1940, p. 171) say: "most likely in the first or second century."

As to the soybean, no indication of it has been found, I believe, in neolithic or early bronze age sites. But it seems to appear in literature of the first millennium B.C. (*cf.* Creel, "Birth of China," p. 326).

References to early dates in Chinese history are likely to be unreliable for any century prior to the eighth before our era.

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OUR SCIENCE MEETINGS AGAIN

IT is getting to be an annual custom to ask, "What *is* the matter with our scientific meetings?" Dr. Merrill asked it quite some years ago on his return to America after a long sojourn abroad. As I remember, he looked forward with enthusiasm to the meetings of the A. A. A. S., his first in many years. And when they convened he wandered from room to room hoping, ever hoping, that in the next room he would find a speaker who could hold his attention. But his wanderings availed him nothing. He made the suggestion that our A. A. A. S. gatherings should not be given over to youngsters who are making their first public appearance. This is true, but it would be just as disastrous if they were given over to the older men. What is needed is a better balance between the stability of older men and the daring enthusiasm of youth. I attempted this in arranging a symposium at which five out of nine speakers were under fifty and two under thirty years of age.

IN a recent issue of SCIENCE (93: 19, 1941), Dr. Francis H. Allen suggests that speakers should improve their delivery. This is important and would help, but it is, so it seems to me, a rather futile attempt at improvement because poor delivery is mostly due to personal traits which are very difficult to correct. To be sure, as Dr. Allen says, we can all learn to hold our heads up and direct our voices toward the back of the room, but to correct a weak voice, which mumbles along in a monotone can be done only by starting when the otherwise able scientist is six years old. If I may suggest several rules for "the acquirement of a clear and common-sense manner of communicating information and ideas to an intelligent audience," then they are the following.

First, foremost and irrevocable should be the rule forbidding the reading of a paper. This will go hard with some, but if a scientist does not know his subject well enough to present it extemporaneously then he should wait until he does. There is usually opportunity for practice on the students and at the home seminar, before the big meetings come. If this rule seems harsh, then attend the next symposium at which some six or eight papers are read, and you will approve the rule wholeheartedly. All other rules are subordinate to this one.

Second in importance is the elimination of historical introductions and lengthy summaries. The latter is as necessary and as effective as a twice-told joke. All mathematical tables and curves should be reduced to a minimum. A column of numbers may help much toward understanding what took place in an experiment, but five tables of five columns each shown one after another leave the audience utterly bewildered. Curves portray a situation with graphic clarity and are always desirable when there is time to study them. Three or four are about all that a speaker can interpret and an audience digest in a half-hour talk, yet a dozen curves at the rate of two a minute is not uncommon at our meetings. These are rules which all can follow and all will be grateful for when they are observed by others.

The greatest lack in our science meetings is discussion. An abstract is printed, the audience has read it, and the speaker repeats it, twice if he gives a summary. It is the awful routine of the papers which is so deadly. One speaker after another, and no comments. If each group could be organized in advance and discussion arranged for, this more than any other change, would make for an interesting meeting.

And all after-dinner talks should be limited to twelve minutes!

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THE PRESENTATION OF SCIENTIFIC PAPERS

THOSE who read F. H. Allen's suggestions about improving the presentation of scientific papers (SCIENCE, 93: 19, 1941) undoubtedly will be interested to learn that the Western Section of the American Society of Plant Physiologists has already taken steps to make scientific meetings more enjoyable by improving the presentation of papers. This question was brought up at the annual meeting during the summer of 1939. The following spring when the call for papers (for the Seattle meeting) was issued, I included the suggestion that prospective speakers *refrain from reading prepared manuscripts, but use a few notes instead.* This suggestion was followed up almost without exception and resulted in better contact between audience and speaker. Because the meetings were followed by an excursion (to Friday Harbor) which lasted a whole day, I had an opportunity to talk to people and inquire about their reaction to the meetings. Many stated that they did not experience the fatigue which is so common after meetings. Although this might have been partly due to the invigorating atmosphere of the Pacific Northwest, I am convinced that the informal

way of presenting papers must have been easier on both the audience and the speakers. The reasons for this are: (1) Most people are able to talk understandably; few are able to read a paper understandably. (2) While talking, the speaker has to formulate his thoughts, which gives the audience a chance to catch up with him. When reading, however, the speaker does not have to formulate his thoughts, and the audience usually does not have enough time to resynthesize words into thoughts.

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SCIENTIFIC BOOKS

THE DESIGN OF HIGH PRESSURE PLANT

The Design of High Pressure Plant and the Properties of Fluids at High Pressures. By DUDLEY M. NEWITT, assistant professor of chemical technology in the Imperial College of Science and Technology. viii + 491 pages, 24.3 × 15.5 cm. 165 figures in the text and 4 plates, with 86 tables in the text and 18 pages of tabular material in the three appendices. Published by the Clarendon Press, Oxford, England, and obtainable in this country from the Oxford University Press, 114 Fifth Ave., New York City, for $10.00.

THE purpose and limitations of this book are doubtless more evident from the title to the English reader than to the American, to whom the use of "plant" in its English technical sense is somewhat unfamiliar. The author attempts no explicit statement of his purpose and limitations, but an examination of the contents shows that its main purpose is to serve as a working manual and complete reference book for the industrial chemist primarily interested in gaseous reactions or other industrial processes such as liquefaction in the range up to 1,000 atmospheres; there is, however, considerable material dealing with liquids up to 12,000. Within its field the book should prove of much usefulness, since the material has never been collected into one place, and much of it is otherwise available only in the original papers.

Consistently with its purpose the book begins with a discussion of the mechanical properties of the materials, mostly steels, from which the pressure apparatus is to be constructed, and the effect of both high and low temperatures on these properties. There follows a chapter, primarily of interest to British readers, on the technical and legal requirements on the cylinders used for the transport of compressed gases. The next chapter discusses the design according to elasticity theory of cylinders for withstanding internal pressure, including built-up and auto-frettaged cylinders; much of this material is valuable and not otherwise easily available. Chapters follow on details of packing, fittings and measurement of pressure. The rest of the book, 360 pages, is devoted to the properties of fluids under pressure and contains much which will interest the physicist not concerned in the narrow technical sense with this field; it is especially to be recommended as a source for numerical data in a course on thermodynamics. There is a full discussion of critical phenomena and the relations between liquid and vapor phases with a discussion of various equations of state. Mixtures of different gases are then discussed. There follow two long chapters on the thermodynamics of gases. Coexisting liquid and vapor phases of binary and ternary mixtures are then treated. M. Ruhemann contributes an interesting chapter on the liquefaction of gases, in which the emphasis is more on the fundamental thermodynamics than in the rest of the book. Chapters follow on the effect of pressure on the solubility, viscosity, dielectric constant and refractivity of gases. The last 50 pages are devoted to proper liquids, in particular, the effect of pressure on viscosity and refractivity, and the pressure-volume-temperature relationships.

As a whole the book should be of much utility, and doubtless every technical worker will insist on having it where it is available, but in using it allowance will have to be continually made for possible lack of completeness. The scheme by which the material has been selected is not at all clear, and there are omissions for which the explanation is not obvious. The following may be mentioned which struck me because I am personally concerned. There is no mention of any of my own work later than 1929 nor of my book on high pressure of 1931. The result is that there is no mention of determinations of the pressure-volume-temperature relations of some fifty liquids, although my earlier work in 1912 on fourteen liquids is described in some detail. It seems that some mention should have been made of the work of Benedicts on the pressure-volume-temperature relations of gaseous nitrogen over a range much wider than that of other observers, and of the work of Birch on the critical data for mercury at the highest temperature and pressure at which critical points have been measured.

P. W. BRIDGMAN

ABSTRACT ALGEBRA

An Introduction to Abstract Algebra. By CYRUS C. MACDUFFEE. 303 pp. John Wiley and Sons. $4.00.

A CONSPICUOUS mathematical development of the last two decades has been the growth of algebra as a unified science, fruitful in applications to modern