

## VII

### THE CHICAGO GROUP AND THE CHICAGO SECTION

With the opening of U. Chicago in the autumn of 1892, and such a remarkable group as E. H. Moore, O. Bolza, and H. Maschke in the department of mathematics, a new era dawned for mathematics in the middle West, which was to be of profound influence throughout the United States. The NYMS had been started only about three and one-half years before, but had already become national in its membership and had been publishing its *Bulletin* for a year. The four-hundredth anniversary of the discovery of America was to be commemorated by a World's Fair at Chicago, and on 21 Oct. (that is, 12 Oct. o.s.) 1892, corresponding to the date of the discovery, the grounds were formally dedicated. A notable feature of the Fair, after it was opened in the following year, was a series of Congresses. One of these was an International Mathematical Congress which occurred 21–25 Aug. Early in 1893 the local comm. for math. and astr. (Moore, Bolza, Maschke, H. S. White) had sent invitations to a large number of eminent specialists in these sciences in American and European countries. The response was gratifying, and in the case of Germany, Felix Klein came over at Kaiser Wilhelm's personal request, as an Imperial Commissioner to attend the Congress. He brought nearly all the mathematical papers contributed by his countrymen, and he cooperated effectively with the local committee in the preliminary arrangements. Klein's duties required him to lecture and to demonstrate the educational exhibit (books and apparatus) of the German Empire. In this first International Congress of Mathematicians the following seven countries participated: Austria, France, Germany, Italy, Russia, Switzerland, and the United States. Prof. W. E. Story of Clark U. was president of the Congress; Prof. E. H. Moore, vice-president, Prof. H. W. Tyler of M.I.T., secy. The exec. comm. consisted of these officers and Profs. Klein and White (then of Northwestern U.). The remarkably successful colloquium by Klein, held at Evanston a little later, is described in some detail in chapter VI. These two gatherings, organized by members of the Chicago group, had important results in the Society. The suggestion by Moore to the Council of the NYMS that it should publish the proceedings of the Congress was acted upon favorably, and was the final impulse leading, on 1 July 1894, to the changing of the Society's name to the American Mathematical Society. Furthermore, it was Prof. White who suggested, and who collaborated with Prof. Fiske in organizing the first Colloquium Lectures of the Society in 1896.

A warm friendship between the great enthusiasts Moore and White

opened the way for frequent conferences and informal discussions in which other members of the math. faculties of Chicago and Northwestern took part. Bolza was a wise consultant in the active trio, and Maschke and T. F. Holgate, of Northwestern, were interested listeners, for the most part. Out of these conferences there grew a desire to bring in a larger group. Prof. Moore's communication to the Council in this regard was referred to the secretary and committee of publication with power. Part of the historic printed circular which resulted and was sent out in early Dec. of 1896 to students and teachers of mathematics in neighboring institutions, is as follows:

#### A CALL TO A CONFERENCE IN CHICAGO

To Members of the American Mathematical Society:

Our Society represents the organized mathematical interests of this country. Its function is to promote those interests in all possible ways.

Do we not need most of all frequent meetings? Those who have attended the summer meetings know the keen stimulus and inspiration resulting from personal contact—inside and outside the stated meeting—with colleagues from other institutions. The regular monthly meetings of the Society afford similar opportunities to those who live in the vicinity of New York.

By the organization of *sections* of the Society can similar advantages be secured for other parts of the country? Shall, for instance, a Chicago section be organized? Obviously only if the members of the Society residing in the vicinity of Chicago wish the section organized and are willing to support sectional meetings by attendance and by the contribution of papers. How shall the sections be related to the Society?

Those members of the Society who may be interested in the consideration of these and cognate questions we invite to meet in conference in Chicago during the coming holidays. The conference will convene in room 35 of the Ryerson Physical Laboratory of the University of Chicago at 10 o'clock, Thursday forenoon, December 31, 1896. It is expected that the conference will have three or four sessions and will adjourn on Friday, January 1, 1897. The deliberations of the conference may result in recommendations to the Society or to the Council of the Society.

The programme of the conference will of course include the reading of mathematical papers. These papers should represent the various lines of mathematical activity of those in attendance. It is requested that titles and time-lengths of papers to be read be sent as early as possible to E. H. Moore.

After another paragraph about railroads and hotels the following 28 names appear:

E. H. Moore, O. Bolza, Thomas F. Holgate, H. Maschke, Henry S. White, W. W. Beman, E. M. Blake, John E. Davies, Ellery W. Davis, H. T. Eddy, E. A. Engler, A. Hall, Jr., Harris Hancock, M. W. Haskell, A. S. Hathaway, E. W. Hyde, Malcolm McNeill, E. Miller, H. B. Newson, James Byrnie Shaw, David Eugene Smith, W. B. Smith, E. J. Townsend, C. A. Waldo, L. G. Weld, C. B. Williams, J. W. A. Young, Alexander Ziwet.

The following 17 members of the Society were present at the Conference: Hancock, Maschke, E. H. Moore, J. W. A. Young from U. Chicago; Shaw, Townsend, U. Illinois; Estella K. Wentz, Industrial Training School, Indianapolis; Newson, U. Kansas; P. H. Philbrick, Lake

Charles, La.; M. McNeill, Lake Forest U.; T. E. McKinney, Marietta C.; Ziwet, U. Michigan; E. W. Davis, Nebraska; Holgate, White, Northwestern U.; E. M. Blake, Purdue U.; C. H. Chandler, Ripon C. A temporary organization was effected by the election of Prof. Moore as chm. and Dr. Blake as secy. A comm. consisting of Ziwet, Shaw, and Blake was appointed to formulate a plan of permanent organization for a local section of the AMS. The resulting resolutions were adopted and Ziwet was requested to transmit to the Council of the Society those resolutions pertaining to it. Fourteen papers were presented at the conference.

As a result, the following clauses were introduced into the By-Laws of the Society:

XII. Whenever it shall appear to the Council that a sufficient number of members of the Society are desirous of conducting in any locality periodic meetings for the reading and discussion of mathematical papers, the Council may authorize the formation of a Section to be composed at each sectional meeting of such members of the Society as may be present; and the Council shall have the right to withdraw such authorization. XIII. Papers intended for presentation at any meeting or sectional meeting of the Society shall be passed upon in advance of the meeting by a programme committee appointed by or under the authority of the Council; and only such papers shall be presented as shall have been approved by such a committee.

The second conference of the Chicago members of the AMS occurred on 24 Apr. 1897 and in accord with the action of the Council organized itself into the "Chicago Section of the American Mathematical Society." Prof. Moore was elected chm., and Prof. Holgate secy. On motion of Prof. White it was voted respectfully to present to the Council the name of Prof. Moore for second VP of the AMS. R. S. Woodward and E. H. Moore were elected first and second VP for 1898, and Moore and T. S. Fiske as first and second VP for 1899 and 1900. Various papers were read at this first meeting of the Section, which was to flourish and be a rich source of inspiration.

The chairmen and secretaries of the Section are listed below. During 1903–05, chairmen were appointed at each meeting; for 1905–15 the chm. was elected annually; for 1916–23, biennially.

*Chairmen*

E. H. Moore 97–Mar. 02	E. B. Van Vleck 07
H. B. Newson Jan. 03	G. A. Miller 08–09
C. A. Waldo Apr. 03	L. E. Dickson 10–11
O. Stone and L. G. Weld Dec. 03–Jan. 04	D. R. Curtiss 12–13
G. W. Myers Apr. 04	E. J. Wilczynski 14–15
E. J. Townsend Dec. 04	W. B. Ford 16–17
E. R. Hedrick Apr. 05	G. A. Bliss 18–19
A. G. Hall Dec. 05	R. D. Carmichael 20–21
A. Ziwet 06	A. B. Coble 22–23

*Secretaries*

T. F. Holgate 97–05	A. Dresden 16–23
H. E. Slaught 06–15	E. J. Moulton (acting secy.) 18–19

A suggestion as to early activity in the Section is indicated by the fact that at the end of the seventh meeting in Apr. 1900, 106 papers had been presented by 41 different persons. There were 11 to 21 members of the Society present at each meeting, but many others were also in attendance. At the third meeting an event of special interest was the exhibition by Prof. Michelson, in his laboratory, of his new Harmonic Analyser, a description of which was published in *Amer. Journ. Sci.*, s. 4, v. 5, p. 1-13, and in *Phil. Mag.* for Jan. 1898. At the fourth meeting Prof. J. W. A. Young reported that the chm. of a comm. of the National Educational Association on College Entrance Requirements requested the Section to secure the appointment by the AMS of a comm. to cooperate with the above mentioned comm. and to prepare a report on the scope, aim and place of mathematical studies in the secondary schools and in preparation for college. The Council authorized the Section to appoint Profs. J. W. A. Young, E. W. Davis, T. F. Holgate, H. B. Newson, and J. B. Shaw on this comm. and placed a sum of money at its disposal for expenses.

It was at about this time that Prof. Moore was put in charge of the great new venture of the Society, namely as editor-in-chief of the *Transactions*, 1899-1907. E. W. Brown and T. S. Fiske were associated with him as editors to the end of 1905. Details concerning the *Transactions* are given in chap. V. But Moore was also P AMS in 1901-1902. (His retiring address as P AMS, delivered at New York on 30 Dec. 1902, was repeated at the meeting of the Chicago Section a few days later.) Thus during the decade 1893-1903 members of the Chicago group were playing important rôles in connection with the high purposes of the Society.

In Dec. 1905 Holgate resigned as secy. of the Section and was succeeded by Slaughter. His reports on the Section's activities in *AMS Bull.*, Feb. 1898-Mar. 1906, strike a reader of the present day as ideal; abstracts of papers then, happily, did not have to be unduly compressed. At the nineteenth meeting of the Section in Apr. 1906, when the 40 persons in attendance included 28 members of the Society, 25 papers were presented. A resolution introduced by Prof. Moore, and unanimously carried, expressed the very earnest hope of the Chicago Section that it may be possible to establish a strong section of the Society which shall hold meetings at some convenient center in the Southwest. This was transmitted to the Council with a supporting letter from Prof. Moore. On the basis of this, and representations made by Prof. Hedrick, the Council in Dec. 1906 authorized the formation of a Southwestern Section and approved of Profs. Hedrick, Chessin, and Porter as members of the program comm. Thus the Chicago group not only originated but developed the Section idea. A San Francisco Section was organized in 1902; see chapter I.

The twenty-second meeting of the Section in Dec. 1907 with 84 members present was the largest gathering up to that time. A series of sessions of mathematicians and engineers was held under the auspices of the Sec-

tion and jointly with Sections A (math. and astr.) and D (mechanical science and engineering) of the AAAS. Over 100 mathematicians and 50 engineers were present at the discussion of the teaching of mathematics to engineering students. A committee was appointed to take into consideration the whole question of the mathematical curriculum in technical schools and in technical departments of colleges and universities. Prof. E. V. Huntington was chm. of this comm. of twenty members which included D. F. Campbell, W. F. Osgood, C. S. Schlichter, C. P. Steinmetz, E. J. Townsend, R. S. Woodward, A. Ziwet. For Slaughter's fine report of these meetings see *AMS Bull.*, Mar. 1908, p. 256-282. The committee's report, *Syllabus of Mathematics*, was published by the Society for the Promotion of Engineering Education. (Pittsburgh, 1914, iv+131 p.).

At the twenty-third meeting of the Section in April 1908 Maschke's death was announced. Bolza's restrained but satisfying tribute, "Heinrich Maschke: his life and work," may be read in *AMS Bull.*, v. 15, p. 85-95. Bolza had accepted an invitation to the U. Chicago at its opening in 1892 on condition that Maschke would be appointed simultaneously. With his passing one of the great attractions of American academic life for him had vanished, and he resigned his position in 1910 and returned to Germany. The loss of these two men at the U. Chicago was irreparable. Readers wishing to be more fully informed with regard to those early days will naturally turn to Bolza's *Aus meinem Leben* (Munich, 1936), p. 23-36. As VP AMS in 1909, E. B. Van Vleck occupied the chair for part of the time at the twenty-fifth meeting when G. A. Miller was the regular chm. The twenty-eighth meeting was held at Minneapolis in Dec. 1910, when L. E. Dickson was VP AMS, an editor of the *Transactions*, and chm. of the Chicago Section. There was a joint session with Section A of AAAS, of which Prof. Moore was chm., at which Prof. E. W. Brown delivered his retiring address as chm. of Section A, and F. R. Moulton and W. D. Macmillan presented papers of a mathematical character. At another session of engineers, physicists, and mathematicians, Huntington presented his report on "The teaching of mathematics to students of engineering," started under the auspices of the Chicago Section; a most hearty vote of appreciation was tendered to him.

On the invitation of the Chicago Section the Society held its first meeting in Chicago in April 1911. Of the 115 persons who attended the sessions 88 were members of the Society; 53 papers were read. But the occasion was made even more memorable by the fact that Prof. Bôcher then delivered his retiring presidential address, postponed by the Council from the annual meeting, as a friendly gesture to the Chicago Section.

The importance of the contributions to the development of mathematics by the Chicago group was fully appreciated by the Council, which voted in Oct. 1913 to designate "the meetings of the Chicago Section, so far as concerns the presentation of scientific papers, as meetings of the

Society." The report of Cole then continues, "The Society will hereafter enjoy the possibly unique distinction of holding almost simultaneous meetings in different cities. The Chicago Section will retain its identity unchanged as regards sectional or local matters." Thus the thirty-second meeting of the Chicago Section in Dec. 1913 was also the "first regular Western Meeting of the Society." The U. Chicago most graciously celebrated the occasion by tendering a complimentary dinner to the members of the Society and others attending the meeting (73). Dean J. R. Angell, afterwards president of Yale U., represented the U. in the absence of President Judson from the city. The Constitution of the Society was amended in Feb. 1914 so as to provide that the secy. of the Chicago Section shall be, *ex officio*, one of the officers of the Society. This continued to the end of 1923. Prof. E. B. Van Vleck was elected P AMS 1913–1914. At the time of the second Western meeting of the Society in Apr. 1914, E. J. Wilczynski was both VP AMS and chm. of the Chicago Section. At this meeting a comm. consisting of Profs. Ziwet, G. A. Miller, E. R. Hedrick, R. P. Baker, and E. B. Skinner was appointed to report at the Dec. meeting of the Section "concerning possible recommendations to the Council of the Society on the question of the relation of the Society to the field now covered by the *American Mathematical Monthly*." At the next meeting of the Section it was voted that the report which it had received on this question should be transmitted to the Council with the request that the Council appoint a comm. to consider and report concerning possible relations of the Society to the field then covered by the *American Mathematical Monthly*. At a meeting in Jan. 1915 the Council appointed as such a comm. Profs. Fiske, Fine, Hedrick, Osgood, and Slaught. In Apr. 1915 the Council voted that "It is deemed unwise for the American Mathematical Society to enter into the activities of the special field now covered by the *American Mathematical Monthly*; but the Council desires to express its realization of the importance of the work in this field and its value to mathematical science, and to say that should an organization be formed to deal specifically with this work, the Society would entertain toward such an organization only feelings of hearty good will and encouragement."

The thirty-sixth meeting of the Section at Columbus, O. in Dec. 1915 was a large one, and the opening session was a joint meeting with Section A of AAAS, at which Prof. White, then of Vassar C., delivered his retiring address as chm. of Section A; and Prof. Wilczynski delivered an address as retiring chm. of the Chicago Section, "Some remarks on the historical development and the future prospects of the differential geometry of plane curves." This latter address was a pleasant new departure. At this Columbus meeting Slaught's notable services as secy. of the Section terminated. He was the leader in the movement, which resulted at this same meeting, in the founding of the Mathematical Association of America, with the *American Mathematical Monthly* as its official organ.

The meeting of the Section in Apr. 1917 was notable, in that a slightly novel idea was illustrated by a Symposium in which the principal papers were "Integrals of Lebesgue and their applications" by G. A. Bliss, and "Integrals, extensions of and related to Lebesgue" by T. H. Hildebrandt; the papers were discussed by Profs. E. H. Moore and Hedrick. The idea of a Symposium was first suggested by Prof. Van Vleck in Apr. 1915 and was discussed by various later committees in the Section. Subsequent Symposia in the Section were as follows:

1918:—"Divergent series and summability" by R. D. Carmichael; "General aspects of the theory of summable series" by C. N. Moore.

1919:—"On the geometry of numbers, relating largely to the work of Minkowski" by H. F. Blichfeldt and L. E. Dickson.

1920:—"The Maxwell field equations and the theory of relativity" by M. Mason and A. C. Lunn.

1921:—"The general theory of approximation by polynomials and trigonometric sums" by D. Jackson.

1922:—"Cremona transformations and applications to algebra, geometry and modular functions" by A. B. Coble

Many later Symposia at Chicago we shall not list here. The Symposium idea was taken up in meetings of the Society at New York in 1920, at Toronto in 1921, and so on; see "Invited Addresses," in chapter II.

Ford's retiring address as chm. of the Section, "A conspectus of the modern theory of divergent series," was delivered at one of the sessions held in Dec. 1917 in conjunction with the MAA. In the following year the annual meeting of the Society was held in Chicago, and Prof. Dickson delivered his retiring address as P AMS, on "Mathematics in war perspective." The program of the Section meeting at St. Louis, in Dec. 1919, in joint session with the Southwestern Section, included Prof. Bliss's address as retiring chm. of the Section, on "Some recent developments in the calculus of variations." D. R. Curtiss was VP AMS in 1918, and D. Jackson in 1921. In Dec. 1921, when Prof. Bliss was P AMS, and Prof. E. H. Moore P AAAS, the forty-eighth meeting of the Section was held in conjunction with the annual meeting of the Society at Toronto; there was a joint session with Sections B and D of AAAS. The cup of the Chicago Section's joy ran over.

In Apr. 1922 a regular meeting of the Society, the forty-ninth of the Chicago Section, was held at U. Chicago in honor of the twenty-fifth anniversary of the Chicago Section. The attendance at the meeting was approximately 150 persons of whom 104 were members of the Society. An outstanding event of the occasion was the presentation to Prof. E. H. Moore of a laudatory address beautifully bound and illuminated, and containing a statement regarding the establishment of the Eliakim Hastings Moore Fund, offered for trusteeship to the Society, see chap. III. In *AMS Bull.*, v. 28, Prof. Dresden has given an interesting survey of the scientific work of the Chicago Section 1897–Apr. 1922. The number of papers presented at meetings of the Section was 1102, which may be classified as follows:

Arithmetic and Algebra	335 or 30 per cent
Analysis	380 or 35 per cent
Geometry	248 or 22 per cent
Mechanics (incl. Math. Physics)	93 or 8 per cent
History, Pedagogy, Philosophy	46 or 4 per cent

The 335 papers on arithmetic and algebra were by 84 authors; 380 in analysis by 135 authors; 248 in geometry by 118 authors; in mechanics 93 papers by 33 authors; in history, etc., 46 papers by 18 authors. The total number of authors is 278. The ten authors who presented 19 to 70 papers each were, in order, W. D. Macmillan, E. H. Moore, A. R. Schweitzer, L. E. Dickson, G. A. Bliss, E. J. Wilczynski, J. B. Shaw, F. R. Moulton, R. D. Carmichael, G. A. Miller. The last meeting as a Section was at Cincinnati in Dec. 1923, "the twentieth Western Meeting of the Society (fifty-second Meeting of the Chicago Section)." Thereafter all meetings of the "Section" were as regular meetings of the Society; the secretary of the Section (Prof. Dresden) became an assistant secretary of the Society. The general understanding was that the Council should meet in Chicago once a year.

In this survey, particularly of the history of the Section, briefly indicating its organization, activities, and external contacts and individuals concerned with them, no reference has been made to the fine good fellowship and solidarity established in the group, and to the characteristic enthusiasm with which its members ever discussed and explored varied fields of research.

In chapter XV are to be found detailed sketches and bibliographies of Profs. E. H. Moore, White, E. B. Van Vleck, Dickson, and Bliss. The Chicago group (including those from Urbana, Ann Arbor, Madison, and Minneapolis, who were also members of the Section) founded the Mathematical Association of America; originated the ideas of Colloquium, Section, and Symposium; hurried up the changing of the Society's name; and contributed four presidents to the Society, six of the nine managing editors for the *Transactions*, and ten of the thirty-three colloquium lecturers.

Perhaps enough has been indicated, faintly to suggest how vital and far-reaching have been the contributions of members of the Chicago group, in the development of the Society to its present position of eminence, and in the establishment of a basis for the American Mathematical School of the present day.