EQUIPPING A VITAMIN LABORATORY ON DEPRESSION FUNDS

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The spending of a sum of money for research purposes in days of decreased and declining income takes on the air of a real adventure. Every dollar must be stretched, even though it has a greater purchasing power than formerly; no false moves can be made and one's ingenuity is considerably taxed to obtain adequate equipment and at the same time to sacrifice nothing which would relate to the precision of results. When given the opportunity of undertaking a research problem in the field of vitamin investigation the writer eagerly set out to see how far funds could be extended.

The first task was to find space for the laboratories. Vitamin work requires space for several different purposes. There must be a room solely for the animals which must be free from extremes of temperature, well ventilated, lighted, and easily cleaned. Fortunately, through the generosity of the Physics Department, a room was found in the Science Building which houses Physics, Geology and Biology. The room was made available by changing a long, narrow classroom into three smaller rooms. Being in a brick steam-heated building, it was well protected from extremes of heat and cold. The floor was cement and there was an excellent cement work table in the center of the room. A small sink had to be installed at the end of the table. The wire-mesh cages for the animals, and the metal units or shelves which hold the cages made up the remaining equipment for this room. The metal units were made at the shop on the campus. The framework was made of 1¼-inch piping joined together so the skeleton frame was 5 feet

high, 4½ feet long and 3 feet wide. A solid sheet of galvanized iron made each shelf. The sheet was stretched over the crosspieces and rolled under the piping on the sides to make a secure holding. Each unit had four shelves. The smooth iron piping and solid sheets of metal made it possible to keep the entire unit spotlessly clean, and the absence of cracks and crevices avoided the accumulation of food and dirt which would be difficult to remove.

The experimental work included both vitamins B(B_1), and G(B_2), and as the rats used in each part of the experiment must be kept separate, two units were required for the experimental animals. A third unit was set aside for the breeding lots, as we planned to raise experimental animals. The rectangular cages 15 inches long, 11 inches high, and 11 inches wide, made at a reasonable cost by a local tinner, were used for breeding animals. The round cages for the individual experimental animals were 9 inches in diameter and 7½ inches high. All cages were made with raised wire screen bottoms, so that none of the animals could have access to feces.

Close by this room was a smaller one admirably suited for a preparation or mixing room, which served also as a storeroom for all supplies for the animals. A refrigerator found in the Biology Department was given over to use in the laboratory. An excellent rebuilt electric mixing machine of the type used as a mayonnaise or bread mixer answered our purpose perfectly for mixing the dry foods. This was obtained at less than half the price of a new machine. A few dollars bought a grinder which could be used as an attachment to the electric mixer. It was smaller than desired, but the grinding was satisfactory. The campus shop built a large, strong table to hold the heavy machine and to serve as a mixing table. The food cups, water cups, and granite trays for the round cages were obtained through the wholesale houses, and two balances, which could be spared from the chemistry department, were borrowed.

Another necessity for vitamin work is a cleaning-room with a good sink and a large oven for sterilizing the animal cages and other apparatus. The only available place for this

was in the Biology Department, two floors above. Here we found a small room with a sink, a large gas-heated oven, and an autoclave. The Biology Department generously offered the use of this room. The oven could accommodate only about six cages at a time, which meant more work and time for the cleaning.

In vitamin B(B_1) work it is necessary to use yeast which has been autoclaved six hours at 15 pounds pressure and 120° C. The autoclave which was available could not be connected to an outside steam supply, but by utilizing the accompanying small boiler we could keep a steam pressure of 15 pounds at 120° C. for four hours. By the end of this time the water supply was too low to continue. By having boiling water ready, we could release the pressure in the autoclave, fill the boiler, and restore the pressure to 15 pounds with only one-half hour of suspended operations. Later work showed that this treatment was quite as effective as that in the heating for six consecutive hours.

Space in the chemical laboratory served for the chemical preparation room. A vacuum pump and an electric stirrer were needed. Mr. J. G. Kearby of the Physics Department in the Engineering School was most helpful and ingenious in building the pump. He used a one-fourth horsepower electric motor belted to two old automobile air pumps, which he inverted to use as exhaust instead of pressure pumps. They were put in series and set out of phase 180°. The valve-closing springs had to be weakened considerably in order to care for the low pressure. The whole was vertically mounted, thereby keeping the oil sleeves on the connecting-rod free from oil seepage. It was driven at 150 r. p. m. by an endless belt. This method reduced the vibration to some extent. By means of this pump we were able to lower the pressure to 20-30 mm., so that the alcohol extracts of the vitamin-bearing materials could be reduced in volume at about 30° C. without any harmful effects. The total cost of the pump was $42.00.

At a wholesale drug house we found a used and discarded electric stirrer such as is used at soda fountains. The motor was small and was rapidly driven, so it could be used

only with light liquids. Mr. Kearby reduced the speed by increasing the resistance, making it possible to use the stirrer for heavier liquids. The plan of attaching the stirring rod was changed so that a concentric L-type stirrer could be used. The total cost of the equipment for all of the laboratories was approximately $400.00.

The work of preparing the experimental foods and animal diets and keeping the supplies fresh and adequate was considerable. In addition, the care of the animals required several hours of careful work every day. This presented a serious problem, since there were no trained workers available, but as the plans and preparations had aroused considerable interest in the department, several of the best students volunteered their services in order to learn the methods of the work. Miss Elizabeth Huke, Miss Rose Steed, and Mr. Francisco Cruz Aedo were most valuable in the help they gave in carrying out the investigation. A study of the vitamin B(B_1) and G(B_2) values of some cotton seed products was undertaken, and an account of the outcome of this experiment will be published in the near future.