$ . The first figure,  $280''$ , is probably a misprint, and should be  $180''$ . *These observations are the first to show the truth of the law that horizontal intensity decreases in approaching the magnetic pole.* Humboldt has credited Lamanon (1785-87) with the discovery of this law; it was not, however, firmly established until Humboldt's observations of 1798-1803. Furthermore, Captain Othniel Beal set out about the same time as Captain Jolly for Boston. From thence he sailed to Barbados, and thence to Charleston, South Carolina. At all these places and at sea he made dip observations with both methods. A dip of  $68^\circ 22'$  is given for Boston, and of  $44\frac{1}{2}^\circ$  for Barbados, on p. 92. *These two dips precede by fifty-eight years any dip that has hitherto become known in the United States.* The vibration-times are unfortunately not given. A third dip instrument was sent with Captain Tempest to Antigua and St. Christopher's, a fourth sent with Captain Michel to Hamburg. The results with the last two instruments had not yet been all received at the writing of the book. Whiston does not give the actual observations, but says, on p. 90, "The original Journals are all in the Hands of my great Friend and patron, Samuel Molyneux, Esq., Secretary to his Royal Highness the Prince of Wales, and Fellow of the Royal Society: which Journals, when I have compleated the rest of the Observations I hope to procure, I intend to publish entire, for the more full Satisfaction of the curious." It seems that Whiston never published these records. It is hoped that the present article will induce some one to look them up. They may possibly be a valuable find.

In conclusion, let us sum up Whiston's achievements.

- (1) Whiston drew the first isoclinics (1719-20).
- (2) He invented the vibration method of determining the dip.
- (3) He made the first relative terrestrial magnetic intensity observations (1720).
- (4) The first intensity observations (1722), revealing the law of decrease of horizontal terrestrial magnetic force with approach towards magnetic pole, were made under his instructions. L. A. BAUER.

#### THE TEACHING UNIVERSITY FOR LONDON.

DURING the last week very satisfactory progress has been made towards the reorganisation of the University of London as a teaching as well as an examining body. In the first place, King's College has been brought into line with the other teaching institutions of the metropolis by expressing a general assent to the recommendations of the Gresham Commission, coupled with the proviso that any Statutory Commission appointed to give effect to the Gresham Commissioners' recommendations should have power to make such modifications in the scheme as may seem to them expedient after consultation with the bodies affected—a proviso already insisted on by every teaching institution that has expressed its general approval of the scheme.

The adhesion of King's College to the views of the other teaching institutions mentioned in the Report of the Gresham Commission, was made known on the eve of the reception by Lord Rosebery of the deputation of delegates from the London colleges, and made it possible for these to present their case with the strength derived from complete accord.

On Tuesday last, Lord Rosebery received two deputations—one in the morning in favour of the Gresham scheme, in which representatives of the Senate, the

Annual Committee of Convocation, and the Committee of Graduates of the University of London; the Royal Colleges of Physicians and Surgeons; University College; King's College; Bedford College; the Medical Schools; the Theological Colleges; and the Association for Promoting a Professorial University for London took part, and a second in the afternoon, composed solely of members of Convocation opposed to the scheme.

Lord Rosebery's replies show that personally he is anxious to give effect to the Commissioners' recommendations. To the first deputation he said that the Government attach great importance to the Report of the Commission, and are fully sensible of the fact that the present time seems to offer a favourable opportunity, and one that ought not to be postponed, for the appointment of a Statutory Commission in the sense desired by those who had addressed him; while to the second, he made it clear that the opinions of the Government point in the direction of the appointment of a Statutory Commission, which would be able to receive full representations from any interests involved, and thereby be enabled to arrive at a scheme not unsatisfactory both to the present University and to the Empire at large.

Lastly, on Tuesday evening, Convocation of the University of London met, and for the first time came face to face with the question of approval or disapproval of the Commissioners' recommendations. As pointed out in a previous article (vol. I. p. 269), the power of veto possessed by Convocation under the Charter lent considerable importance to the decision arrived at, since an adverse vote might seriously retard the reorganisation of the existing University. In view of this contingency, it is highly satisfactory to record that Convocation, the last of the bodies to which the scheme has been submitted, by 157 votes to 133 resolved—"That Convocation, while desiring to express generally its approval of the proposals contained in the Report of the Royal Commission, is of opinion that power ought to be given to the Statutory Commission to vary the details of the scheme, and that it ought to be made an instruction to the Commissioners, before framing the statutes and regulations, to confer with duly accredited representatives of the Senate and of Convocation as to the modifications which may be desirable;" a previous resolution affirming that there should be one University in London, and not two, being carried by a slightly larger majority, namely, 206 votes to 175. These majorities may not be large, but they may be fairly taken to proportionately represent the opinion of the 3600 members of Convocation, since so far as any expression of opinion has been elicited by the various parties, 1165 members have expressed general approval of the Commissioners' recommendations, while 900 have indicated that in their view any teaching University for London ought to be constituted apart from the existing University. It may be earnestly hoped that with this vote the long controversy within the University has come to an end, and that all parties will now unite in the endeavour to make the new University worthy of the capital of the Empire. W. PALMER WYNNE.

#### NOTES.

We are informed that Mr. G. F. Scott Elliot has arrived at Blantyre, in the Shiré Highlands, on his way home. His route from Ruwenzori has been by Karagwe and Urundi, to the extreme north of Tanganyika, which was traversed in Arab dhows to Abercorn. Thence he followed the usual route by the Stevenson Road to Lake Nyassa and the Upper Shiré.

PROF. E. WARBURG, Professor of Physics in Freiburg University, has been appointed Prof. Kundt's successor in Berlin University.

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M. HAUTEFEUILLE, Professor of Mineralogy at the Sorbonne, has been elected a member of the Section de Minéralogie of the Paris Academy of Sciences.

DR. S. NAWASCHIN has been appointed Professor of Botany and Director of the Botanic Garden at Kiew, Russia.

THE death is recorded, at Berne, on December 13, of Dr. F. A. Flückiger, well known for his researches in pharmacologica botany, at the age of sixty-six.

DR. MURRAY THOMSON died on the 13th inst., in his sixty-first year. He was a Fellow of the Royal Society of Edinburgh and a Fellow of the University of Calcutta. For some years he was Professor of Experimental Science in the Government Engineering College, Roorkee, and chemical examiner for the Government in the North-Western Provinces of India. He was also the author of several medical and chemical treatises.

THE *Times* correspondent at Teheran reports that the town of Kuchan, which was destroyed by an earthquake fourteen months ago, and immediately rebuilt, was again destroyed on January 17. The extent of the damage and the loss of life are not yet known. Earthquake shocks were also felt at Meshed, but no damage was done.

WE learn that a general survey of the tides and currents on the Canadian coasts is now being commenced by the Canadian Department of Marine and Fisheries. It cannot fail to be of great use to navigation, and of especial interest to science, as the districts will include the phenomenal one of the Bay of Fundy with its 70 feet rise of tide, with which we have nothing to compare in magnitude in the British Isles.

THE Königliche Gesellschaft der Wissenschaften of Göttingen are organising a conference of delegates of scientific societies and academies, for the consideration of the relations between the variations in the intensity of gravity and the geological constitution of the earth's crust. It is intended that the congress shall take place at Innsbrück on September 5, where and when the International Geodetic Association will hold a meeting.

THE first number of the new series of *Science* has now reached us. To the editorial committee announced in our issue of December 20, should be added President T. C. Mendenhall of the Worcester Polytechnic Institute (Physics), Prof. R. H. Thurston of Cornell University (Engineering), Prof. Le Conte of the University of California (Geology), and Prof. H. F. Osborn of Columbia College (General Biology). The editorial committee, composed of the American men of science best known in England, and the contents of the first number, promise a journal that will adequately represent the progress of science in America. If in a multitude of counsellors there is wisdom, the journal should greatly advance scientific knowledge; not, however, by publishing memoirs and papers for specialists, but by promoting intercourse between students of all branches of nature.

ON Friday, the 11th inst., the Physical Society of London, in response to an invitation from Prof. Carey Foster, visited the new physical laboratories of University College. Before the commencement of the regular meeting in the lecture theatre (a report of which will be found in another column), the large number of members present went over the laboratories and practical class-rooms. There are three large rooms solidly built on the ground, and devoted to the use of the more advanced students, and of those engaged in original research. They are in a separate building apart from the main structure, and were specially built for physical work. Above one of them is the optical room, while within the main building there are two