

and that in the formulæ the numerical value of  $m$  also implies a local unit of mass. But to avoid confusion it is best that in formulæ for application  $m$  should be replaced by  $W/g$ . And, in any comparison of results involving different values of  $g$ , let each force be expressed in poundals by simply multiplying by the local value of  $g$ .

Professor Greenhill has made a marked innovation in this matter as compared with the usage of recent English writers. Calling the pound the unit of weight, and refusing to regard weight as a force but rather as "the quantity which is determined by the operation of weighing," he practically makes the pound a unit of mass; and, abandoning the formula  $W = mg$ , puts  $W$  for the number of pounds, so that in formulæ it appears where we are accustomed to see  $m$ . Then, with regard to force he says "it is convenient to take the attraction of the earth on a pound weight as the unit of force, and to call it the *force of a pound*; this is the British unit of force in universal use in all practical problems of architecture, engineering, mechanics, and artillery."

As contrasted with the usual notation supposing absolute units to be employed,  $W$  is thus merely put in the place of  $m$  so that  $Wg$  instead of  $mg$  is the expression in poundals for the force of gravity acting on the body. At the same time, however, Professor Greenhill uses  $F$ ,  $R$ , and other symbols of force as co-dimensional with  $W$ , so that they are the numbers of local pounds of force, and it must be remembered that the expressions for the same forces in poundals are  $Fg$ ,  $Rg$ , etc. With regard to gravitation and absolute units, he says: "The attraction of the earth in any locality provides such a convenient and invariable measure of force that all instruments, great and small, for measuring force and work are calculated and graduated originally in gravitation measure; the reduction to absolute measure if required being made subsequently by means of the local value of  $g$ ; presumably determined previously with the greatest attainable accuracy by means of pendulum experiments."

---

 NOTES.

## NOTES.

A REGULAR meeting of the NEW YORK MATHEMATICAL SOCIETY was held Saturday afternoon, April 7, at half-past three o'clock, the president, Dr. McClintock, in the chair. Mr. Pomeroy Ladue, of the University of Michigan, having been duly nominated, and being recommended by the council, was elected to membership. The president announced the resignation on account of ill health of the treasurer, Mr.

Harold Jacoby, and stated that the council had appointed Professor R. S. Woodward as his successor, Mr. Jacoby taking the place thus left vacant in the council. A set of amendments to the constitution, recommended for adoption by the council, were read by the secretary.

Professor W. Woolsey Johnson read a paper entitled "Gravitation and absolute units of force." An abstract of this paper appears in the present number of the BULLETIN: see p. 197. In the discussion which followed the paper, Mr. C. S. Peirce proposed that the term *galileo* be applied to the unit of acceleration in the C. G. S. system.

Mr. C. S. Peirce exhibited an arithmetic of 1424, from the valuable collection of Mr. George A. Plimpton of New York. It is an extensive manuscript work written in Latin, and has been entirely unknown to the historians of mathematics. The author was Rollandus, a Portuguese physician, known for a work upon surgery and another upon physiognomy. He was a minor canon of the Sainte-Chapelle and a protégé of John of Lancaster, to whom the arithmetic bears a flowery dedication.

THE summer meeting of the NEW YORK MATHEMATICAL SOCIETY will be held this year on August 13, 14, 15, and not on August 20, 21, 22, as announced in the last number of the BULLETIN. The first general session of the American Association for the Advancement of Science will be held on August 16. At the time of making the announcement a month ago, it was anticipated that the American Association would meet one week later.

Dr. E. STUDY has been made Professor of Mathematics at the University of Bonn to succeed Professor Minkowski, who was called to Königsberg.

DURING the second semester of the current year the mathematical courses at the *Sorbonne*, as announced in *L'Indicateur des Cours publics*, are: Appell, Dynamics of systems. Bousinesq, Turbulent and whirling movement of fluids in conduits of great cross-section. Hermite, Theory of Eulerian integrals and Theory of elliptic functions. Picard, Differential equations from the point of view of mathematical physics. Poincaré, Calculus of probabilities.

T. S. F.

THE German mathematicians will meet this year in Vienna, September 24-30. At this time will take place both the meeting of the *Deutsche Mathematiker-Vereinigung* and that of the first (mathematical) section of the *Versammlung deutscher Naturforscher und Aerzte*. Professor W. Dyck of

Munich (Hildegardstrasse 1½) is secretary of the former association. A preliminary programme of the proceedings will be issued early in July.

THE one hundredth anniversary of the birth of the Russian mathematician *Nicolas Ivànovich Lobachevsky*, which occurred on the 3d of November (or 22d of October, according to the Russian calendar) 1893, was celebrated in a worthy manner by the Physico-Mathematical Society of the University of Kazàn. The celebration extended over three days.

On Friday, the 3d of November, after religious services and a solemn requiem mass, the University Senate assembled to hold a memorial meeting at which Professors Th. M. Suvòrov and A. V. Vasiliev spoke on the life and scientific work of the Russian geometer. The daily paper "Volga Messenger" published a portrait of Lobachevsky on its front page and devoted over three pages to accounts of his varied activity as a man of science, as rector and professor of the university, and as a progressive and public-spirited citizen.

On the next day, the Physico-Mathematical Society arranged a special public session at which the following papers were read: (1) by *A. V. Vasiliev*, On Lobachevsky's writings on algebra and analysis; (2) by *I. A. Izòdskov*, On Lobachevsky's activity in the Imperial Economic (Agricultural) Society of Kazàn; (3) by *V. A. Sikstèl*, The foundations of spherical geometry; (4) by *D. M. Sintsov*, Lie's researches concerning the foundations of geometry; (5) by *Th. M. Suvòrov*, On differential linear elements.

In the afternoon of November 5th, the Municipal Council of the city of Kazàn dedicated with appropriate ceremonies a memorial tablet inserted in the front wall of the house in which Lobachevsky had lived. In the evening of the same day, at a public session of the Physico-Mathematical Society, the committee appointed to raise a "Lobachevsky fund" rendered its first account, and two more papers were read: (1) by *A. N. Smirnov*, On the axioms of geometry, and (2) by *A. V. Vasiliev*, On  $n$ -dimensional geometry.

The contributions to the Lobachevsky fund had reached the sum of 3039.55 rubles at the time of the celebration; but the subscription is still open. About 200 rubles have been contributed by Americans. The income from this fund it is intended to use for the annual award of a Lobachevsky medal or prize, and, if possible, for erecting a bust of Lobachevsky at Kazàn, in the public square that bears his name.

Several years ago the Physico-Mathematical Society of Kazàn published a complete edition of Lobachevsky's geometrical works, in two volumes, the first volume containing the writings in the Russian language, the second those written

in German or French (*Collection complète des œuvres géométriques de N. I. Lobatcheffsky*, édition de l'Université impériale de Kasan; 4to; Vol. I, 1883, viii and 550 pp., 14 plates; Vol. II, 1886, 8 pp., pp. 551-680, and xx pp., 4 plates, 1 portrait). Of the second volume, which contains a photographic portrait of Lobachevsky, a brief sketch of his life, and a bibliography of non-Euclidean geometry by M. E. Vashchenko-Zakharchenko, based on Halsted's, 50 copies are still for sale at the reduced price of 8 francs (including postage); the price for both volumes together has now been raised to 8.80 rubles. Orders for these works and contributions to the Lobachevsky fund can be sent to the Physico-Mathematical Society of Kazan, Russia, of which Professor A. V. Vasiliev is the president.

A. Z.

INSTEAD of the republication by the Leipzig Academy of Sciences of Lambert's paper described in the BULLETIN for December 1893, Dr. Paul Staeckel of the University of Halle and Professor Friedrich Engel of the University of Leipzig will publish within this year with Teubner of Leipzig a volume under the title *Die Theorie der Parallellinien*, containing Lambert's essay and the first book of the marvellous work by Saccheri, "Euclid vindicated from every fleck," wherein he developed in 1733 the two hypotheses which, besides Euclid's, are possible, and also obtained all the results in this subject which have been ascribed to Legendre.

The book will open with a collection of those theorems of Euclid which are related to his eleventh axiom (the parallel-postulate). In the time from Euclid to Wallis, expressions about the parallel-postulate are rare; but Wallis in 1663 showed that the axiom of the existence of similar figures is equivalent to it. After Wallis comes the wonderful Saccheri, 1733. Lambert in 1766 carried on Saccheri's ideas.

The relation between the different authors will be shown, and full notes, explanatory, historical, and bibliographic, will accompany the text.

LA Real Academia de Ciencias Exactas, Físicas y Naturales de Madrid offers first and second prizes and honorable mention for theses on the following subject:

*Didactic treatment of the modern non-Euclidean geometric theories, or reasoned analysis of the principal works on this part of mathematical science.*

The first prize consists in a special diploma, a gold medal of 60 grammes weight, and one thousand five hundred pesetas in money. It includes further the printing of the thesis at the cost of the Academy, and the delivery to the author of one hundred copies. The second prize is the same, except the money. Theses will be received until December 31, 1895.

G. B. H.