

having, for the time being, overshadowed all others.

Our laboratory, however, must provide also the means for chemical investigations of air, water, food, sewage, secretions and excretions, and the products of bacterial growth; for testing the effects of gases, alkaloids, and albumoses of various kinds upon the animal organism; for investigations in the domain of physics pertaining to heating, ventilation, house drainage, clothing, soils, drainage, etc.

Just at present research is being specially directed to certain minute animal organisms—the microzoa—such as are found in the blood in malaria and in the skin in certain diseases, and to immunity; especially to that immunity which may be artificially produced.

Experimental investigation is a slow process, and very uncertain in its results. An experiment may be conceived which seems as if it would give important results. The experiment itself would require only a few moments or a few hours if all the apparatus were ready to produce the required conditions, and to record in terms of weight and measure the results obtained. But to make this apparatus in the best form, and to provide the means of recording, may take a year or more, and in making this preparation a dozen problems will come up to be solved by other experiments.

You are pretty sure to discover something new, but by no means sure that it will be what you began to seek. Every discovery opens new questions and indicates new experiments, and the precise shape in which the work presents itself varies with place and season.

We cannot foresee precisely the demands which will be made upon us, or which we shall make upon ourselves, but we do know that we shall want some large rooms in which a dozen or twenty men can be at one time taught how to investigate, working under the eye of an instructor; and also a number of small rooms, each fitted for the work of one or two men who have attained a certain amount of skill, and are engaged in original research. In all these rooms we shall at times need to use microscopes, gas-heating, and steam; there will be vapors and fumes produced; there will be delicate instruments scattered about, and the

rooms must therefore be light, have abundance of gas, steam, and water, hoods and flues for conveying away fumes, and plenty of fresh air without dust.

Many of the things that will be seen through the microscopes will be rapidly changing form, and we shall need pictures as well as descriptions of their different shapes.

The most useful drawings for our purposes are those made by sunlight, and therefore we want photo-micrographic rooms.

We shall wish to test the merits of various articles of house-equipment, such as different patterns of steam radiators, traps, sinks, closets, etc., and for this purpose we must have places where they can be fitted and put into use.

We must know what other investigators in other laboratories, and many places besides laboratories, have done and discovered, that time and effort may not be wasted.

We must therefore have the books and journals in which these are recorded, which are already many, and coming rapidly. A small library and reading room is therefore essential.

Much of the apparatus to be used must be either made or specially fitted and adjusted on the spot to meet special indications which it is impossible to foresee, and therefore we need a large workshop, with tools and appliances for working in wood, glass, and metal, and with power.

After describing the new laboratory, Dr. Billings continued as follows:

We hope that some increase of knowledge will be made here by the workers in the laboratory itself; but the main point to be kept in view is to provide well-trained, scientific, and practical men for other fields of labor. Dr. Mitchell has said that the true rate of advance in medicine is not to be tested by the work of single men, but by what the country doctor is. So, also—and even more so—advance in practical sanitation is not to be measured by laboratory records, but by what health officers and sanitary engineers are able to accomplish.

Even now we *know* much more than we *do*, and the skilled sanitarian too often finds himself in the position of the happy daughter of Priam and Hecuba, who could foretell, but to no purpose.

This laboratory is fortunate in being closely