in prostitution, in sterilization, in alcoholism and drug addiction, in the problems of old age and in chronic diseases such as tuberculosis and cancer, to cite only a few? What is the mental hygiene basis for such practical matters as the censorship of literature, of art, of the stage and of the movies? And in myriads of other directions how are we going to get any guidance unless we appreciate the fundamental psychological principles that lie at the basis of all these questions? And, finally, I am reminded that one of the most recent requests that has crossed my desk was a request to recommend a speaker to a distinguished group, meeting in the near future, who could discuss for them the bearings of mental hygiene on international relations. Surely the gamut is sufficiently extensive. And if, as the Greek philosopher said, "Man is the measure of all things," it might be added that that part of man which measures is his mind. If twenty-two years ago some one had said of Mr. Beers's prophecy of an international movement that it was impossible, every one would have believed him, but there is one factuality of the human mind to which the psychologists have paid very little attention, and that is the factuality of bringing to pass the impossible. In this particular instance, Mr. Beers's impossible prophecy has come to pass.

In this brief survey I have indicated some of the outstanding points in the development of the mental hygiene movement, how in the first instance the trials and tribulations of Mr. Beers were converted by the alchemy of his mind into the mental hygiene idea and how finally this has developed in every direction until it has reached international proportions. I have briefly indicated how the thought of the physician has been gradually changed by the introduction of the concept of mental health, and I would add only a few more words along this line in closing, for I believe that the most significant change that mental hygiene is going to effect in the future will be a change in our concept of values as applied to human beings. I have indicated that the highest ideals that medicine had reached in the last century were the prevention of disease and the avoidance of death. These ideals, when applied in the mental field, were expressed in the well-known dictum, "A sound mind in a sound body." If, however, as I believe, living in order to avoid dying presents very little that is either worth while or stimulating as an ideal, so the concept of the sound mind in the sound body falls equally short of the truth, and in the same, namely, a negative, direction. The thought that I would like you to take away from the few words that I have said is that mental hygiene presents a positive program for life well lived, for mental health because of its values and not because of what it avoids. The value of life is measured by what we become, and so by the nature of the influences we radiate in our living. Life's values, from the standpoint of mental health, are not expressed in terms of the chemistry of nutrition or the integrity of the heart muscle or of any organ, but in terms of character, of man as a social being, of those effects which he produces on those about him, the enthusiasms he stimulates, that go reverberating down the ages translated by the personalities that trace back to the original source. This is a tangible form of immortality toward which every one may strive with some show of success, and in the striving get out of life the most there is in it for him. Perhaps I can express this ideal no better than in the words of Plato, who said over two thousand years ago: "My belief is, not that a good body will of its own excellence make the soul good, but on the contrary that a good soul will by its excellence render the body as perfect as it can be."

PERIODICALS FOR ELECTRICAL ENGINEERS

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THREE items of importance in the qualifications of a department for granting the degree of doctor of philosophy are a competent staff, adequate library facilities and funds and equipment. The lack of any one of the three will seriously interfere with thorough research work and render futile the research work of the staff and of the advanced graduate students.

This paper is concerned with the library facilities. It was thought desirable that the research publications at Iowa State College be checked over to ascertain the deficiencies existing. The question at once arose as to the standard to be used in making a list of the periodicals which should be available.

It was found that similar studies had already been made in the fields of chemistry[1] and mathematics.[2]

After some study, it was decided to count the references to periodicals in the following journals for the period from January, 1925, to June, 1929, inclusive.

[1] P. L. K. Gross and E. M. Gross, "College Libraries and Chemical Education," SCIENCE, 66: 385, 1927.

[2] Edward S. Allen, "Periodicals for Mathematicians," SCIENCE, 70: 592, 1929.

Table I gives the number of references in each of these journals for this period.

TABLE I

SEVEN JOURNALS USED

	Number of references
American Institute of Electrical Engineers (*Transactions*)	2,994
Archiv für Elektrotechnik	2,122
Electric Journal	187
Elektrotechnische Zeitschrift	4,602
Franklin Institute, *Journal*	446
Institution of Electrical Engineers, *Journal*	2,174
Revue Générale de l'Electricité	5,466
Total	17,991

It will be noted that the list contains three American, one English, two German publications, and one French publication. The result is that the English language publications predominate, but it is assumed that such should be the case for American libraries.

TABLE II

REFERENCES COUNTED IN THE *Transactions* OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, JANUARY, 1925, TO SEPTEMBER, 1929

	Number of references	Per cent.
A. I. E. E. *Trans.*	845	28.22
Annalen der Physik	44	1.47
Archiv für Electrotechnik	69	2.30
Bell System Technical Journal	48	1.60
Electrician	49	1.63
Electric Journal	131	4.37
Electrical Review	36	1.20
Electrical World	228	7.61
Elektrotechnische Zeitschrift	59	1.97
Elektrotechnik und Maschinenbau	35	1.16
Engineering (London)	39	1.30
Franklin Institute, *Journal*	42	1.40
General Electric Review	152	5.07
Institution of Electrical Engineers, *Journal*	65	2.27
Philosophical Magazine	44	1.47
Physical Review	82	2.73
Power	57	1.90
Power Plant Engineering	32	1.06
Railway Electrical Engineer	82	2.73
Royal Society of London, *Proceedings*	35	1.16
Miscellaneous	820	27.38
Total	2,994	100.00

Some diversity of subject-matter is obtained by the selection of these particular publications, including the American, English, German and French journals.

The question of including the references to other articles in the same publication (for example, references to articles in the *Transactions* of the American Institute of Electrical Engineers, when counting references therein) has been discussed by Professor Allen in his study in the field of mathematics. It seemed desirable in the present paper to include such references with the others. The journals selected to furnish the references were the more important ones in the field. There seemed, therefore, to be no good reason for omitting references to themselves although their number might be somewhat excessive.

Also it seemed logical to reduce the references to a percentage basis so that equal weight might be given to each of the seven journals used. Table II shows the proportions of the various references listed from the *Transactions* of the American Institute of Electrical Engineers. Similar tables were made for the other six journals but have not been included in this paper.

The individual percentages from the seven tables were divided by seven and combined in Table III, giving the figures as percentages of the total. Table III shows the reference periodicals arranged in the order of their importance as determined by the method here described.

TABLE III

REFERENCE PERIODICALS ARRANGED IN THE ORDER OF THEIR IMPORTANCE

	Per cents. of total references
1. American Institute of Electrical Engineers, *Transactions*	10.851
2. *Elektrotechnische Zeitschrift*	7.925
3. *Revue Général Electricité*	7.591
4. *Electric Journal*	6.616
5. *Archiv für Elektrotechnik*	5.843
6. Institution of Electrical Engineers, *Journal*	3.888
7. *Physical Review*	3.729
8. *Philosophical Magazine*	3.157
9. *Annalen der Physik*	3.017
10. *Electrical World*	1.909
11. Royal Society of London, *Proceedings*	1.822
12. *Electrician* (London)	1.474
13. *Electric Railway Journal*	1.228
14. Franklin Institute, *Journal*	1.200
15. Académie des Sciences, *Comptes Rendus*	1.158
16. *General Electric Review*	1.129
17. *Elektrotechnik und Maschinenbau*	.997
18. *Zeitschrift für Physik*	.970

TABLE III—*Continued*

	Per cents. of total references
19. *Zeitschrift für physikalische Chemie, Stochiometrie und Verwandtschaftslehre*	.940
20. Institute of Radio Engineers, *Proceedings*	.867
21. Société Française des Electriciens, *Bulletin*	.724
22. Physical Society of London, *Proceedings*	.719
23. American Chemical Society, *Journal*	.708
24. *Bell System Technical Journal*	.664
25. National Electric Light Association, *Proceedings*	.607
26. *Electrical Review*	.593
27. *Physikalische Zeitschrift*	.521
28. *Power Plant Engineering*	.420
29. *Elektrizitätswirtschaft Mitteilungen*	.405
30. *Railway Electrical Engineer*	.389
31. *Elektrizitäts Verwertung*	.318
32. *Zeitschrift für technische Physik*	.290
33. *Power*	.275
34. *Engineer*	.231
35. *Electric Light and Power*	.231
36. American Electrochemical Society, *Transactions*	.231
37. *Siemens wirtschaftliche Mitteilungen*	.217
38. *Zeitschrift für Instrumentenkunde*	.202
39. *World Power*	.202
40. *Journal de Physique et le Radium*	.188
41. Optical Society of America, *Journal*	.188
42. *Engineering* (London)	.188
43. Société Française de Physique, *Bulletin*	.173
44. *Zeitschrift für Elektrochemie und Angewandte physikalische Chemie*	.159
45. *Physico-Mathematical Society of Japan*	.159
46. *Journal de Physique, Chimie et Histoire Naturelle Elémentaires*	.159
47. *American Journal of Roentgenology*	.159
48. Union des Syndicates de l'Electricité, bi-mensuel *Bulletin*	.145
49. Verein Deutscher Ingenieure, *Zeitschrift*	.145
50. Association Suisse des Electriciens, *Bulletin*	.145
A. Miscellaneous	23.934
Total	100.000

It will be noticed that about 24 per cent. of the references are included under the heading Miscellaneous. This is due to the method of including in the list of references, for each of the seven journals, only those appearing to a total of more than 1 per cent. of the number of references in that journal. The balance were grouped under the head Miscellaneous. Since these seven groups were added, the Miscellaneous per cent. is higher than it should be.

The publications included in Table III are those containing more than 1 per cent. of the references found in any one of the seven journals. In some cases a particular publication would total more than 1 per cent. on two or three lists and fractions of a per cent. on the other four or five. The fractions were included under the heading Miscellaneous. Had these been distributed, the effect on the total per cent. for each publication would have been slight. The combined effect on the Miscellaneous total of a number of such cases would have been greater.

For example, references to *Annalen der Physik* are more than 1 per cent. of the references listed from each of the following journals, the *Transactions* of the American Institute of Electrical Engineers, the *Archiv für Elektrotechnik* and the *Journal* of the Franklin Institute. References to *Annalen der Physik* are 0.75 per cent. of the total in *Revue Générale de l'Electricité*, 0.263 per cent. of the total in *Journal* of the Institution of Electrical Engineers, 0.50 per cent. of the total in the *Elektrotechnische Zeitschrift* and are not found in the *Electric Journal*. Since these are each less than 1 per cent., they are included under Miscellaneous, yet if they had been added to those found for the first-mentioned journals, the total Miscellaneous per cent. would have been reduced 0.22 per cent. The effect on the total for *Annalen der Physik* is negligible. Although the change in the Miscellaneous per cent. would be large if such a correction were made for all similar cases, the additional work could not be justified, since the relative order of the references would be little changed.

Since this list was made up from the standpoint of electrical engineering only, it follows that a library serving other branches of engineering, physics and chemistry should make up a composite list from similar lists for each.

It should be understood that lists such as those discussed in this paper are based upon the assumptions made, and that other investigators would probably obtain somewhat different results if permitted to make the assumptions which seemed most logical to them.

However, this problem is similar to many others in engineering. The best that can be done is to start out with the best assumptions possible and derive results which are more accurate than could be obtained by assuming the final result.

The assumptions in this case are: (1) the value of a periodical to professional workers is in direct proportion to the number of times it is cited as a reference in technical articles in the field in question;

(2) that the seven journals for the period from January, 1925, to June, 1929, give a correct view of the relative use of technical periodicals in general by American electrical engineering students, faculty and research workers; (3) that the seven periodicals used should be weighted equally.

The results obtained in this survey have cost no little effort upon the part of those interested in graduate work at this institution. Other institutions doubtless will appreciate such a list of periodicals in checking over their holdings. It is with this in mind that this paper is presented for publication.

SCIENTIFIC EVENTS

THE RAYLEIGH COLLECTION AT THE SOUTH KENSINGTON MUSEUM[1]

AMONG recent additions to the Science Museum, South Kensington, is a most interesting collection of apparatus used by the late Lord Rayleigh in the course of his scientific research. On the occasion of the unfortunate fire, last year, at Lord Rayleigh's home at Terling, Essex, a considerable quantity of apparatus was destroyed, but the historical apparatus was fortunately undamaged and the bulk of it has been generously given by the present Lord Rayleigh to the Science Museum, where it should prove a continual source of interest and inspiration to professional and amateur scientific workers alike. It is scarcely necessary to remind readers of *Nature* of the extent and importance of the late Lord Rayleigh's contributions to science. During a period of more than fifty years he published no fewer than 446 papers, every one of which made a distinct addition to our knowledge of the subject and was characterized by that lucidity and elegance of expression for which its author was renowned.

On viewing this collection, one is struck very forcibly—as were visitors to the laboratory at Terling—by the extraordinary simplicity of the bulk of the apparatus. The ability to attain results of the highest accuracy and importance by the aid of odd bits of wood, glass tubing, wire and sealing-wax was undoubtedly bound up with Rayleigh's unerring instinct in discriminating between the essential and the non-essential. It is doubtless true that some branches of modern physical research can not profitably be pursued without the use of expensive apparatus. At the same time, many workers who are apt to grow despondent after a perusal of the price-lists of the scientific instrument makers should find a tonic in the Rayleigh collection, which also serves as a salutary reminder that the man is more important than his tools.

The present collection is thoroughly representative of the vast field which Lord Rayleigh covered, and is exhibited in six cases, two dealing with acoustics, while the remainder come under the headings of optics, magnetism and electricity, argon, and miscellaneous. It is impossible in a short notice to deal adequately with the whole of the exhibits, but a few representative examples may perhaps be mentioned. The acoustics section includes apparatus used in experiments on reflection and interference and on the intensity of aerial vibrations; also the apparatus by means of which it was demonstrated that our lateral perception of the direction of a sound depends upon the phase-difference at the two ears. One of the most important exhibits in the optical section is the apparatus used for the determination of the constant of the magnetic rotation of light in carbon disulphide, while there is also a reminder that, so early as the year 1902, Rayleigh made an attempt to detect motion through the ether. Prominent in the electrical section will be found apparatus for determining the laws of resistance of periodic currents. The argon collection gives an excellent idea of the course taken in that classical series of investigations extending from 1892 to 1895 in the latter part of which Sir William Ramsay collaborated, while under "Miscellaneous" the chief exhibits deal with capillarity, fluid motion, and cognate problems. Every piece of apparatus has been provided with a full explanatory label giving references to the original source and to the "Collected Scientific Papers," and public lectures on the exhibits will be given from time to time.

[1] From *Nature*.

THE NEW SCIENTIFIC LABORATORIES AT THE UNIVERSITY OF CHICAGO

TWO new science buildings, each believed to be the finest of its kind in the United States, were opened recently at the University of Chicago for the first time to accommodate summer quarter classes. The recently completed buildings are the Bernard A. Eckhart Hall of Mathematics, Mathematical Astronomy and Physics and the new Botanical Research Laboratory.

Seventeen classes in mathematics and astronomy moved into the Eckhart building, the erection of which was made possible by a gift of $710,000 from Mr. Bernard A. Eckhart. Adjoining the older Ryerson Physical Laboratory on the east, the new structure rises to four floors along University Avenue on the Main Quadrangle.

Eckhart Hall, the work of Charles Z. Klauder, Philadelphia architect, is said to be one of the finest