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plant pathology which he helped to elevate to a profession of high standing will endure for all time. In this line of endeavor nature's obedient response to his interrogations is well evidenced by a survey of the astonishing number of publications he has contributed, 167 original and 73 reviews, a total of 240.

It is not necessary to say to the friends of Dr. Smith that his culture was far more than plant pathological. An inherent love of the more refined embellishments of our civilization, especially literature, served to further distinguish this many-sided man. A patron of all the arts, he was a master of lucid composition and a gifted poet. A book of verse published privately in 1915, containing 197 sonnets and other original poems, together with understanding and sympathetic Latin translations from the German, French and Italian languages, is an achievement of his creative ability, practically unknown except to the small circle of friends among whom the limited edition was circulated. His fondness for the beautiful city of his adoption was not confined to a detached admiration of its charm. As a member of the Arts Club of Washington he actively served with the enthusiastic and disinterested groups of public-spirited citizens in movements designed for preserving its natural beauty and enhancing it with architectural adornments in keeping with the vision of L'Enfant.

A glimpse into his home disclosed a veritable treasure house of art objects and a superlative library selected with discriminating taste during a long lifetime of profound meditation on the serious things of this life and the hereafter. Dr. Smith was not a churchman in the sense of regular display of piety, but he was deeply religious and his faith as revealed in his written records constitutes an answer to the challenge of the fundamentalists who see in the interpretations of science an undermining of the structure of Christianity.

At a time when he could look back over the course of a long life rich in service to his fellowmen and just following the spontaneous tribute to his genius by his fellow scientists at the Philadelphia meetings of the American Association for the Advancement of Science he passed into the state which can not be voiced more fittingly than in his own words:

QUIETUDE: A PRAYER

God of all flesh, when these my days are sped
Let me but hear the music of the spheres
Or see, far off, the progress of the years
And I shall be greatwhile content though dead;
For to their heavenly music I am wed
And thrill with subtle thrills, nor yield to fears.
Thy great To-morrow wipes away all tears
And there, as here, Thy law shall be our bread.
Then let me dwell in some great quiet place

Where I may brood in peace on time's deep things
And all the mystery that round man clings;
Far off, mayhap, have glimpse of one sweet face;
And catch the tones of twanging golden strings
Whereto Thy myriad million stars keep pace!

E. W. BRANDES

UNITED STATES DEPARTMENT
OF AGRICULTURE

COLLEGE LIBRARIES AND CHEMICAL EDUCATION

WHETHER we would have it or no, the purpose of the small college is changing. A decade ago the graduate of a college was thought to be fitted with the requisites of a cultural, liberal education, to be ready to begin his life work as a good citizen. Within a generation, however, has come an era of specialization. Everywhere we see the demand for the expert worker, the professional man who has devoted from two to four additional years to train himself in a special way in a particular field.

The small college has stood staunch in its desire to supply the liberal education and perhaps it has done well in maintaining this position. On the other hand, many of the large universities have shifted the emphasis from undergraduate work to graduate study. Still others have tried to develop both side by side. Few of the small colleges have kept astride with the inevitable consequences of such a situation. The few who have are sending an increasing number of their graduates to these universities to complete their training. As an example of this, it is the boast of Pomona College that over seventy per cent. of her graduates have taken subsequent professional training. It has become the evident duty, therefore, of the small college to prepare its men, not only to enter such graduate schools, but also to meet successfully the ever-increasing intensity of competition found there. This in addition to supplying a broad cultural education. This duty has brought with it a number of problems of first magnitude. One of the biggest of these is the problem of adequate library facilities.

It is the purpose of this paper to discuss this problem with special reference to the student whose college major is chemistry. The answer to the question of what books a library in chemistry should contain will be found excellently answered in a book, containing a list of 1,600 books, each one judged by experts as to importance and value. This book, edited by Patterson and Crane, will soon be available. The problem of the purchase of new books as they appear is one which must be answered anew for each

volume and can hardly be discussed in a paper of this kind. Fortunately, perhaps, the question of books is a minor part of the principal problem, and is almost totally eclipsed by the bigger question: What files of scientific periodicals are needed in a college library successfully to prepare the student for advanced work, taking into consideration also those materials necessary for the stimulation and intellectual development of the faculty? This latter need is quite as important as the first because of the increasing demand of the colleges for instructors with the doctorate degree. Such men are reluctant to accept positions in colleges where facilities for continuing the research which they have learned to love are lacking.

One way to answer this question would be merely to sit down and compile a list of those journals which one considers indispensable. Such a procedure might prove eminently successful in certain cases, but it seems reasonably certain that often the result would be seasoned too much by the needs, likes and dislikes of the compiler. In casting around for a better method of arriving at the answer, the writers decided to seek an arbitrary standard of some kind by which

to measure the desirability of purchasing a particular journal.

If one grants, to avoid argument, that the department is trying to train men, first, to understand the science of chemistry (including, of course, the methods and means of advancing the frontiers of the science) and, second, to be able actually to contribute to this progress, then it seems inquiry should be made into the library tools which men are using who are now doing just this. With this purpose in mind, it was decided to tabulate the references in a single volume of *The Journal of the American Chemical Society*. This journal was chosen as the most representative of American chemistry. It is believed that the results of such a tabulation can be considered statistically and used with certain reservations to predict the future needs for a period, let us say, of ten years. The most recent complete volume (1926) of this journal has been chosen and the results tabulated in such a way that the relative importance of any single periodical for any five-year period can be seen. This is very important when one considers that only relatively few libraries can afford complete files of journals which have been published continuously for a century or more.

TABLE I

	Total	1921-1925	1916-1920	1911-1915	1906-1910	1901-1905	1896-1900	1891-1895	1886-1890	1881-1885	1876-1880	1871-1875
<i>Ber.</i>	686	78	30	67	115	79	64	60	56	53	44	33
<i>J. Chem. Soc.</i>	390	122	37	60	45	47	21	20	5	2	1	.....
<i>Ann.</i>	278	26	8	37	33	23	22	21	19	18	13	.....
<i>Z. physik. Chem.</i>	191	53	6	21	29	19	28	16	6	.....	.....	.....
<i>Compt. rend.</i>	126	26	3	23	15	23	15	21	7	9	8	.....
<i>J. Phys. Chem.</i>	93	42	13	13	5	1	1	.....	.....	.....	.....	.....
<i>Ann. Physik</i>	93	18	4	28	13	6	0	0	6	5	2	.....
<i>J. Biol. Chem.</i>	80	41	16	14	7	.....	.....	.....	.....	.....	.....	.....
<i>Am. Chem. J.</i>	70	.....	.....	9	21	20	14	8	4	2	1	.....
<i>Z. anorg. Chem.</i>	68	21	11	5	8	11	6	2	.....	.....	.....	.....
<i>Ann. Chim.</i>	68	5	0	6	9	7	3	5	1	8	4	2
<i>Bull. Soc. Chim.</i>	60	16	3	4	7	10	4	4	3	4	2	1
<i>Proc. Roy. Soc.</i>	55	30	5	4	8	5	1	0	1	.....	.....	.....
<i>J. Ind. Eng. Chem.</i>	53	33	10	5	1	.....	.....	.....	.....	.....	.....	.....
<i>Z. Phys.</i>	51	41	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
<i>Monatsch.</i>	51	2	1	21	5	9	3	2	5	3	.....	.....
<i>J. prakt. Chem.</i>	50	6	1	2	2	6	3	12	6	6	2	2
<i>Phil. Mag.</i>	49	17	14	4	2	3	3	1	1	0	0	1
<i>Gazz. chim. ital.</i>	44	10	6	2	6	4	8	4	3	0	1	.....
<i>Phys. Rev.</i>	44	23	8	3	5	4	.....	.....	.....	.....	.....	.....
<i>Physik. Zeit.</i>	41	26	0	7	3	.....	.....	.....	.....	.....	.....	.....
<i>Z. Elektrochem.</i>	37	11	13	4	4	4	1	.....	.....	.....	.....	.....
<i>Biochem. Z.</i>	37	18	2	9	10	.....	.....	.....	.....	.....	.....	.....
<i>Rec. trav. chim.</i>	36	14	5	2	2	2	5	4	1	1	.....	.....
SCIENCE	27	22	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
<i>Trans. Far. Soc.</i>	24	18	0	1	0	1	.....	.....	.....	.....	.....	.....
<i>Proc. Nat'l Acad.</i>	22	19	0	.....	.....	.....	.....	.....	.....	.....	.....	.....
<i>Nature</i>	21	13	5	1	.....	.....	.....	.....	.....	.....	.....	.....

The abbreviations used above and in the tables to follow are those accepted by *Chemical Abstracts* and may be found in their list of periodicals abstracted, issued October 20, 1926.

For the purposes of this tabulation, references to *The Journal of the American Chemical Society* have been excluded. References to the current year (1926) are not included in the tables except in the totals because of the fact that certain journals published near at hand are more readily available than others and references to the current year would, of course, be more numerous for these journals than for others. The total number of references thus considered was found to be 3,633 and these were found to be distributed among 247 different journals or periodicals. In Table I are given the results of this tabulation for the leading 28 periodicals, arranged in order of total number of references. A short study of this table will show that a large total number of references is not the only criterion of desirability which should be applied. It must be realized that a periodical which has been in existence for only ten years, having, let us say, but half as many references as one which has been published continuously for fifty years, would be more desirable, dollar for dollar invested, than the latter, assuming the cost per year to be comparable in the two cases. It is also possible that a journal may have been of such quality for a long period of years that it is now little used and that in later years its quality may have improved or the nature of its material changed in such a way that it is now a very valuable journal. The reverse change is even easier to imagine. It is for such reasons that the distribution as to years of publication of articles referred to is given after the column giving the total number of references.

The distribution of references not included in the above table is shown in Table II.

TABLE II

Number of references	Number of periodicals
15-20	7
10-14	15
5-9	27
3-4	37
2	33
1	99

The meaning of Table II is made clear when it is stated that there were 99 periodicals to which there was but a single reference, or that there were 27 journals to which reference was made from five to nine times each.

A third tabulation will prove valuable in deciding what journals should be included in the current library subscription lists, even though funds may not

be available for the extensive purchase of back-files. In this connection, it must be realized that the "present trend" rather than the "past performance" of a journal should be considered first. In Table III the journals have been rearranged in order of number of references in the period 1916-1925 inclusive.

TABLE III

Name of Journal	No. of references 1916-1925
<i>J. Chem. Soc.</i>	159
<i>Berichte</i>	108
<i>Z. Phys. Chem.</i>	59
<i>J. Biol. Chem.</i>	57
<i>J. Phys. Chem.</i>	55
<i>Z. für Physik</i>	46
<i>J. Ind. Eng. Chem.</i>	43
<i>Proc. Roy. Soc.</i>	35
<i>Annalen der Chemie</i>	34
<i>Z. anorg. Chem.</i>	33
<i>Ann. Physik</i>	32
<i>Phil. Mag.</i>	31
<i>Phys. Rev.</i>	31
<i>Compt. rend.</i>	29
<i>Phys. Zeit.</i>	26
SCIENCE	25
<i>Z. Elektrochem.</i>	24
<i>Biochem. Z.</i>	20
<i>Proc. Nat. Acad. Sci.</i>	19
<i>Rec. trav. chim.</i>	19
<i>Bull. soc. chim.</i>	19
<i>Trans. Far. Soc.</i>	18

The importance of such a tabulation is realized when the relative positions of periodicals are compared in Tables I and III. For example in Table I, Liebig's *Annalen der Chemie* is third while *Zeitschrift für Physik* is in fifteenth place, while in Table III *Annalen* is ninth and the *Zeitschrift für Physik* is in sixth place. It must appear that to the American chemist the current number of the latter journal is of more importance than a current number of the classical *Annalen der Chemie*.

The use of these tables is left to the individual reader who will know best how to adapt them to a local need. The following conclusions formulated from them by the writers may prove of assistance in making such applications.

(1) It is assumed that the first need of any American college chemistry library is a complete file of the publications of The American Chemical Society: *The Journal of the American Chemical Society*, *Chemical Abstracts*, *The Journal of Industrial and Engineering Chemistry*.

(2) The complete file of the *Berichte der deutschen chemischen Gesellschaft* is indispensable. It must

come as a surprise to many chemists, even though they were conscious of the vast number of references to this journal, that 18.88 per cent., or almost one in five, of all references are to this single journal.

(3) The file of *The Journal of the Chemical Society* (London) should begin with 1891 and be complete to date. Even though funds for back-files are not available, this journal should be included in the current subscription lists of every library. This will be realized if reference is made to Table III.

(4) The file of the *Zeitschrift für physikalische Chemie* should be complete from 1895 to date, and it should be on the current subscription lists. From its present trend of usefulness (*vide* Table III) it is believed that this journal deserves consideration before *Liebig's Annalen der Chemie*. There is another reason for placing this journal next, because by so doing the balance between organic and physical chemistry is better maintained.

(5) Next in importance, perhaps, is *Annalen der Chemie* (Liebig's). It should be borne in mind that many of the classical researches to which students studying organic chemistry should be constantly referred are found in the back files of this journal. The quality and usefulness of this journal has apparently been very uniform since its first publication. Because of this fact, the back files should begin as far back as possible. Original reprint of this journal is now almost impossible to obtain. Anastatic reprint is available, however, at not unreasonable cost. It should be remembered that such reprint when reproduced from old and time-worn original print may not be first class.

(6) Certainly no American college library of chemistry should be without *The Journal of Physical Chemistry* to-day. Apparently the quality of this periodical has been much improved recently. (See Table I.) Back files should certainly start as early as 1920 and wherever possible with 1910 issues.

(7) Next in importance, the writers place *The Journal of Biological Chemistry*. This journal should only be considered by colleges where members of the staff in chemistry or biology are interested in this field. Students looking forward to the study of medicine should be provided with this journal. Back files might well begin in 1920.

(8) Attention should be called to the recently growing importance of so-called "practical" journals for academic work. Publication of research has been at such a pace that the regular channels of publication are overcrowded. The natural result of this is that many articles of academic interest are now being regularly published in non-academic journals. An excellent example of this is found in the marked in-

crease in usefulness, as exemplified by the number of references to it, of *The Journal of Industrial and Engineering Chemistry*. (See Table I, 1921-25.)

(9) An interesting and important corollary of this tabulation is discovered when one considers the language of publication of the references tabulated. Considering only the foreign periodicals (*i.e.*, excluding those published in the United States) the results are found in Table IV.

TABLE IV

Language	Number of references	Per cent.
German	1667	52.5
English	1119	35.2
French	300	9.4
All others	87	2.8

Certainly it should be insisted that a reading knowledge of German be required of every student majoring in chemistry in college. French can hardly be accepted as a substitute although it should, of course, be urged as a complementary tool of value.

(10) The conclusions which precede have been drawn from a consideration of periodicals which are strictly chemical in their subject matter. Due to the rise of physical chemistry during the last decade, there are an increasing number of journals usually considered in the domain of physics which must be considered as important for a chemistry student. This fact must not be lost sight of in the expenditure of library funds. The following journals which come in this class are of prime importance to the chemist and might well be considered jointly by the departments of physics and chemistry: *Annalen der Physik*, *Zeitschrift für Physik*, *Physical Review*, *Physikalische Zeitschrift* and *Transactions of the Faraday Society*.

(11) There is also a group of periodicals of even wider interest than the group immediately preceding. These might well be considered by the entire science division of the college faculty, as material of interest in astronomy, biology, chemistry, geology, mathematics, physics, etc., is included. The list follows: *Philosophical Magazine*, *Comptes rendus de l'Académie des Sciences*, *SCIENCE*, *Nature*, *Proceedings of the National Academy of Sciences* and *Proceedings of the Royal Society* (London).

Perhaps the writers have not succeeded in answering the general question which they set for themselves at the outset of this survey. Perhaps, however, they have succeeded in pointing the way in which this question may be more readily answered by

chemists, who may profit by the data here tabulated. Perhaps, also, the way has been pointed for workers in fields other than chemistry to answer this question for themselves. If this partial success has been achieved, the time and labor expended in this study will have been amply repaid.

P. L. K. GROSS
E. M. GROSS

DEPARTMENT OF CHEMISTRY,
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SCIENTIFIC EVENTS

ZOOLOGY AT THE NASHVILLE MEETING OF THE AMERICAN ASSOCIATION

THE American Society of Zoologists and section F (zoology) of the American Association for the Advancement of Science will hold joint sessions for the reading of papers at Nashville from Wednesday, December 28, to Friday, December 30, inclusive. The Hermitage Hotel, Sixth Avenue and Union Street, will be headquarters for members of both organizations; the stated price for single rooms is \$2.50 to \$5.00. Those planning to attend the meetings are strongly advised to write direct to the hotel and make reservations as early as possible, since it may not be possible to accommodate all.

On Wednesday evening will be held a biologists' smoker; on Thursday evening the zoologists' dinner; and on Friday evening the naturalists' dinner; all in the Hermitage Hotel. At the zoologists' dinner, Thursday evening, Professor W. C. Curtis, retiring vice-president of section F, will deliver his address on the topic, "Old Problems and New Technique." Sessions for the reading of papers will be held in the school of medicine, with ample provision for meetings and for demonstrations.

Members of section F, not members of the American Society of Zoologists, who desire to read papers, should submit titles accompanied by abstracts not exceeding 250 words. These may be sent to the secretary of section F at the address subscribed to this notice any time before November 12, or they may be sent direct to the secretary of the American Society of Zoologists, D. E. Minnich, department of zoology, University of Minnesota, any time before November 15. Papers will not be received by the secretaries after these respective dates. The maximum time allowed for the presentation of a paper is fifteen minutes. The American Society of Zoologists has charge of the program and arrangements.

General announcements regarding the matters of transportation, housing and the like, will be found in the preliminary statement of the permanent secretary

of the American Association for the Advancement of Science, soon to be published.

GEO. T. HARGITT,
Secretary, Section F

LYMAN HALL, SYRACUSE UNIVERSITY,
SYRACUSE, N. Y.

THE INTERNATIONAL OFFICE OF CHEMISTRY AT PARIS

THE American Chemical Society has addressed a letter to the Secretary of State, Frank B. Kellogg, stating its opposition to American membership in the International Office of Chemistry at Paris, to which an invitation to membership has been received from the French government.

The letter to Secretary Kellogg, made public by the secretary of the society, Charles L. Parsons, states that the invitation of the French government is still before the department for consideration. The Department of State, however, in commenting upon the letter October 18, stated that the invitation of the French government was received on June 1, 1926, and that a reply had been sent August 12, 1926, that the "United States Government had reached the opinion that the compensatory advantages that would accrue to it through membership in the International Office of Chemistry were not sufficient to warrant the United States Government in becoming a member of the office at this time."

The full text of Dr. Parsons' letter follows:

HON. FRANK B. KELLOGG,
The Secretary of State,
Washington, D. C.

Sir: By vote of the council of the American Chemical Society, I was requested to call your attention officially to the enclosed October 10 issue of the News Edition of the official organ of our society.

The American Chemical Society has in its organization practically all of the prominent and influential chemists of America and a membership of approximately 15,400.

We would respectfully request that, before any action is taken by the United States toward participating in the International Office of Chemistry which is still before your department on proposal of the French Republic, careful consideration be given the facts and data presented in this publication.

The American Chemical Society is very strongly opposed to the creation of any international center for the control of chemistry, whether it be located in France or elsewhere. We would, accordingly, request that this communication and this publication be duly filed with the proposals which have been received from the French Government covering the International Food Laboratory and an International Office of Chemistry.