The table given here is good for *any year*. Two months of 30 days are followed by one month of 31 days, making 13 weeks in each quarter. January, April, July and October are *exactly alike*. The first day of these four months is Monday—it is the same in every year. The first day of February, May, August and November is always Wednesday, and the first day of March, June, September and December is always Friday.

Each quarter has exactly 91 days; the monthless days (Year-Day and Leap-Day), being holidays, may be left out of account in reckoning interest, rents, wages, etc. Birthdays, wedding anniversaries, holidays and other notable dates fall on the same day of the week every year. Election Day is always November 7; Inauguration Day is always Monday. A college or school which opens on (say) the third Tuesday in September would always open September 19. These are but a few of the many ways in which reckoning is simplified.

Any person of ordinary intelligence can readily find the day of the week for any date in any year according to this Calendar. In a few minutes one can learn to associate Monday, Wednesday and Friday with the proper months, and the rest is easy. Even a schoolchild could answer without difficulty such questions as were asked at the outset, though they effectually baffle most of us under the present system. The Gregorian Calendar has fourteen different yearly arrangements; each of these involves a table of twelve months. The New Era Calendar calls for only *one table of three months*. If we consider the table of extra days as doubling the complexity of our scheme, the New Era Calendar is still twenty-five times simpler than the Gregorian.

Among the reconstructions which will undoubtedly follow the war, would it not be worth while to adopt a common-sense Calendar?

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rather similar in 1884, but Monsieur Grosclaude seems to have been given the first definite formulation. (See *Journal suisse d'horlogerie*, 1900, *24* pp. 378–9, and table on p. 356; also note in *Revue scientifigue*, 1900, 4°s. *13*, p. 766, where the present writer first saw it.) Flammarion repeated his proposal in 1901 (*La Revue, 37*, pp. 233–246). Alexander Philip proposed virtually the same plan in 1814. ("Reform of the Calendar," London: Kegan Paul, pp. 127.)

Several different schemes have also been suggested; *e. g.*, 13 months of 28 days each; and the matter was once discussed by an international commission. See also a number of communications in SCIENCE, 1910, *32*. The writer is unable to find that the idea of grouping the year-days into "year-weeks" has ever been suggested before.

CHEMICAL LITERATURE AND ITS USE

BUNSEN says, there are two distinct classes of men, those who work to enlarge the boundaries of knowledge, and those who apply that knowledge to practical uses. If we agree with a recent declaration that "chemistry is the intelligence department of industry," the modern chemist and particularly the chemical engineer, who is called on to answer all questions for every industry as well as know his own subject, needs to be aware of all possible sources of information.

Thus, a first-class chemist (including here the chemical engineer) must know and be able to use not books, only, but the periodical literature, journals, publications of societies and governments. He requires, then, a reading knowledge of German, with French if possible, and sufficient practise in English to enable him to make, both orally and in writing, a concise, clear report of work accomplished or planned, this being in addition to technical skill gained by training, and a liking for his work.

Specific training in this use of literature becomes a real problem where there are a number of students engaged individually in more or less advanced stages of research work, as seniors and graduate students.

Such training is given to a certain extent under various names, in a number of American technical schools and universities. Seniors are directed to find first what has been done on any problem assigned them. Even sophomores realize that the class texts are not the only books, while some join the American

Chemical Society and gain first-hand acquaintance with its journals. With a smaller number of students, we find, usually, limited library facilities, while, where more literature is available instructors have less time for individual direction of men to the sources of information.

Three years ago a brief study of current catalogs from about twenty institutions giving chemical courses similar to those at Illinois was made. From the data obtainable, the amount of work varied greatly. Meetings are held weekly, fortnightly, or monthly; attendance is for "any one interested"; for "graduate students and instructors"; meetings are "open to advanced undergraduates"; or attendance is "required of candidates for an advanced degree."

In only five of the institutions studied was there a definite statement as to credit given for the course. Case gave one hour, the second semester of the senior year; Ohio had a two-hour course second semester of junior year, required for chemists, but elective for chemical engineers. Michigan offered one to three hours, credit for senior chemical engineers, entrance to the course being by special permission; no statement of it for chemists was found. Massachusetts "Tech" required one hour a week the first semester for senior chemists, and two hours for senior chemical engineers. Chemists had to attend the instructors' journal club. Worcester Polytechnic Institute required a two-hour course the second semester for sophomores and a one-hour course all the junior year. None of these specifically stated training in use of the library as part of the course.

At Illinois, the existing junior journal course seemed to offer an opportunity for definite instruction and training in the use of reference books, abstract and review serials, and collective indexes, without adding an extra course to the well-filled schedule. Some account of the work so far and its results may be of interest; since several who looked it over at the April, 1916, meeting of the American Chemical Society have since used the outline, readings, lectures and problems, as a basis for similar courses elsewhere.

The journal course began as reports on recent numbers of foreign journals, at the first meetings of the Chemical Club in November, 1892. It appeared in the university catalog 1893–94 as "Chemistry 19. Seminary. Reports and discussions upon assigned topics from current chemical literature," with credit, and persisted as weekly or fortnightly meetings, being a prescribed course for juniors, seniors, and graduate students, with a few minor changes, till 1910–11, when a separate section for juniors was arranged, leaving seniors, graduates and instructors in the other section.

The revised journal-library course, now, as prescribed for all juniors in chemistry and chemical engineering, gives one hour credit each semester. It comprises study of the history of chemistry, chiefly biographical, based on the first volume of Kopp's "Geschichte der Chemie," with additional biographical papers in German or French. This gives opportunity for each student to make each semester two translations of fifteen to twenty pages, and two speeches. Then the twelve half-hour library lectures in the year, with problems for each one, give some practical experience in the actual use of books and serial publications. During the second semester the topics for translation are from current chemical serials, on recent important developments of the science. In 1915, 1916 and 1917, a summer school course was offered with lectures briefly covering the history of chemistry, and including class reports and all the library lectures, being considered as equivalent to either the first or second semester of the regular course according to the problems worked by the individuals.

The library lectures attempt to compel use of the books, works of reference and serials, in the chemistry library, by the students, so that they may at least know that such material exists and be able if called upon to utilize it. The lectures include explanation of the classification, catalog, and arrangement, of books; and serials; statements as to the fields covered

by the various works of reference; the general and special journals and society publications; discussion with explanation of the kind of information to be had in the different abstract, index and review serials; and information as to the best works available here in the several sections of chemistry, general, analytical, inorganic, mineral, organic, physiological, applied, theoretical, physical and colloid. The selection of these "best" works has been made or approved by the man who uses that section, before they are presented to the class for consideration. Frequent revision is of course necessary to keep the lists up to date. No parallel course is given elsewhere to my knowledge, and training of this kind has a money value, as well as does that in the laboratory proper, since many of the larger industrial plants have libraries and reference librarians, to help them keep up with current investigations and the effect upon their special problems. Little & Co., of Boston, is a good example.

Students are referred to what are the best, *i. e.*, most comprehensive and up-to-date books at any given time, and are compelled to some use of them. For example, some of the larger, important works at present, 1917, in the various divisions of chemistry at Illinois are:

Inorganic: Roscoe and Schorlemmer, edition four, 2 vols., and in German the Handbücher of Abegg and Gmelin-Kraut, edition 7, but both of these German texts are as yet incomplete, but have good bibliographies for the elements and the years they cover.

Organic: Meyer and Jacobson, "Lehrbuch," edition 2, has no equal in English, and the lack due to the fact that Vol. 2 has not come out may be supplied in part by the eleventh German edition of Richter's text-book, and in part by Hilditch's thirty-year course, in English, with Clarke's Introduction as a more elementary but modern work.

Analysis: Here is Treadwell, edition 4, 2 vols., for general, Gooch, Crookes and Classen for selected methods. Lunge in 6 volumes on technical, Allen in 8 for technical organic; for organic, Mulliken has at last got three volumes out with a promise of the fourth soon. Clarke's Handbook, and Weston on carbon compounds, are less comprehensive.

Biochemistry: Abderhalden's 10 volumes of methods are supplemented by Oppenheimer's volumes of general information. In English the series of monographs on biochemistry is being kept up and covers practically every topic.

Theoretical: Nernst, edition 7, in English is now available. Mellor's "Chemical Dynamics," and his book on mathematics for chemists, with Partington's are very useful.

Industrial: The newest books are old here as compared to the serials, but Martin's edition 2, Molinari and Sadtler, edition 4, do well for industrial organic. Molinari's inorganic industrial is a trifle old and Rogers, edition 2, does not include everything. The analytical texts have been mentioned and the number of special texts is great.

Of course, to do new work we must begin on the basis of present knowledge. It is assumed that the specialist will keep up in his own field, receiving publishers' circulars, and noting book reviews for new books. But given a new topic, or an unusual one, chemists should know how to find or at least where to search for what is known at present, quickly and surely. Here the organic chemist has an immense advantage, in the case of a known substance. Having the formula, Richter's "Lexikon" with its supplement will give him physical constants, the principal references to literature, and most important of all the page reference to Beilstein's "Handbuch," where he finds a concise careful summary.

Thus he has all information to and including 1911. The annual indexes of *Chemical Abstracts* and the *London Journal of the Chemical Society,* may be supplemented by the formula indexes, annual, of papers published in the *Annalen* and *Berichte.* Sometimes Abderhalden's "Biochemisches Handlexikon" is helpful, being newer than Beilstein and giving more information than Richter. If the substance is a coal-tar product, a dyestuff or the like, the volumes of Friedlaender's "Fortschritte" with subject indexes and collective indexes by German patent numbers, 1877 to 1914 inclusive, are invaluable. If the problem as processes or material is not listed under a special substance, Weyl and Lassar-Cohn give methods, in German of course. For preparations, adequate, brief and

timely, the organic volume of Vanino is the best at present and it gives plenty of references to original papers.

If these fail him, he, with the inorganic, physical and industrial man, must plunge into what librarians call the abstract and review serials, giving currently or for an annual period the literature with abstracts, and, in review serials, some critical discussion as well. There are many in English, German and French; perhaps a few suggestions may be of service—at least the plan has worked fairly, during a trial of six years with the senior graduate students and an occasional faculty member.

For rapid work, take those abstract serials in English first: when the ten-year collective index to *Chemical Abstracts* appears that will be for a time the best starting point. Barring that, take the annual indexes of the *Chemical Abstracts* or the *London Journal,* going back to the newest collective index of the *London Journal,* for 1903–12; then use these collective indexes, which take the literature back to 1841. If these articles and cross references are not enough, turn to Liebeg and Kopp's *Jahresbericht,* from 1847, but published so far only through 1910, and use collective indexes again. To insure finding everything, one may check by use of the collective indexes of the French *Bulletin,* 1858–1896, and *Chemisches Centralblatt;* the latter has no collective index published for 1880–96. For work done before 1847 there are two chief sources: (*a*) Berzelius's *Jahresbericht,* 1822 to 1850, with a collective index for the first twenty-five volumes; we have one also, made at Illinois, for the volumes 26–30; (*b*) the collective indexes of the *Annales,* 1789 to approximately 1870, when it ceased giving abstracts. For 1901 on, International Index to Scientific Literature: Chemistry, may give some references omitted by accident from the other lists, though it does not often happen. Supplementary too, are the collective indexes of the *Chemical News,* Vol. 1–100, and *Journal für praktische Chemie,* Vol. 1–100, but neither of these attempts to include all chemical literature. This list does not pretend to be complete, though the foregoing are enough in most cases, but some divisions of chemistry have excellent special publications; as, in agricultural chemistry the collective indexes of the *Experiment Station Record,* Biedermann's *Centralblatt* and Hoffmann's *Jahresbericht.* For industrial chemistry in general, the two indexes of the *Journal of the Society of Chemical Industry,* 1882–1905, the one, 1887–1907, of *Zeitschrift für angewandte Chemie* and two for Wagner's *Jahresbericht* for 1855–1894; here for dyes, explosives and coal-tar products in general the Friedlaender, noted for organic chemistry, is invaluable; biochemistry has a worthy rival to Beilstein and more up-to-date, in the indefatigable Abderhalden's "Biochemisches Handlexikon" and its supplement, ten volumes now, but without a collective index as yet; the *Biochemisches Zentralblatt,* dating from 1902, has only one collective index as yet; the most thoroughly satisfactory source for the time it covers is Maly's *Jahresbericht,* 1870 to date, though unfortunately the collective index for 1901–10 has not yet reached this country, if it has even appeared. For pharmaceutical chemistry, the 50-year Index to Proceedings, now continued as Yearbook, of the American Pharmaceutical Association, 1851–1902, is useful, as well as the collective and annual indexes of the *British Pharmaceutical Journal,* 1841 to date, and of the *American Journal of Pharmacy,* 1833 to date. The U. S., National-Standard, and the American Dispensatory, all give references, particularly to medical literature, not to be had elsewhere.

The work as offered seems in part to solve the problem, when the number of students is too large for individual instruction, and it has the advantage of calling to the students attention the literature in several divisions of chemistry, Seniors pride themselves on being able to find books on the shelves, as well as references for their own use. Some training is gained by presentation of the oral reports, since the outline for these is discussed with the instructor before presentation in class; the class furnishes a critical audience; notebooks are expected to contain date, topic, speaker,

reference, and some brief notes, for each report, and are called for at irregular intervals. A brief final examination is given.

Two to four seniors who have taken this course serve in the department library as student assistants. Three of the men found use for the training in library work in their commercial work during the past summer. One who had also worked in the department library has a good position as "reference librarian" with a large company interested in chemical work.

The library lectures alone have been used for reference by graduate students, especially those who have not had access to large libraries, and wish to learn what is available at Illinois.

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RESEARCH WORK AT THE UNIVERSITY OF MICHIGAN BIOLOGICAL STATION DURING THE SUMMER OF 1917

RESEARCH work was carried on at the biological station of the University of Michigan, by members of the instructional staff and by a number of students. Because of the lack of suitable laboratory space and equipment, the character of work undertaken was limited largely to systematic and ecological work on plants and animals, the behavior of birds, the embryology of certain fishes and life histories of parasitic worms. This is fundamental work, however, and as knowledge of the local fauna and flora is extended it is desired to give opportunity for careful physiological work. While the cold, late season doubtless interfered with certain investigations continued from previous years, it permitted the securing of many plants in blossom which in ordinary seasons have finished their blossoming before the opening of the station, and by retarding the breeding season of many animals an opportunity was given to take at the height of their breeding season several animals not usually found breeding during the session.

Dr. J. H. Ehlers, of the University of Michigan, collected about two thousand specimens of flowering plants comprising about two hundred and fifty species. A number of these represented genera and species not included in the published list of this region.

Mr. Lee Bonar, of the University of Michigan, under direction of Dr. Ehlers, collected plants affected with fungous diseases with the view of listing the host plants and studying the parasitic fungi.

Miss Margaret Pengelly, under Dr. Ehlers's direction, made a collection of the grasses of the region. Fifty species were collected, forty-five of which have been identified. Further collections are planned before publication of results.

Miss Lois Smith, of Colorado College, research assistant in botany, was engaged in the collection and study of sedges of the genus *Carex*. This work had been begun in 1914 when forty-nine species were collected and identified. During the past summer a large number of specimens were collected, among them a number of species not included in the previous list. The material is now being studied by Miss Smith and a published report on the work may be expected soon. The specimens belonging to the above collection will be placed in the herbaria of the station and of the university, while some will be available for exchange.

Dr. Richard M. Holman, of Wabash College, and Mr. Ernest Reed, of the University of Michigan, have made a beginning in the study of the aquatic cryptogamic plants. They devoted the greater part of their time to the identification of the algal forms of the lakes and streams of the region, to the study of the topography and hydrography of these lakes, and to collecting such facts as they were able relative to the spatial and seasonal distribution of the forms. Weekly temperature readings were made at ten foot depth intervals at four stations on Douglas Lake and at Lancaster, Munro and Vincent Lakes. Surface plankton hauls were taken at all these stations weekly, and plankton samples were taken at depth intervals of twenty feet in Douglas Lake. Bottom samples were also taken in order to determine diatom species not found