methods of analysis, the necessity of preparing the apparatus for the work, the difference in wages and the necessity for accuracy and not speed. The latter case appears when there is a legal matter involved and several repeat tests are made.

The costs are primarily based on the productive amount. Between the period when a worker starts his job and when he finishes it his time is estimated and placed on a card. Each day he completes a Daily Time Report, filling in the laboratory number, work done and the estimated time required. It is impossible to accurately determine the amount of time spent on the job, as from start to finish. The reason for this being the number of jobs a worker can do at one time, namely, start one and get that job in a condition where it will work while he is away from it, in the meantime, start another, watching both at the same time.

After the worker fills in his card it is approved by the man in charge and sent to the accounting department daily. The department chiefs and assistants are given cards which permit them to record their time from start to finish. The nature of their work, which consists mainly in consultation work, permits a recording of their time accurately.

The time cards of both the workers and chiefs are then summarized by the addition of the per hour rate, and the amounts chargeable to any particular job are entered on a cost-ledger card.

The productive amount as shown on the cost ledger card is increased by its proportionate share of the overhead as determined by the distribution of overhead. Materials used are so small in comparison with the other factors that to determine the amount used on each job would cost more than the results would warrant. The total amount of materials used, as determined by a check against the inventory on the yearly basis, is charged directly into the overhead.

In the beginning it is necessary to appraise the inventory as accurately as possible, also the location of the various items as to departments. The space occupied by each department must be known so as to properly distribute the rent charges. The question of insurance can be distributed according to its risk, *i. e.*, fire—on the basis of the inventory.

The value of this work is evidenced in more than one direction. It presents a basis for setting a figure for a fair price for analytical and consulting work, a check on the comparison of costs so as to quote on large amounts of tests (*viz.*, more than one at a time), keep a close watch on the speed and efficiency of the various workers, determine the value of unfinished work, have a complete record at all times of the costs of promotion of prospectives, a perpetual record of the costs on contracts, and the value of the various kinds of income and their cost.

The difference in keeping these costs in a laboratory is apparent within two to three months after the installation. The operation of these records does not require any large force to keep it running and the time in preparing the cards by the employes does not in any way interfere with their regular work.

FRED W. FEUERBACHER

QUOTATIONS

PROTECTING SCIENTIFIC RESEARCH AT THE POLLS

AT the polls in November, in California, Colorado and Washington, scientific medicine will be tried at the bar of public opinion. The verdict will depend in part on public knowledge of the attainments and conduct of physicians in the past. The true physician, as attorney for the defense, will be actively campaigning against the antis of all kinds, and he will be especially active on election day, when the case goes to the jury.

In Colorado and in California, the people will decide by popular vote whether medical research involving the use of living animals shall be prevented. The antivivisectionists in these states, mistrusting or despising their legislatures, are seeking, through the initiative, to bring about the enactment of such measures by playing on the ignorance and the emotions of the people. No properly informed person can vote in favor of the antivivisectionist measures proposed.

In Washington, the contest is being fought

under the referendum to restrict the activities of the health authorities with respect to the sanitary and hygienic control of the public schools. The foes of scientific medicine, among them those who even deny the existence of disease, procured the passage of an act in 1921 granting to parents the privilege of forbidding examination of their children in school by the health authorities. The public health forces of the state, recognizing the danger to public health inherent in this measure, have procured its submission to the people, and it will be voted on, November 7. The demand for this uncivilized legislation was presumably due to recognition, by the enemies of medical science, that medical mysticism and quackery can not thrive in a community enlightened with respect to modern medicine, and that the public schools constitute the great channel through which the people can be enlightened and future generations gain from the past. In fact, opposition to the rejection of this measure is an attempt to destroy one of the most effective methods of teaching facts concerning disease, namely, by their active application in school administration.

In California, members of two of the cults that now infest the medical underworld are fighting through the initiative to free themselves from control. The liberal and fair-minded provisions for licensing their practitioners do not satisfy them. Chiropractors have been defying the law, and, when convicted and sentenced, have gone to jail rather than pay fines, thus posing as martyrs. Apparently neither cult will be satisfied by any measure that does not allow it to pursue its own course at its own sweet will.

The medical profession must see that no ground is lost to the enemies of scientific medicine and particularly of preventive medicine. The debt of the physician to his patient and his community can not be discharged by proxy. Personal service, intelligently, energetically and loyally rendered, is absolutely essential to success, if the results of the contest are to be certain and complete. Every physician in each of the communities now laboring under the threat of this dangerous legislation should devote an hour or two each day between now and election to enlightening his patients and friends, to informing them as to what is right and to urging them to act on behalf of the right. Thus he will not only be doing his proper part as a true physician but also as a good citizen.—*Journal of the American Medical Association.*

SCIENTIFIC BOOKS

Applied Colloid Chemistry: General Theory. By WILDER D. BANCROFT, professor of physical chemistry at Cornell University. First edition (1921), International Chemical Series. H. P. Talbot, consulting editor. McGraw-Hill Book Company, Inc., New York.

In this volume Professor Bancroft professes to deal with the general theory of colloidal solutions in a new way; he says, "I have written this book deductively." By this one is led to understand that the author sets out to deal with general principles which later may be applied to the particular case involved in the study of colloidal solutions. One should not, then, object that colloidal solution is hardly mentioned in the first third of the book.

In carrying out his plan, the author devotes the first three chapters—or considerably more than one third of the book—to the treatment of the phenomena of absorption in all its phases. This subject is dealt with in the encyclopedic manner so frequently found in German texts, but the style is illuminated and made interesting by that piquancy of suggestion and comment which makes Professor Bancroft's lectures and papers especially attractive. Undoubtedly there is here a valuable summary of the present state of our knowledge of absorption; if any criticism is to be offered, it is that some of the matters dealt with, while important from the point of view of general absorption phenomena, seem to have very little application to the study of colloidal solutions: as, for example, the outlines of various commercial chemical operations at the end of the first chapter.

The fourth chapter is devoted to surface tension and the Brownian movement. After