It would surprise most persons to be told of the large number of manufacturing industries which to-day find use for chemists. Leaving out of consideration those works which are distinctively chemical in character, and in which all the processes are conducted strictly on a chemical basis, it may be said that we can more easily enumerate those manufactures where a chemist would be superfluous, than those in which he would be helpful. The utilization of the products of the vegetable, animal, and mineral kingdoms involves chemical phenomena at every step; the metallic ores, petroleum, clay, coal, wool, hides, fats, vegetable fibres, and extracts, gum, sugar, starch, oils, etc., are the raw materials for manifold manufactures which are successful in proportion as they are directed by chemical knowledge.

In most of the useful arts empiricism has preceded science, and many of these arts have attained a high state of perfection without any knowledge on the part of the artisan of the nature of the processes involved. Progress under these conditions is slow, and based on costly failures. Centuries ago steel for tools and weapons was made on a small scale in certain favored localities, which in quality and finish cannot be to-day surpassed. But it has only been within the last few generations since the chemist explained the true nature of steel, that the economical manufacture on a large scale, and in infinite variety of composition and character, became possible. The marvelous development of the steel industry in the last twenty-five years is based on chemical knowledge and research. Similar instances could be adduced from many other industries. The progress in the manufacture of colors for dyeing and printing is a no less remarkable illustration of the application of chemical research to an industrial problem.

In the arrangement of a course of chemical study in a school which, like the Massachusetts Institute of Technology, bears a close relation to the useful industries, the kind of work which the graduates will be called upon to perform should be kept in mind. This will be, in all likelihood, the controlling of special branches of manufacture by chemical analysis, and—what is of far greater importance—the improvement of the manufacture in efficiency and economy by new devices and processes. This is the true career of the chemist in the useful arts; namely, as a seeker for new and better methods whereby the products of industry are improved in quality and cheapened in cost.

It is clear, therefore, that the instruction in a school of this character should be as broad and deep as it can possibly be made, since one can never tell what department of chemistry will be the most helpful with fertile suggestions. It is a grave mistake to suppose that a technical school should teach the practice of the art itself. This is fatal to progress. Illustrations of practice are valuable just so far as they familiarize the student with existing apparatus and processes, emphasize chemical principles, train the powers of observation, and give material for thought and invention.

The chemical course in the Institute has been planned primarily to give the student a thorough knowledge of general chemistry and chemical theory upon which all future progress must rest. In the lectures on Industrial Chemistry the details of the great manufacturing industries are described, with the chemical facts and principles on which they are based. This course is accompanied by laboratory practice, in which the student makes various products on a considerable scale from raw materials. Dyeing and bleaching, than which no department of applied chemistry is more important, receives extended illustration in the laboratory for textile coloring. In the course in Sanitary Chemistry attention is mainly directed to the examination of air and water, and a few food products, such as butter and