the temperature constant within $\frac{1}{2}°$ F. of the point selected. The refrigeration is kept independent of the ventilation; the air for ventilation is cooled in the anterooms to the temperature of the rooms to which it is to be admitted. This matter of ventilation is one of the most difficult, but absolutely necessary when it is intended to keep living animals for long periods. The refrigeration is by the circulation of brine in coils, automatically controlled by thermostats. For the cooling of the brine there are two ammonia-compressors of the vertical single-acting type; one is large enough to operate the entire plant under all conditions; the second with a capacity of half of that of the first. Within constant-temperature rooms where living animals are to be kept there are no ammonia pipes, so that there can be no leakage of ammonia in the rooms.

The direct steam heating is from a central power station, as is also the electric power. All lighting is by electricity. In the basement is the plant (Nos. 17, 18, 19) for ventilation by filtered air, and this is subdivided into systems so that different parts of the building may be ventilated independently of each other. All ventilation conduits are placed within the walls lining the corridors. Steam, gas and water pipes are all exposed, and so are the rain conductors which are inside the building. The sinks, which are in nearly every room of the building, are of soapstone with an ash drain board at one end; most of the sinks measure one and a half by two feet, but certain special sinks for anatomy are much larger; one of the latter is 3 feet deep and 8 feet long. Each bibb has an extra small cock for the attachment of rubber tubing. Bunsen burners are attached to gas outlets by flexible wire tubing.

All tables have birch tops, ebonized. All wall cases are of oak with glass doors, and all the furniture is master-keyed. Drawers and trays of all standard wall cases are interchangeable. The general type of wall case is four feet wide; the upper part is provided with glass doors and shelves, the lower, deeper part with wooden doors and shallow drawers. The usual type of preparation table has a top measuring $1\frac{3}{4} \times 5$ feet, and is of a convenient size to move. Beneath the built-in window tables there are no drawers, so that one may work at any part of them. All chemical hoods have wooden frames in order that the glass may be readily replaced when broken.

The office room (No. 102) is on the first floor between these two entrances that are most used; it is occupied by the stenographer, who also acts as telephone central and keeps student records. There is an intercommunicating telephone system with twelve stations, at any of which a person may call up any station independently of the telephone central. A room (No. 103) for the janitor is placed near the main entrance. For freight there is a room (No. 8) in the basement and also a large space (No. 10A) beneath the seats of the auditorium.

For the use of the men students are two locker rooms in the basement, with vertical lockers of expanded metal, adjoining which is a large lavatory (No. 2) and a smoking room (No. 4). There is a separate toilet for janitors (No. 7). For women is provided a locker and sitting room (No. 108) on the first floor, with lavatory (No. 107) contiguous. On the second and third floors are other toilet rooms (Nos. 211, 310), that of the second floor provided with a bath for the convenience of any investigator who chooses to reside in the building.

The whole building has been made as elastic as possible so as to provide for future needs. Partitions between rooms are of terra cotta and may be easily removed; it will prove cheaper to tear down partitions so as to make larger rooms when necessary than to have large rooms at the start and later erect partitions in them.

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THE CHEMIST AS A CONSERVATIONIST

It is remarkable, if one has not given the matter serious consideration, to what extent the chemist is interested and concerned in the conservation movement, that has recently been agitated in this country. This was especially emphasized by the papers that were read and the discussions presented at the recent meeting of the third National Conservational Congress in Kansas City. It was intended that this should be especially a "Soil Conservation" meeting, and as such great prominence was given to this topic.

Ever since the settlement of this country, its abundant soil resources have been drawn upon, or there has been, as A. P. Grout puts it, a literal "Rape of the Soil." The fertility was earliest exhausted on the thin soils of the eastern states, but it is only a matter of time when the abundant cropping will tell all over the country; and in fact the important mineral constituents of the soil will be practically exhausted. We are not a people who can sit down and wait for nature, through the slow decomposition processes and through vegetation, to again render the soil fertile. The chemist must come forward and show how cheap phosphorus, cheap potash and cheap nitrogen can be obtained. The physical character of the soil must be studied in order to secure better cultivation and greater adaptability of crops to environment.

The water supplies of the country should be more thoroughly understood. Not only must the engineer utilize the pent-up mountain torrents for producing power or for irrigation, but the surface and ground waters must also be used as domestic and municipal supplies. The quality of this water should be known, and the conditions favorable to maintaining its purity are to be investigated in the laboratory. Again, with the growing manufacturing industries, the industrial waste has to be taken care of in some way so that the health of the people be conserved, and the streams remain unpolluted. If the sewage is allowed to enter the streams, it must be so purified that it is no longer sewage. Water-softening plants are now deemed a necessity whenever the water is not soft enough for laundry and domestic use.

We realize that our wood supply is rapidly wasting away, and there is need of care to prevent waste not only in the cutting of timber for lumber purposes, and in the precautions against forest fires, but also in the utilization of the immense quantities of waste in smaller limbs, roots and slabs. This, J. B. White asserts, is often as much as 60 per cent. of the tree. Here is an almost inexhaustible supply of material which, as has been shown by G. B. Frankforter and other chemists, may be utilized in the manufacture of charcoal, acetic acid, wood alcohol, tar, resin oil, acetone, gas and turpentine. The sawdust chokes the streams and kills the fish; use it as a fuel or for the manufacture of chemicals.

In this same connection it is worth while to notice that the need for so much wood in construction has gradually been decreased by using Portland cement. The chemist has tested the limestones and shale, and can tell where cement can be made at a profit. He studies the market, the supply of raw material and the cost of transportation of fuel for a given locality.

A few years ago our people went on the principle that the supply of natural gas as fuel was practically inexhaustible, but now that they have begun to realize their error from the shortage in many states, they are trying to make the gas last as long as possible. Other fuels are investigated by the chemist and we are familiar with the use of "process-gas" and petroleum burners. The "slack" from the mines is molded into "briquettes," and used as domestic fuel.

That the "live-stock farm" will do much towards preserving the fertility of the soil is the belief of F. B. Mumford. It seems very reasonable that if the farmer returns to the soil the barnyard manure from his stock, the more important chemical ingredients will be retained. If, on the other hand, he sells his crops, such as corn, wheat and hay, the land will soon show signs of depletion.

In the utilization of by-products no one is more active than the chemist. He shows how all the waste material may be utilized at the packing house, how the whey from cheese manufacture may be used to make milk sugar; how the casein may be made into buttons or dried and used in the arts; how the cotton seed may be utilized for making oil, and for a stock food; how peanut oil may be used to take the place of lard; how the once despised coal tar may be made the basis for the manufacture of dyes and scores of organic chemicals, and how the waste lye of the soap-boiler may be used for the manufacture of glycerine.

In the preservation of the life and health of the children, who is more concerned and active than the expert who studies the composition of the air they breathe in the school room, and of the water they drink, at home? What more efficient help can be afforded to the people at large than that given by the various pure-food laboratories, both state and national? The foremost object of these laboratories is to safeguard the public against impure and injurious foods, and to protect them from the frauds of mislabeling and misbranding.

In the department of domestic science in the schools and colleges, much of the instruction is in these same lines, *i. e.*, to teach what is good food, wholesome surroundings, pure air, a sanitary dwelling; in all of this and similar work the chemist is continually giving his help, and by his investigations advancing the well-being of the community, so as to make life more worth the living.

E. H. S. BAILEY

CYRUS G. PRINGLE

CYRUS G. PRINGLE was born in Charlotte, Vermont, May 6, 1838, and died in Burlington, Vermont, May 25, 1911. At an early stage his studies at the University of Vermont were interrupted by the death of his father and he was compelled to return to the home farm to assist his mother in the support of the family.

Always interested in botany and horticulture, he declared in 1869, "My chief study shall be the adaptation of our beautiful Valley of Lake Champlain to horticultural pursuits"—the development of his native valley was the ambition of his life.

He began with a comparative study of the climatic conditions of the Champlain valley and of the adjoining horticultural areas. He followed this study by introducing plants from more southern areas and testing them under Vermont conditions. Finally, he attempted to improve plants which could be grown under these conditions, by breeding and selection. It was in this field that he attained his greatest success.

Dr. Pringle laid a broad foundation for his work. He visited nearly all persons in this country who were engaged in the improvement of plants by breeding and selection, studying their methods and results. February 24, 1869, he imported a copy of Lecog's work on hybridization. While waiting at the mill for his turn to have his wheat ground, he learned to read French and pursued the study of Lecog's work.

As might be expected from such a man, he soon gained a wonderful insight into the nature of plants and success crowned his efforts. In a short time his farm became well known both to scientists interested in the laws of plant breeding and to horticulturists and seedmen seeking new varieties. Among his early friends and visitors was Luther Burbank.

Dr. Pringle did not limit his work to any one line of plants, but included all kinds, both useful and ornamental, which might help to develop his native state. Some idea of the scale on which he worked may be gained by a study of his early records. These show that he set out 1,500 apple and 600 pear stocks for an experiment in adaptation; that he was carrying on breeding experiments with over 25 species of plants, including cereals, potatoes, grapes, pears, plums, apples, cherries, a variety of ornamental plants and others; and that in every case he was working with very large numbers of individuals. His collection of bulbs of ornamental plants was the largest in point of variety, not only in the United States, but in the world.

He was able to originate and place on the market three potatoes of special merit. These were the Snowflake, the Alpha and the Ruby. The first attained great popularity and was sold at a large figure to a New York house. This house paid him as high as $1,000 per pound for potato seed. In cereals he originated the Defiance Wheat, the Champlain Wheat and Hulless Oat. The first of these "has been for years the standard wheat for