

# The Selection of Chemical Engineering Periodicals in College Libraries

*Mr. Smith is librarian of the Aeronautical Archives of the Institute of the Aeronautical Sciences, Inc. His paper is a compression of a master's essay accepted at the School of Library Service, Columbia University, in 1942 and exemplifies one of the two series described in Miss Fay's article on pages 207-16.*

THE PURPOSE of this essay is to consider the problem of selection of chemical engineering periodicals in the engineering college library, using as a basis the statistical method. In this method the periodical references in one or more representative source journals are counted and tabulated in order to arrive at a list of the periodicals most used by investigators in the field.

As the study was undertaken with reference to the chemical engineering curriculum, the content of this curriculum was examined as presented in the report published in 1938 by Albert B. Newman,<sup>1</sup> chairman of the Chemical Engineering Education Committee of the American Institute of Chemical Engineers. The accrediting of chemical engineering curricula by this organization had been in operation for some time, and the data accumulated through its work in surveying individual colleges provided a basis for the section

<sup>1</sup> Newman, A. B. "Development of Chemical Engineering Education in the United States." In American Institute of Chemical Engineers. *Transactions*, v. 34, Supplement, July 1938. 46p.

on the curriculum in Newman's report.

He points out that:

The institute does not desire to set up any hard and fast limits on the scope and character of the curriculum, nor on the relative amounts of time that should be devoted to the several groups of studies which will make up a satisfactory course of instruction in chemical engineering. The committee has, however, made a careful analysis on several occasions of the content of such courses in the more widely recognized curricula. The following distribution of time is typical of programs which produce an effective composite for the instruction of well-prepared graduates from schools offering a four-year undergraduate course in chemical engineering.<sup>2</sup>

TABLE I  
Distribution of Time in Representative  
Chemical Engineering Curricula

	Per Cent
Chemistry .....	25-30
Chemical Engineering .....	20-15
Other Engineering .....	12
Mathematics .....	12
Physics .....	8
Mechanics .....	6
Other Sciences .....	2
Cultural Subjects .....	15

Thus, as shown in Table I, the distribution of time in representative chemical engineering curricula allows chemistry 25 to 30 per cent, chemical engineering 20 to 15 per cent, and these, together with addi-

<sup>2</sup> Newman, *op. cit.*, p. 22-23.

tional engineering and science courses, take up 85 per cent of the time, the remaining 15 per cent being devoted to cultural subjects. It was assumed that this distribution of time served as a reasonable partial guide in the consideration of source journals.

Two lists of periodicals were used as additional guides. One was compiled by

next was *Industrial and Engineering Chemistry*, industrial edition, a publication of the American Chemical Society. This journal accounted for 24.22 per cent of the references in the *Transactions* of the American Institute of Chemical Engineers and was considered by specialists consulted to be the most inclusive and possibly the most important journal for

TABLE II  
Sources in Which References Were Counted, Ranked  
According to Number of References

Title	Number of References	Number of Self-References	Per Cent	Number of Pages
<i>Industrial and Engineering Chemistry</i> (industrial edition) v. 28-32, 1936-40	14,546	2,737	18.80	7,541
Society of Chemical Industry. <i>Journal</i> ("Transactions and Communications") v. 55-59, 1936-40 . . . . .	4,257	482	11.32	1,940
American Institute of Chemical Engineers. <i>Transactions</i> , v. 32-36, 1936-40 . . . . .	1,672	207	12.38	3,625
J. H. Perry. <i>Chemical Engineers' Handbook</i> , second ed., 1941 . . . . .	1,253	—	—	3,029
	<u>21,728</u>			<u>16,135</u>

the Department of Chemical Engineering of the Cooper Union<sup>3</sup> in 1936 and sent to its library for a report on holdings. The other was compiled by the American Institute of Chemical Engineers in 1939.<sup>4</sup>

Sources

References were tabulated from four sources. The first was the *Transactions* of the American Institute of Chemical Engineers, chosen because of the importance and activity of the institute and on the advice of specialists consulted. The

chemical engineering students. The *Chemical Engineers' Handbook*, second edition, edited by John H. Perry, was selected as the next source when no journal in chemical engineering was found which had a sufficient number of references to serve the purpose. The *Transactions* of the Institution of Chemical Engineers, London, was considered, but the 1940 volume was not available and therefore it was not used: The fourth source used was the "Transactions and Communications" section of the *Journal* of the Society of Chemical Industry, London. These four sources are listed in Table II, ranked according to the number of references found in the volumes which were used.

<sup>3</sup> Cooper Union. Department of Chemical Engineering. [List of Periodicals.] New York City, 1936. 3 l. Typewritten.

<sup>4</sup> American Institute of Chemical Engineers. Book List (No. 1, Parts 1 & 2) "Minimum List of Recommended Books for a Chemical Engineering Library." New York City, 1939. 11 l. Supplement, New York City, 1939. 24 l. Mimeographed.

"Self-references," that is, references in source journals to their own files, were included in the tabulations, as such inclusion has little effect on the final ranking of journals when each source is given equal weight by the percentage method. References to the current year were excluded in order not to give undue weight to domestic or more accessible journals.

chemical engineering student is German, as will be seen from the data presented in Table III. The importance of French is somewhat less for current material than for older references. Only one French periodical achieved the final list in this study, but there were seven German journals in the final list. The number of foreign references in all the American sources

TABLE III  
Number and Per Cent of English, German, and French References  
in the Four Sources

Title	Language	Number of References	Per Cent
<i>Industrial and Engineering Chemistry</i>	English	10,594	72.83
	German	2,594	17.83
	French	672	4.63
	All Others	686	4.71
		<hr/>	<hr/>
		14,546	100.00
American Institute of Chemical Engineers. <i>Transactions</i>	English	1,352	80.82
	German	223	13.34
	French	40	2.39
	All Others	57	3.45
		<hr/>	<hr/>
		1,672	100.00
J. H. Perry. <i>Chemical Engineers' Handbook</i> , second ed., 1941	English	1,053	84.00
	German	157	12.95
	French	7	.50
	All Others	36	2.55
		<hr/>	<hr/>
		1,253	100.00
Society of Chemical Industry. <i>Journal</i> (Transactions)	English	2,988	70.19
	German	872	20.48
	French	226	5.31
	All Others	171	4.02
		<hr/>	<hr/>
		4,257	100.00

That is, in the volume of *Industrial and Engineering Chemistry* for 1940 all references dated 1940 were excluded; in the volume for 1939, all references dated 1939 were excluded; and so on.

The most important language for the

was less than 50 per cent, but in the British source was more than 50 per cent. Tables III and IV show the percentages of English, German, and French references and foreign and domestic references in each of the four sources.

TABLE IV  
Number and Per Cent of Domestic and Foreign References  
in American and British Sources

American Sources	Domestic References		Foreign References	
	Number	Per Cent	Number	Per Cent
<i>Industrial and Engineering Chemistry</i> ....	8,345	57.37	6,201	42.63
American Institute of Chemical Engineers. <i>Transactions</i> .....	1,108	66.26	564	33.74
J. H. Perry. <i>Chemical Engineers' Hand- book</i> . Second ed., 1941 .....	943	75.25	310	24.75
British Source				
Society of Chemical Industry (London) <i>Journal</i> (Transactions) .....	1,812	42.56	2,445	57.44

United States government publications, especially those of the Bureau of Mines and the *Journal of Research of the National Bureau of Standards*, are of great importance to the chemical engineering student. The *Journal of Research* and the *Reports of Investigations* and *Bulletin* of the Bureau of Mines appear in the final list of this study. The publications of state engineering experiment stations are of next importance. It should be pointed out that these publications, while they rank relatively low statistically in the

present study, are usually definitive and frequently monographic. British government publications, which have the same quality, are cited less than American ones, even in the British source. Tables V and VI give the number of references in the four sources to the various types of government publications and the titles of the more important ones. The titles of engineering experiment station bulletins have been included in Table VI, and state government publications and two series published by colleges are included.

TABLE V  
Types of American and Foreign Government Publications  
Cited, Showing Number of References in American  
and British Sources

	American Sources	British Source
American		
Federal .....	687	47
State engineering experiment stations ....	171	16
State agricultural experiment stations ....	54	19
Miscellaneous state publications .....	24	3
British .....	33	39
Other Foreign .....	23	17
	992	141
Total References .....	17,471	4,257
Per Cent of Government Publications .....	5.6	3.3



TABLE VI

Titles of Principal Government and College Publications Cited, Showing Number of References in British and American Sources

Title	Number of References	
	American Sources	British Source
California. University. <i>Publications in Engineering</i>	5	
Carnegie Institute of Technology. <i>Mining and Metallurgical Investigations</i>	5	1
Cornell University. Engineering Experiment Station. <i>Bulletin</i>	5	
Great Britain Aeronautical Research Committee. <i>Reports and Memoranda</i>	5	
— Adhesives Research Committee. <i>Reports</i>		5
— Department of Scientific and Industrial Research. <i>Technical Papers</i>	11	
— Food Investigation Board. <i>Reports</i>	4	24
— Fuel Research Board. <i>Technical Papers</i>	15	
— Medical Research Board. <i>Technical Papers</i>		10
Illinois. University. Engineering Experiment Station. <i>Bulletin</i>	35	2
Iowa State College. Engineering Experiment Station. <i>Bulletin</i>	5	
<i>Iowa State College Journal of Science</i>	15	2
<i>Journal of Agricultural Research</i> (U. S. Department of Agriculture)	50	10
<i>Journal of Research of the National Bureau of Standards</i>	185	25
Michigan. University. Department of Engineering Research. <i>Engineering Research Bulletin</i>	7	1
— <i>Circular Series</i>	4	
Polytechnic Institute of Brooklyn. <i>Research Note</i>	4	
Texas. University. <i>Bulletin. Engineering Series</i>	4	
— <i>Bulletin. Science Series</i>	4	
U. S. Bureau of Fisheries. <i>Investigational Report</i>	5	
— Bureau of Labor Statistics. <i>Bulletin</i>	4	
— Bureau of Mines. <i>Bulletin</i>	72	
— <i>Information Circular</i>	10	
— <i>Monographs</i>	9	
— <i>Reports of Investigations</i>	74	
— <i>Technical Papers</i>	55	
— Department of Agriculture. <i>Bulletin</i>	15	5
— <i>Circular</i>	18	
— <i>Miscellaneous Publications</i>	11	
— <i>Technical Bulletin</i>	32	
— Department of Agriculture. Bureau of Chemistry. <i>Bulletin</i>	4	
— Department of Agriculture. Bureau of Soils. <i>Bulletin</i>	6	
— Geological Survey. <i>Annual Report</i>	4	
— <i>Bulletin</i>	41	
— <i>Professional Paper</i>	8	
— National Advisory Committee for Aeronautics. <i>Technical Memorandum</i>	5	
— <i>Technical Reports</i>	19	
— National Bureau of Standards. <i>Circular</i>	4	
— <i>Scientific Papers</i>	9	
— <i>Technologic Papers</i>	8	
— Public Health Service. <i>Public Health Bulletin</i>	12	6

TABLE VI (Continued)

Title	Number of References	
	American Sources	British Source
— <i>Public Health Reports</i>		34
Utah, University of, and U. S. Bureau of Mines. <i>Technical Paper</i>	5	
West Virginia. University. Engineering Experiment Station. <i>Research Bulletin</i>		5
— <i>Technical Bulletin</i>		10
Wisconsin. University. Engineering Experiment Station. <i>Bulletin</i>	24	

Any journal which achieved 1 per cent of the references in any one source was included in the final list of journals resulting from the addition of the data from the four sources. This final list of thirty-four journals is presented in Tables VII and VIII. Table VII shows them ranked according to the total number of references, with the data arranged by five-year periods, and Table VIII shows them ranked according to their added and average percentages of total references. Thus in Table VIII each source is given equal weight by the use of percentages.

The statistical method is not offered as a final solution to the problems of selection of periodicals in chemical engineering for the college library. In the application of the data presented, the nature of the institution which the library is serving is a major factor. A university library, for example, serving a comprehensive curriculum, may find that the majority of periodicals are applicable to the needs of two or more departments. To illustrate, the *Journal of Agricultural Science*, which is number thirty-three in the list of journals in Table VIII, would be a major journal in an institution giving degrees in agricultural science and would have partial value for chemistry, biology, and chemical engineering departments in the same institution. Its cost per department would be less than in an institution granting degrees

in fewer subjects. In an institution giving only engineering degrees, this journal would be only partially applicable to the needs of only one department, that of chemical engineering, and thus would not be recommended for purchase.

A notable trend among libraries, that of cooperation in the purchase of expensive materials, should be considered in connection with the selection of chemical engineering periodicals. This is especially effective for valuable but less-used foreign language periodicals. Such cooperation is not recommended in respect to material which is likely to be in daily demand. For example, a complete file of *Industrial and Engineering Chemistry* should be in the library of an institution granting degrees in chemical engineering, as will be seen by reference to its standing in Tables VII and VIII.

#### *Quality of Periodicals*

The quality of periodicals, measured by the conclusiveness and completeness of their articles and the authority of their authors, must be considered. Two general types of periodicals appear in Tables VII and VIII, those publishing research, and trade and technical journals. Most of the former are published by scientific or engineering societies, universities, or government bodies. Of the journals listed in Tables VII and VIII, three are of the

trade and technical type. They are *Chemical and Metallurgical Engineering*, *Engineering and Mining Journal*, and *Canadian Chemistry and Process Industries*. There is little doubt of the value of them to the chemical engineering student. While they publish little original research, they contain a great deal of important descriptive data on the process industries and should be available to the chemical engineering student. However, extensive purchase of journals of this type, at the expense of research material, should be avoided.

Three of the journals listed in Tables VII and VIII bear directly on chemical engineering. On the basis of the evidence in Table VII, a set of the *Transactions* of the American Institute of Chemical Engineers beginning in 1916 would serve most purposes in an institution giving courses in chemical engineering, as there is only one reference previous to 1916. The same is true of *Chemical and Metallurgical Engineering*, which has only three references before 1916. A complete set of the *Transactions* of the Institution of Chemical Engineers, London, is indicated.

In related branches of engineering, journals which are recommended as useful to chemical engineering students in all institutions are: *Transactions* of the American Society of Mechanical Engineers, set beginning in 1911; *Transactions* of the American Institute of Mining and Metallurgical Engineers, set beginning in 1916; *Reports of Investigations* of the U.S. Bureau of Mines, complete set; *Mechanical Engineering*, set beginning in 1921; *Refrigerating Engineering*, set beginning in 1921; *Proceedings* of the American Gas Association, set beginning in 1921; *Technical Publications* of the American Institute of Mining and Metal-

lurgical Engineers, set beginning in 1926; *Engineering and Mining Journal*, set beginning in 1926. These journals are listed in the order of their importance, based on the evidence in Tables VII and VIII. The sets indicated here are the ones recommended for chemical engineering students. For example, mechanical engineering students might need a set of the *Transactions* of the American Society of Mechanical Engineers beginning earlier than 1911.

In industrial chemistry, continuing the recommendations based on Tables VII and VIII, *Industrial and Engineering Chemistry* is indispensable and a complete set from 1909 is recommended. The *Journal* of the Society of Chemical Industry, London, is of next importance, both the "Transactions" and "Chemistry and Industry" sections being recommended from 1900 to date. Libraries desiring completeness should have *Angewandte Chemie*, 1900 to date, and *Canadian Chemistry and Process Industries*, 1931 to date.

In chemistry, the *Journal* of the American Chemical Society, 1900 to date, is recommended for all institutions giving courses in chemical engineering. *Berichte der Deutschen Chemischen Gesellschaft*, a complete set, and the *Journal* of the Chemical Society, London, are both essential, as indicated by the evidence in Tables VII and VIII. The latter has a valuable abstract section corresponding to that in the *Journal* of the Society of Chemical Industry. Only one index is published and it covers both sections. Libraries having only one of these will find themselves explaining throughout the year that the other section must be consulted elsewhere. *Industrial and Engineering Chemistry, Analytical Edition*, is recommended, 1929

TABLE VII  
 Journals Cited in the Four Sources, Ranked According to Total Number of References  
 (Data Arranged by Five-Year Periods)

Title	Total Number Refer- ences	40-36	35-31	30-26	25-21	20-16	15-11	10-06	05-01	Before
1. <i>Industrial and Engineering Chemistry</i>	3665	1025	1537	619	343	82	49	10		
2. American Chemical Society. <i>Journal</i>	1382	263	500	297	147	63	48	39	16	9
3. Society of Chemical Industry. <i>Journal</i> (Transactions)	672	140	321	107	47	22	4	18	11	2
4. Deutsche Chemische Gesellschaft. <i>Berichte</i>	604	39	91	82	60	30	40	35	56	170
5. American Institute of Chemical Engineers. <i>Transactions</i>	487	175	216	49	31	15		1		
6. Chemical Society (London). <i>Journal</i>	449	40	122	72	61	33	30	22	25	44
7. <i>Industrial and Engineering Chemistry. Analytical Edition</i>	406	120	251	35						
8. <i>Journal of Physical Chemistry</i>	306	45	97	108	28	8	4	7	7	2
9. <i>Chemical and Metallurgical Engineering</i>	292	59	85	57	57	31	2	1		
10. <i>Biochemical Journal</i>	259	64	123	38	9	7	8			
11. Institut de France, Academie des Sciences, Paris. <i>Comptes Rendus</i>	245	9	40	39	21	10	16	16	15	79
12. Society of Chemical Industry. <i>Journal</i> ("Chemistry and Industry")	239	96	52	11	18	16	10	6	10	15
13. <i>Journal of Biological Chemistry</i>	238	33	89	48	39	22	5	2		
14. <i>Zeitschrift für Physikalische Chemie</i>	229	16	48	50	22	3	19	12	23	36
15. <i>Justus Liebig's Annalen der Chemie</i>	209	13	39	19	4	2	8	16	12	98
16. Royal Society (London). <i>Proceedings. Series A</i>	186	17	55	52	15	8	10	12	2	15
17. <i>Journal of Research of the National Bureau of Standards</i>	185	43	103	39						
18. <i>Kolloid Zeitschrift</i>	172	24	50	44	27	5	19	3		
19. <i>Angewandte Chemie</i>	148	21	40	27	21	11	6	11	6	5
20. American Society of Mechanical Engineers. <i>Transactions</i>	139	50	47	20	4	7	11			
21. <i>Analyst</i>	105	22	31	27	4	9	6	2	3	1
22. <i>Forschung auf dem Gebiete des Ingenieurwesens. Ausgabe B</i>	89	12	60	17						
23. American Institute of Mining and Metallurgical Engineers. <i>Transactions</i>	83	16	36	10	11	8	—	—	—	2
24. Institution of Chemical Engineers. <i>Transactions</i>	82	15	42	16	9					
25. U. S. Bureau of Mines. <i>Reports of Investigations</i>	74	18	32	17	6	1				
26. U. S. Bureau of Mines. <i>Bulletin</i>	72	14	22	19	4	9	4			
27. <i>VDI; Zeitschrift des Vereines Deutscher Ingenieur</i>	69	8	22	10	4	16	3	6		
28. <i>Mechanical Engineering</i>	68	28	18	15	7					
29. <i>Journal of Agricultural Science</i>	60	6	21	22	4	1	5	—	—	1
30. <i>Refrigerating Engineering</i>	51	11	23	9	5	1				
31. American Institute of Mining and Metallurgical Engineers. <i>Technical Publications</i>	41	25	5	10	1					
32. American Gas Association. <i>Proceedings</i>	30	1	7	13	9					
33. <i>Canadian Chemistry and Process Industries</i>	28	3	17	5	3					
34. <i>Engineering and Mining Journal</i>	28	8	9	6	1	2	2			



TABLE VIII

Final List of Thirty-Four Journals Cited in the Four Sources, Ranked According to Their Added and Average Percentages of Total References, with Publication Data

Journal	Added Per Cent of References	Average Per Cent of References
1. <i>Industrial and Engineering Chemistry</i> , v. 1-32, 1909-date, Washington, D.C. Monthly. \$3 per year	73.540	18.385
2. American Chemical Society. <i>Journal</i> , v. 1-62, 1879-date, Easton, Pa. Monthly. \$8.50 per year	21.901	5.745
3. American Institute of Chemical Engineers. <i>Transactions</i> , v. 1-36, 1908-date, New York. Bimonthly. \$9 per year	21.850	5.642
4. Society of Chemical Industry. <i>Journal</i> ("Transactions and Communications"), v. 1-59, 1882-date, London. Monthly. 84s. per year	14.376	3.594
5. <i>Chemical and Metallurgical Engineering</i> , v. 1-49, 1902-date, New York. Monthly. \$3 per year	10.177	2.544
6. Deutsche Chemische Gesellschaft. <i>Berichte</i> , v. 1-73, 1866-date, Berlin. Monthly. RM70 per year	7.808	1.952
7. Chemical Society. <i>Journal</i> , 1841-date, London. Monthly. 65s. per year	7.596	1.899
8. American Society of Mechanical Engineers. <i>Transactions</i> , v. 1-62, 1880-date, New York. Monthly. \$12 per year	6.906	1.726
9. <i>Industrial and Engineering Chemistry (Analytical Edition)</i> , v. 1-12, 1929-date, Washington, D.C. Monthly. \$2.50 per year	5.350	1.337
10. <i>Biochemical Journal</i> , v. 1-35, 1906-date, London. Monthly. 70s. per year	4.880	1.220
11. <i>Journal of Physical Chemistry</i> , v. 1-44, 1896-date, Baltimore. Monthly. (October-June) \$8 per year	4.456	1.114
12. Royal Society of London. <i>Proceedings</i> . Series A. <i>Mathematical and Physical Sciences</i> , v. 1-176, 1800-date, London. Monthly. 2 or 3 vols. per year, 30s. per vol.	4.387	1.096
13. <i>Zeitschrift für physikalische Chemie</i> . Abt. A: <i>Chemische thermodynamik, kinetik, elektrochemie, eigenschaftslehre</i> , v. 1-202, 1887-date, Leipzig. Irregular. RM25-80 per vol.	4.356	1.089
14. Society of Chemical Industry. <i>Journal</i> ("Chemistry and Industry"), v. 1-59, 1882-date, London. Weekly. 1s. 9d. per no. (Included in price of complete <i>Journal</i> , 84s. per year)	4.040	1.010
15. <i>Forschung auf dem gebiete des Ingenieurwesens, Ausg. B.</i> (Includes supplement, <i>Forschungsheft</i> ) v. 1-11, 1930-date, Berlin. Bimonthly. RM25 per year	3.852	.963
16. <i>Journal of Biological Chemistry</i> , v. 1-136, 1905-date, Baltimore. Monthly. \$4 per vol.	2.916	.729
17. Institut de France, Academie des Sciences. <i>Comptes Rendus Hebdomadaires des Seances</i> . . . , v. 1-210, 1835-date, Paris. Weekly. 374 fr. per year	2.791	.697
18. <i>Justus Liebig's Annalen der Chemie</i> , v. 1-545, 1832-date, Berlin. Irregular. RM11 per vol.	2.727	.681

TABLE VIII (Continued)

Final List of Thirty-Four Journals Cited in the Four Sources, Ranked According to Their Added and Average Percentages of Total References, with Publication Data

Journal	Added Per Cent of References	Average Per Cent of References
19. <i>VDI; zeitschrift des Vereines deutscher ingenieur</i> , v. 1-84, 1857-date, Berlin. Weekly. RM40 per year	2.632	.658
20. Institution of Chemical Engineers. <i>Transactions</i> , v. 1-18, 1923-date, London. Annual	2.480	.620
21. <i>Journal of Research of the National Bureau of Standards</i> , v. 1-25, 1929-date, Washington, D.C. Monthly. \$3 per year	2.480	.626
22. American Institute of Mining and Metallurgical Engineers. <i>Transactions</i> , v. 1-140, 1876-date, New York, 4-5 vols. per year. \$5 per vol.	2.388	.597
23. U. S. Bureau of Mines. <i>Reports of Investigations</i> , No. 2000-3540, 1919-date, Washington, D.C. Irregular. Free	2.380	.595
24. <i>Mechanical Engineering</i> , v. 1-62, 1906-date, New York. Monthly. \$5 per year	2.318	.579
25. U. S. Bureau of Mines. <i>Bulletin</i> , No. 1-435, 1910-date, Washington, D.C. Irregular, 15-75¢ each	2.240	.560
26. <i>Refrigerating Engineering</i> , v. 1-40, 1914-date, New York. Monthly. \$4 per year	2.227	.556
27. <i>Angewandte Chemie</i> , v. 1-53, 1887-date, Berlin. Weekly. RM40 per year	2.136	.534
28. <i>Kolloid-Zeitschrift</i> , v. 1-92, 1906-date, Dresden. Monthly. RM80 per year	2.120	.530
29. <i>Analyst</i> (Society of Public Analysts and Other Analytical Chemists), v. 1-65, 1875-date, Cambridge, England. Monthly. 30s. per year	2.040	.510
30. American Gas Association. <i>Proceedings</i> , v. 1-32, 1919-date, New York. Annual	1.740	.425
31. American Institute of Mining and Metallurgical Engineers. <i>Technical Publications</i> , No. 1-1257, 1927-date, New York. Irregular	1.570	.392
32. <i>Engineering and Mining Journal</i> , v. 1-141, 1866-date, New York. Monthly. \$3 per year	1.469	.367
33. <i>Journal of Agricultural Science</i> , v. 1-30, 1905-date, London. Quarterly. 30s. per year	1.294	.323
34. <i>Canadian Chemistry and Process Industries</i> , v. 1-24, 1917-date, Toronto. Monthly. \$3.50 per year	1.131	.282

to date. The *Journal of Physical Chemistry*, 1900 to date; *Zeitschrift für physikalische Chemie*, 1900 to date; and the *Journal of Research of the National Bureau of Standards*, complete set, are recommended for all libraries. Libraries desiring completeness should have the *Bio-*

*chemical Journal*, 1911 to date; *Journal of Biological Chemistry*, 1916 to date; and *Justus Liebig's Annalen der Chemie*, a complete set. This last journal appears on the evidence to be more important for its nineteenth-century volumes than for its volumes published since 1900, but the

later volumes are consistently used and the articles in this journal are of a high order. *Kolloid Zeitschrift*, complete set, and *Analyst*, 1926 to date, are recommended for libraries desiring completeness.

#### *Foreign Language Journals*

Of the foreign language engineering journals, *Forschung auf dem Gebiete des Ingenieurwesens, ausgabe B*, on the evidence in Tables VII and VIII, is desirable in a complete set. This journal includes a valuable supplement, *Forschungsheft*, which contains monographic papers. *VDI: Zeitschrift des Vereines deutscher ingenieur*, 1900 to date, is recommended. This is a general engineering journal of a type not found in the United States.

Of the two general science journals listed in Tables VII and VIII, the *Proceedings of the Royal Society, London, Series A, Mathematical and Physical Sciences*, is recommended for all libraries, 1900 to date. *Comptes Rendus Hebdomadaires de l'Institut de France, Academie des Sciences*, because of the inconclusiveness of its articles and its high price of seventy-five dollars per year, is not recommended for the engineering college library, but it is desirable in the large university library.

The *Journal of Agricultural Science*, published by Cambridge University, is recommended only for the university which includes agriculture in its curriculum.