

from Isaac Cummings, is an intelligent and technically irreproachable family history. "Isaac Comins, Senior," whose will was probated June 14, 1877, was a settler in Ipswich, Mass. His descendants have taken great liberties with the spelling of his name, the majority following the New England tendency to change the ending -en or -in to -ing. The compiler has gone with this majority in his book, even to spelling his own name Cummings in its chronological place at page 557, but Cummins on the title-page as on his bank checks. His motive has been the simple truth so far as it could be ascertained, and he has not sought by embellishment to avoid a dry chronicle of facts. There is some good reading in extracts relating to collateral ancestors, and an occasional characterization is full-bodied. The stock appears to be simple New England, largely agricultural and mechanical in its occupations, with but few shining lights. College graduates are relatively rare. Loyalists and patriots divided in the Revolution; one solitary Cummings (of this line), having been born in the South, was subdued to it, and served in the Confederate ranks against his kinsmen. One turned Mormon, and his son had a "first wife" living twenty-one years after his death. Inventors have been numerous and clever: Joshua, of the sixth generation, removed from Leominster to Westminster, Mass., for the better education of his children, and was richly rewarded in them. There are a few portraits, all typical and suggestive; none more pleasing than that of the compiler.

The distinction of the 'Dexter Genealogy, 1642-1904,' begun by John Haven Dexter, carried on by Orlando Perry Dexter, and now arranged by Henry L. Miles (American News Co.), is that, by an ingenious system of "superior figures"—in printer's parlance—the authority for every statement is given where possible. No. 99, which stands for Family Bible, of course recurs constantly. The whole aspect of this genealogy is therefore most businesslike and self-commending. The family name is eminent in New England, and the more prominent descendants of Richard Baxter (1606-1680) receive relatively long biographies; that of Mr. O. P. Dexter being as interesting as it is tragic. Andrew Dexter (1779-1837), a native of Brookfield, Mass., founded the city of Montgomery, Ala. Samuel Dexter (1761-1867) sat in both houses of Congress, and was Secretary of War and of the Treasury. The one plate is a charming view of the old Dexter mansion in Malden, Mass., standing on property purchased from the Indians by Richard Dexter in 1663, and still occupied by his posterity. Only 400 copies of this work are issued.

The seventy-two laboratory exercises contained in Prof. J. C. Olsen's 'Text-book of Quantitative Chemical Analysis' (D. Van Nostrand Co.) appear to us to be judiciously chosen and admirably described, and altogether to be calculated to make a skillful analyst of the student. So much of the other matter as is naturally wanted along with the exercises, to furnish information about quantitative analysis that is indispensable to the young man entering upon it and acquiring his first skill, is also good. But whether, over and above that, it was worth while in a single volume to penetrate further into the vast

mass of details, or to undertake more than to direct the student to the different books and papers, with hints as to the use of them, is a question not easy to answer to one's own satisfaction.

An interesting attempt to give permanent value to a second-hand-book catalogue has been made by the newly established firm of Rudolf Haupt in Halle, who prefates a recent catalogue of books on bibliography and printing with a sketch by Professor K. Haebler, entitled "From the Beginnings of the Book Trade." It deals with early book advertisements, and traces their development from circulars about single books to lists of books printed by the same printer or for the same publisher, and finally to the appearance of catalogues of books issued by several publishers or printers, and collected in the shop of the same dealer. The early development of the book trade in Venice is described, and it is shown how the printing of books became in that city for the first time a branch of manufacture, and the selling of books a business pure and simple. Here were to be found, as early as before the year 1500, nearly all the features of the modern book trade.

The *Magazine of American History*, with Notes and Queries, is to be revived after a long eclipse. It will be published monthly at \$5 per annum by William Abbott, at No. 281 Fourth Avenue, New York. The first number will probably be issued in January.

Prof. G. Frederick Wright assumes the editorship of *Records of the Past* (Washington), which enters upon its fourth year in January.

In the *National Geographic Magazine* for November Prof. F. H. Bigelow describes the new research meteorological observatory at Mount Weather, Bluemont, Virginia, about sixty-five miles northwest of Washington, and its work. It is proposed to establish a physical laboratory there "to accommodate experiments in meteorological physics, in the improvement of instruments, in atmospheric electricity, ionization, and radioactivity of the air and of soils, and other research investigations." Another paper deals with the methods of Government assistance in handling forest lands. A résumé of an essay on the "Foreign Commerce of Japan since the Restoration, 1869-1900," is by Yukimasa Hattori, a student at Johns Hopkins University. In referring to the probably large increase in importations of food products in the near future, he calls attention to the fact, almost without a parallel, that the Japanese farmer understands his work "so thoroughly that, by elaborate means of irrigation and the skillful use of fertilizers, he has been able to obtain rich harvests from the same land during fifteen or twenty centuries." There is also given the substance of Sir F. D. Lugard's address before the Royal Geographical Society on northern Nigeria, with numerous interesting illustrations.

The *Geographical Journal* for November opens with an illustrated description of the little known country between the Niger and Lake Tchad, by Col. Elliot of the Anglo-French Boundary Commission. Among the scientific results of this expedition was the discovery of fossils showing that the Mediterranean once extended to this region. Some of them are distinctly of an Indian character—a sea-urchin being of a kind

hitherto described only in Sindh—which would indicate, according to Dr. Bather of the British Museum, a connection of India and the Sahara in early geologic ages. Col. Elliot referred to the lawlessness of the country when he passed through it in 1902, which was before the British occupation. Now, says Major Burdon, the officer in command of that district, "that lawlessness does not exist; and there is nothing more striking or encouraging in the result of British occupation than the way in which the people allow all their fortifications and walls to fall into decay at once. They say openly they no longer have any need of them." The remaining contents are an account of the survey of the fresh water lochs of the Ewe Basin, Scotland, and Dr. Sven Hedin's interesting and characteristic preface to his forthcoming "Scientific Results" of his last journey, to which we have already referred.

African railways are the subject of the article of most general interest in the *Annales de Géographie* for November. The accompanying map, showing the roads in operation and those under construction, as well as the lakes and rivers on which there is steam navigation, gives a vivid impression of the number and extent of these paths of commerce through the Dark Continent which have been opened during the past half century, for the first railway was constructed in Egypt in 1852. Other topics are instruction in topography as preparatory to the study of geography, and the cartography of Spain, with an account of the principal maps of the country, from that of Lopez published in 1765-98 to those very recent ones of the French Alpine Club, chiefly of the Pyrenees. In an interesting notice of the changes wrought by the industrial "boom" in northern Spain, mention is made of the fact that the change of Santander from being merely a port for colonial commerce into a mining and manufacturing community is due mainly to the Spaniards who left the West Indies in consequence of the war and settled there.

—In a very real sense, Andrew D. White's initial paper on Hugo Grotius, in the December *Atlantic*, might be called the most timely contribution of the number, though it is too much to expect that many readers of to-day will stop to recognize and reflect upon the lessons which the career of the great Dutch publicist has to offer to the present generation. The first important work of Grotius, the *Mare Liberum*, became the herald of a new and better epoch, we are told, because it laid its foundations in the doctrine of the inalienable rights of mankind—a doctrine not exactly popular just now, as it does not square with dominant tendencies in national development. This study of Grotius is one of the series of papers which Dr. White has prepared under the general title of the "Warfare of Humanity with Unreason." Samuel P. Orth contributes a paper on "Our State Legislatures," a large portion of which is devoted to a minute analysis of the make-up of four typical legislative bodies, leading to the conclusion that they are really fairly representative of the people by whom they are elected, however unsatisfactory their legislative product may be. This conclusion is true enough if one has in mind a representation merely of the average ability and honesty, but it is not true at all if

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## REPORT OF THE WATSON TRUSTEES.

Under the arrangement already reported to the Academy, the work of preparing tables of the Watson asteroids has been carried on under direction of Prof. A. O. Leuschner, of the University of California. The latter has two computers working under his direction, and he reports a satisfactory rate of progress. The general perturbations of all the asteroids discovered by James C. Watson are substantially completed, with the exception of Aethra, which was observed only during the opposition at which it was discovered, and has never been recognized since. To all appearance this asteroid will have to be left out of the present consideration.

There is still an available balance of income of \$1,295.04, which, with the accruing income, will enable the work to be carried on through at least the present year. The principal work which now remains to be done is to tabulate the perturbations, compare the results with observations, and correct the elements.

Respectfully submitted,

SIMON NEWCOMB,  
*Chairman Watson Trustees.*

## REPORT OF THE HENRY DRAPER COMMITTEE, 1903-4.

The fifth clause of the deed of gift by Mrs. Henry Draper, establishing the Henry Draper fund, is as follows:

Fifth. In trust, that if at any time or times the interest and income of the said trust fund of \$6,000 shall exceed the amount necessary for the striking of said medal and the care of the said die and of the fund, such surplus over and above the sum or sums so required for the purposes of the trust as hereinbefore recited and set forth shall be used in such manner as shall be selected by said National Academy of Sciences, in aid of investigation and work in astronomical physics to be made and carried on by a citizen or citizens of the United States of America.

In a letter dated June 22, 1903, Mrs. Draper writes:

With reference to the Henry Draper medal fund of the National Academy of Sciences, my desire is that the income thereof, above what is required to provide the Draper medals, should be allowed to accumulate and should be added to the principal until the latter amounts to \$10,000. Thereafter any excess of income of this fund over and above that needed for the purchase of medals I should be willing to have used, under the direction of the Academy, for purposes of research in the line for which the fund was originally given.

It is therefore recommended by the committee that no appropriations be made for research, but that the excess of income be added to the principal.

EDWARD C. PICKERING, *Chairman.*

The Academy, on recommendation of the council, adopted the following resolution:

*Resolved,* That the treasurer be instructed to reserve the income of the Draper fund not required for the giving of the Draper medal and invest it until the original fund amounts to ten thousand dollars; provided that in a case of exceptional importance, the trustees of the Draper fund be instructed to bring the application for a grant before the Academy.

## ELECTIONS.

Messrs. Billings, Bowditch, Brush, Hale, Walcott, and Welch, were elected members of the council.

Messrs. William T. Councilman, William Morris Davis, John Uri Nef, and William Fogg Osgood, were elected members of the Academy.

The following-named gentlemen were elected foreign associates of the Academy: Messrs. Ludwig Boltzmann, of Vienna; George H. Darwin, of Cambridge; Paul Ehrlich, of Frankfurt-am-Main; Emil Fischer, of Berlin; William Huggins and William Ramsay, of London; H. Rosenbusch, of Heidelberg, and Hugo de Vries of Amsterdam.

## DEATHS.

The Academy lost only one member during the year 1904, Mr. Charles Emerson Beecher, who died on the 14th of February.

Karl Alfred Ritter von Zittel, a foreign associate, died January 5, 1904.

## INTERNATIONAL ASSOCIATION OF ACADEMIES.

The International Association of Academies, of which the National Academy of Sciences is a constituent member, met in London May 25-27, 1904. Our Academy was represented by one of its foreign members, Sir Archibald Geikie, F. R. S. The object of this association is to promote cooperation among the leading scientific organizations of the world and to suggest and support lines of research in subjects of international importance.

Among the subjects to which attention was especially directed at the meeting was the proposed work of the International Seismological Association, in which it is hoped that the United States will be represented.

## LIST OF PAPERS PRESENTED AT THE APRIL SESSION.

On Fluorescence Spectra. E. L. Nichols and Ernest Merritt.

Spectra of Gas at High Temperatures. John Trowbridge.

Short Wave-Lengths of Light. Theodore Lyman. (Presented by John Trowbridge.)

Spectra produced by the Wehnelt Interrupter. H. W. Morse. (Presented by John Trowbridge.)

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Note on Radioactivity and Autoluminescence. George F. Barker.

A Double Suspension Apparatus for determining the Acceleration of Gravity. R. S. Woodward.

The Compressibility of the Earth's Mass required by the Laplacian Law of Density Distribution. R. S. Woodward.

The Disposition of Rainfall in the Basin of the Chagres. Henry L. Abbot.

Surface Friction of the Air at Speeds below 10 Feet a Second. A. F. Zahm. (Introduced by A. Graham Bell.)

Physiological Economy in Nutrition, with Special Reference to the Minimal Protein Requirement of the Healthy Man. A Preliminary Report. R. H. Chittenden.

Recent Paleontological Discoveries by the American Museum Exploring Parties. Henry F. Osborn.

Reclassification of the Reptilia. Henry F. Osborn.

Position of the Limbs in the Sauropoda. W. D. Matthew. (Submitted by Henry F. Osborn.)

A Preliminary Report upon *Apocynum cannabinum*. Horatio C. Wood, jr. (Presented by Horatio C. Wood.)

Biographical Memoir of James Hadley. Arthur T. Hadley. (Presented by the Home Secretary.)

Biographical Memoir of Henry Barker Hill. Charles L. Jackson.

The Multi-nippled Sheep of Beinn Bhreagh. Alexander Graham Bell.

Application of New Statistical Methods to the Question of the Causes Influencing Sex. Simon Newcomb.

Note on the Simplest Possible Branch of Mathematics. C. S. Peirce.

The president announced the appointment of Messrs. Gilbert and Hale to represent the Academy at the fiftieth anniversary of the founding of the University of Wisconsin.

The president announced that Sir Archibald Geikie and E. Ray Lankester, foreign associates of the Academy, had been appointed to represent the Academy at the meeting of the International Association of Academies May 24, 1904; also that the Royal Academy of Sciences of Madrid had been admitted to membership in the International Association of Academies.

#### PRESENTATION OF THE DRAPER MEDAL.

The Henry Draper medal was presented to Mr. George E. Hale at the New Willard Hotel, Washington, on Wednesday evening, April 20, 1904. Upon this occasion the following statement was read giving the reasons for this award:

TO THE NATIONAL ACADEMY OF SCIENCES:

The work of Professor Hale may be divided into four classes: Investigations of solar phenomena, studies of stellar spectra, editing the *Astrophysical Journal*, and

the executive work involved in the direction of the Yerkes Observatory. In 1868, it was shown by Janssen and Lockyer, independently, that solar protuberances might be observed when the sun was not eclipsed. The method employed was to allow an image of the edge of the sun's disk to fall upon the slit of a spectroscopic, and thus obtain the spectrum of this region only. If the image of a protuberance fell upon the slit, so large a portion of its light was monochromatic that the hydrogen line C appeared as a bright line in the corresponding portion of the spectrum. If now the slit was widened, the form of the protuberance became visible. By placing a second slit so as to cut off all portions of the spectrum except that of the line to be studied, replacing the eyepiece by a photographic plate, and giving similar motions to the latter and to the image of the sun on the slit we have the spectroheliograph. The principal credit must be given to Professor Hale for the independent invention of this instrument, for excellence in the plans of its mechanical construction, for skill in its use, and for the final results obtained with it, although as almost always happens, a portion of the credit must be given to other astronomers who were pursuing the same line of work. With this instrument we may therefore analyze the light of any object, obtaining a series of photographs which show the relative proportion of rays of each different wave length in its different parts. When the sun is the object observed we obtain widely different results for the protuberances, faculae, and spots. The extent and character of the different portions is thus shown far better than would be possible in an ordinary photograph.

Professor Hale has shown the same skill in invention, construction, and application in the other portions of his work. The problem of photographing the spectra of stars of the third and fourth types is one of unusual difficulty. Owing to the red color of these stars they ordinarily produce but little impression upon the photographic plate. By the great light-collecting power of the 40-inch refractor, and the use of isochromatic plates, Professor Hale succeeded in photographing the spectra of these stars with a large dispersion. He was thus able to classify them and to show the resemblances of the spectra of stars of these two classes. This is the more remarkable since visually or with a small dispersion the spectra appear very unlike.

During the years 1893, 1894, and 1895 Professor Hale edited the astrophysical portion of *Astronomy and Astrophysics*. In January, 1896, he established the *Astrophysical Journal*, associating with him the leading astrophysicists of the world as assistant editors. With the liberal support of the University of Chicago he has made this journal a nearly complete compendium of the work done in astrophysics during the last nine years.

The manifold duties of the director of a great observatory may not be appreciated by one who sees only the results. To attain success good judgment, patience, skill, and knowledge of a great variety of subjects are required. For the establishment, erection of buildings, construction of instruments, selection of officers, general plan of work, and assignment of duties, a vast amount of time and energy is required before the actual scientific work begins. Those who avail themselves of these facilities may fail to remember that but for the director none of these appliances would have been at their disposal. It is unnecessary to enumerate the researches carried on and in progress at the Yerkes Observatory, and how much astronomy would have lost but for its liberal endowment and skillful direction.

The reasons enumerated above show why the Henry Draper medal has been awarded to Prof. George Ellery Hale.

## AUTUMN MEETING OF THE ACADEMY.

## SCIENTIFIC SESSION.

[Held in New York November 15 and 16, 1904.]

A scientific session for the reading of papers having been called by the council, the Academy met in Havemeyer Hall of Columbia University, New York City, November 15 and 16, 1904.

Vice-President Rensen presided at the sessions, and the following members were in attendance: Messrs. Billings, Boas, Boss, Bowditch, Brewer, Brooks, Cattell, Chandler (C. F.), Chittenden, Comstock (C. B.), Dutton, Emmons, Hague, Hastings, Mitchell, Morley, Morse, Newcomb, Peirce, Penfield, Prudden, Rensen, Verrill, Walcott, Webster, Wells, and Woodward.

The following papers were presented:

Biographical Memoir of Charles Emerson Beecher. W. H. Dall.

On the Affinities of the Pelagic Tunicates. W. K. Brooks.

The Life History of *Turritopsis*. W. K. Brooks and S. Rittenhouse.

*Phoronis architecta*: Its Anatomy, Life History, and Branching Habits. W. K. Brooks and R. P. Cowles.

On the Electrical Resistance of a Vacuum. John Trowbridge.

Psychic Associations in Primitive Culture. Franz Boas.

Time Electrical Impulses. M. I. Pupin. (Introduced by R. S. Woodward.)

The Occurrence of Maxima and Minima of Atmospheric Nucleation in Approximate Coincidence with the Winter and Summer Solstices, respectively. C. Barns.

The System of Magnetic Forces Causing the Secular Variation of the Earth's Magnetism. L. A. Bauer. (Introduced by R. S. Woodward.)

The Influence of Low Proteid Metabolism on the Formation and Excretion of Uric Acid in Man. Russell H. Chittenden.

Note on the Theory of Experiments to Detect the Second Power of the Aberration of Light. Edward W. Morley.

Report of a Repetition of the Michelson-Morley Experiment on the Drift of the Earth through the Luminiferous Ether. Edward W. Morley.

On Topical Geometry. C. S. Peirce.

An Experimental Demonstration of the Formation of Centrosomes de novo. N. Yatsu. (Presented by E. B. Wilson.)

An Analysis of the Phenomena of Organic Polarity. T. H. Morgan. (Introduced by E. B. Wilson.)

Experiments on Prelocalization in the Annelid Ovum. E. B. Wilson.

The Absolute Value of the Acceleration of Gravity Determined by

the Ring-Pendulum Method. C. E. Mendenhall. (Presented by R. S. Woodward.)

The Double Suspension Pendulum for Measuring the Acceleration of Gravity. R. S. Woodward.

Biographical Memoir of Robert Empe Rogers. Edgar F. Smith.

A Determination of the Dispersive Power of the Human Eye. Charles S. Hastings.

The Air in the New York Subway. Charles F. Chandler.

The Genus *Claytonia*: Morphological and Anatomical Studies. Theo. Holm. (Introduced by George L. Goodale.)

## BUSINESS MEETING.

[New York, November 16, 1904.]

A business meeting of the Academy was held November 16, with the vice-president, Mr. Ira Rensen, in the chair.

## PRELIMINARY REPORT FROM THE COMMITTEE ON SOLAR RESEARCH.

THE PRESIDENT AND COUNCIL OF THE NATIONAL ACADEMY OF SCIENCES.

GENTLEMEN: We have the honor to report that immediately after the appointment of the committee by the Academy, plans were made to secure the aid of various societies in Europe and America for the purpose of preparing a general scheme of cooperation in solar research. The societies were invited to appoint committees on solar research, and to send delegates to a conference, which we decided to hold in September at St. Louis, on the occasion of the International Congress of Arts and Sciences. Some societies had already adjourned for the summer when the invitations were received, and therefore could not comply with our request. Nevertheless, the general response was very satisfactory, and the meeting of delegates at St. Louis was a fairly representative one.<sup>a</sup>

We respectfully request the Academy to ask the approval by the International Association of Academies of the proposed plan of cooperation in solar research. It is desirable that such approval should be secured as soon as possible, in order that the work may be well organized before the sun-spot maximum, which may occur next year.

It was the wish of the conference that all of the committees representing societies should be standing committees, in order that the members may frequently discuss the various questions under consideration. We accordingly request that this committee be continued.

Respectfully submitted.

GEORGE E. HALE, *Chairman*.

<sup>a</sup>The various papers read at the conference on solar research may be found in the *Astrophysical Journal*, Vols. XX-XXI, No. 5, December, 1904 and No. 1, January, 1905.

## APPENDIX C.

### ORGANIZATION OF THE ACADEMY, 1904-5.

	Expiration of term.
AGASSIZ, ALEXANDER, <i>President</i> .....	April, 1907.
REMSEN, IRA, <i>Vice-President</i> .....	April, 1909.
NEWCOMB, SIMON, <i>Foreign Secretary</i> .....	April, 1909.
HAGUE, ARNOLD, <i>Home Secretary</i> .....	April, 1907.
EMMONS, S. F., <i>Treasurer</i> .....	April, 1908.

### ADDITIONAL MEMBERS OF COUNCIL, 1901-5.

BILLINGS, J. S.	HALE, GEORGE E.
BOWDITCH, H. P.	WALCOTT, C. D.
BRUSH, G. J.	WELCH, W. H.

### COMMITTEES OF THE ACADEMY.

#### *On nominations of new members.*

- |                               |                                       |
|-------------------------------|---------------------------------------|
| 1. Mathematics and Astronomy. | 2. Physics and Engineering—Continued. |
| ABBE, C.                      | COMSTOCK, C. B.                       |
| BOSS, L.                      | HASTINGS, C. S.                       |
| CAMPBELL, W. W.               | LANGLEY, S. P.                        |
| CHANDLER, S. C.               | MENDENHALL, T. C.                     |
| COMSTOCK, G. C.               | MICHELSON, A. A.                      |
| DAVIDSON, G.                  | MORLEY, E. W.                         |
| ELKIN, W. L.                  | NICHOLS, E. L.                        |
| HALE, G. E.                   | PICKERING, E. C.                      |
| HALL, A.                      | TROWBRIDGE, J.                        |
| HILL, G. W.                   | WEBSTER, A. G.                        |
| HOLDEN, E. S.                 | WOODWARD, R. S.                       |
| LANGLEY, S. P.                | WRIGHT, A. W.                         |
| MOORE, E. H.                  |                                       |
| NEWCOMB, S.                   | 3. Chemistry.                         |
| OSGOOD, W. F.                 | BARKER, G. F.                         |
| PERCE, C. S.                  | BRUSH, G. J.                          |
| PICKERING, E. C.              | CHANDLER, C. F.                       |
| WOODWARD, R. S.               | CHITTENDEN, R. H.                     |
| YOUNG, C. A.                  | CRAFTS, J. M.                         |
|                               | DANA, E. S.                           |
|                               | GIBBS, W.                             |
|                               | GOOCH, F. A.                          |
|                               | HILGARD, E. W.                        |
|                               | JACKSON, C. L.                        |
|                               | JOHNSON, S. W.                        |
|                               | MICHAEL, A.                           |
| 1. Physics and Engineering.   |                                       |
| ABBE, C.                      |                                       |
| ABBOT, H. L.                  |                                       |
| BARKER, G. F.                 |                                       |
| BARUS, O.                     |                                       |
| BELL, A. G.                   |                                       |

### COMMITTEES OF THE ACADEMY—Continued.

#### *On nominations of new members—Continued.*

- |                              |                       |
|------------------------------|-----------------------|
| 3. Chemistry—Continued.      | 5. Biology—Continued. |
| MORLEY, E. W.                | GILL, T. N.           |
| NEE, JOHN U.                 | GOODALE, G. L.        |
| PENFIELD, S. L.              | MARK, E. L.           |
| REMSEN, I.                   | MERRIAM, C. H.        |
| RICHARDS, T. W.              | MINOT, C. S.          |
| SMITH, E. F.                 | MORSE, E. S.          |
| WELLS, H. L.                 | OSBORN, H. F.         |
| 4. Geology and Paleontology. | PRUDDEN, T. M.        |
| AGASSIZ, A.                  | PUTNAM, F. W.         |
| BECKER, G. F.                | SARGENT, C. S.        |
| CHAMBERLIN, T. C.            | SCODDER, S. H.        |
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#### *On Weights, Measures, and Coinage.*

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