The central laboratories also have an experimental animal cancer department under the immediate direction of Dr. Shigemitsu Itami, who has had ten years' experience at the Crocker Cancer Institute of New York and four years with the British Empire Cancer Campaign in London, and who is assisted by a chemist and zoologist. Research work in radiation and other physical aspects of cancer is being carried on in the central laboratories in collaboration with the Bartol Institute, and for this purpose the Cancer Research Fund is maintaining two physicists, two chemists and a scientific secretary.

At the Philadelphia General Hospital the Cancer Research Fund has had for some time a research laboratory for the study of biochemistry of the blood before and after radiation of patients, and for the study of the hematology and immunology of cancer. This laboratory works in conjunction with the cancer clinic of the Philadelphia General Hospital, and has a staff of three chemists, one immunologist, one physician and one voluntary worker.

In addition to maintaining the laboratories mentioned, the Cancer Research Fund has made a number of grants for investigation to be carried on by research workers in collaboration with the work of the fund. These are as follows: A study of the metabolism of cells, by Professor W. D. Bancroft, of Cornell University; a study of the fixation of pathological material, by Dr. Henry J. Fry, of New York University; a study of the sensitization of cells to fluorescent substances and specific wave-lengths of X-rays, by Professor Eric Ponder, of New York University, and a study of the quantitative spectrographic estimation of minute quantities of substances in biological material, by Dr. Andrew Dingwall, of the department of chemistry, Columbia University.

In connection with the last-named study the fund has established a fellowship under the name of the Dr. J. Packard Laird Fellowship for Cancer Research; this fellowship is held at present by R. J. Crosen, of Columbia University. Another fellowship to be known as the Dr. John G. Clark Fellowship in Cancer Research also is being established.

The director of the cancer research is Dr. Ellice McDonald, assistant professor of gynecology in the graduate school of medicine of the university, and the Cancer Research Fund is controlled by an executive committee consisting of Dr. McDonald, Dr. George H. Meeker, dean of the graduate school of medicine, and Professor W. F. G. Swann, director of the Bartol Research Foundation and special lecturer on electrical engineering at the university.

In addition there is the following board of scientific directors of the research: Dr. McDonald, *chairman;* Dr. Meeker; Professor Swann; Dr. John A. Kolmer, professor of pathology and bacteriology in the graduate school of medicine; Dr. Eugene L. Opie, professor of pathology in the graduate school of medicine; Dr. Martin Kilpatrick, assistant professor of chemistry, University of Pennsylvania, and Dr. Clarence E. McClung, professor of zoology at the university. The board of scientific directors has recently established a publications committee with Dr. Opie as chairman.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A DIET FOR STOCK RATS

DURING the past seven years the stock rats of this laboratory have been reared on a diet which has given uniformly satisfactory results from the standpoint of growth and fertility and which has the further advantage of being obtainable ready-mixed at a very reasonable cost.

This ration was originally developed by Maynard, Norris and Krauss[1] as a feed for young calves. It was later tried out with rats with such good results that it was adopted as our stock diet. The formula[2] for this diet as now used is as follows:

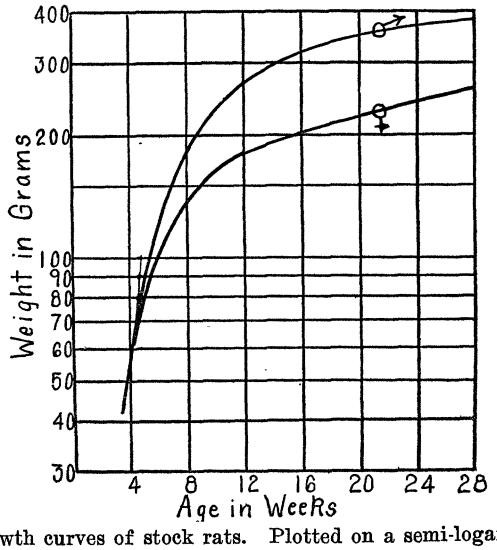
300 lbs.	Linseed oil meal
200 "	Ground malted barley
440 "	Wheat red dog flour
300 "	Dried skim milk
300 lbs.	Oat flour
400 "	Yellow corn meal
20 "	Steam bone meal
20 "	Ground limestone
20 "	Salt

Originally the formula contained some soluble blood flour, a special product which later became difficult to obtain and which was therefore replaced by the dried skim milk. The diet is used as the sole ration, with the exception that cod-liver oil is fed twice a week, mixed in as 3 per cent. of the day's food. No green food of any kind is supplied.

The mean growth curves for our rat colony, plotted upon a semi-logarithmic scale, are shown in the chart. The animals providing the data for these curves were weaned at twenty-three days of age. The foundation rats for our colony were obtained from the stock of Osborne and Mendel. Since 1919 no animals from any outside source have been introduced.

[1] Cornell Agr. Expt. Sta. Bull. 439, 1925.

[2] This formula is marketed as a ready-mixed feed under the name G. L. F. Calf Meal by the Cooperative G. L. F. Exchange, Buffalo, N. Y.



Growth curves of stock rats. Plotted on a semi-logarithmic scale diagram.

The efficiency of this diet for reproduction is indicated by the following data. In August, 1929, all the females of the stock colony which were over one hundred days of age and less than one year were mated. Of this group fifty-two were young females which had never before been mated and twenty-eight were mature animals which had produced one or more litters. A male was placed with each three females and left with them for a period of five days. All the males were young and untested as regards fertility. From these matings fifty-two of the females, 65 per cent., produced litters. In view of the fact that most of the animals used were young and untested and that the mating period was limited to five days, we feel that the above records indicate a high degree of fertility. The average number per litter from the above matings was 7.3. Each mother was given six young to rear with the exception of thirteen mothers which were given five only. Thus the fifty-two mothers were allowed a total of 299 young. Of this number over 90 per cent. were reared and successfully weaned at twenty-three days of age.

Recently this stock diet has been tried out with rats in three other laboratories and uniformly satisfactory results have been reported to us. During the past year we have used it as a stock diet for our mouse colony with excellent results. Since this ration is mixed in hundreds of tons for marketing as a calf meal, it is available at a price which is very much lower than the cost of the ingredients and labor involved in the preparation of stock diets in small quantities in experimental laboratories.

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AN IMPROVED CALOMEL ELECTRODE VESSEL

IN much previous work in this laboratory the salt bridge connecting cell and electrode has been a cotton string wet with KCl solution of the same concentration as that used in the electrode. This string led into a beaker into which also dipped a calomel electrode tip of a conventional type. When six or more electrodes were used on a single cell, there was difficulty in getting the electrode tips with their attendant beakers close enough together. Even though the beakers stood on a paraffined bench, the slight contamination of the paraffin surface with moisture and spilt KCl gave cause to doubt the perfect insulation of the electrodes from the ground and from each other. An electrode vessel of the type shown in Fig. 1 was therefore used. The cup into which the

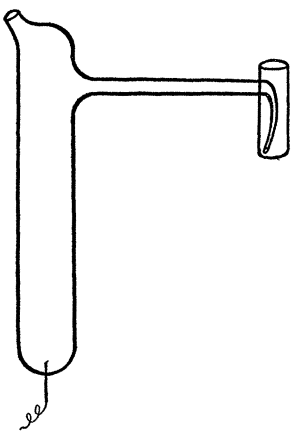

FIG. 1. Calomel electrode vessel with attached cup for string salt bridge.

string dips is blown onto the end of the electrode arm, which is long enough to permit placing the cups as close together as desired. The electrode arm enters the side of the cup, so that the entire surface of the electrode may be wiped with paraffin oil without oiling the solution in the cup. The arm is drawn to a capillary and extends to the bottom of the cup to prevent much mixing of the solution in the cup with that in the electrode. At the end of the day's work the cup is emptied with a pipette, more solution from the electrode vessel is flushed through and a rubber stopper is inserted to prevent evaporation of water and consequent creeping of KCl. The electrode vessel is held in a grounded metal clamp from which it is sufficiently insulated by the glass, oiled with paraffin. This electrode vessel has been found a great time-saver.

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