QUOTATIONS

SCIENCE AND PUBLIC WORKS

THE economy axe has been wielded with so much zeal, not always according to knowledge, among government bureaus that science has fared badly. Even in prosperous years less than 1 per cent. of the federal budget was appropriated for research. Now there is a reduction of 60 per cent. over 1932. The army and navy, on the other hand, will continue to receive huge sums. So glaring is the discrepancy that various cabinet members have done their best to correct a manifest error of judgment.

The term "public works" is so broad that it can be made to embrace not only such tangible structures as roads, bridges and radio stations, but also the testing of airplane engines in a laboratory that must now stand idle, or the discovery of new alloys. Reasoning thus, Secretary of Commerce Roper applied for grants out of the public works fund to continue research that had to be abandoned. On behalf of the Bureau of Standards, which has been compelled to rid itself of 380 of a staff that once numbered 974, he asked for no more than $450,000. There were also requests to aid the Bureau of Mines ($275,000), the Bureau of Fisheries ($1,072,474), the Coast and Geodetic Survey ($3,300,938) and the Bureau of Lighthouses ($2,355,068), the money to be spent on "new projects." Since buildings and equipments are public property, further applications were made for funds to recondition them. Secretary Ickes appealed for aid to permit the Geological Survey to continue investigations of the highest importance to the mineral industries, and Secretary Wallace stepped into the breach on behalf of the Department of Agriculture.

The first decisions on these applications have now been made. They make sad reading for science. Of the $64,561,542 of the public works funds involved, only $4,255,592 is to be spent by scientific bureaus, and this largely for labor and building material in making necessary repairs. Evidently the term "public works" is narrowly construed. Between public works in the strict sense of the term and laboratory research the choice should be easy. The record of such an institution as the Bureau of Standards speaks for itself. Literally tens of millions have been earned and a score of new industries have been created by research. Besides, there is the question of hundreds of highly trained chemists, physicists and engineers. Are they now to be numbered among the unemployed? They have been the most powerful of all creators of employment. A million entrusted to them returned not only tens of millions but gave us industries of which there was no previous inkling.—*The New York Times.*

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A PHOTOGRAPHIC TECHNIQUE FOR THE STUDY OF EXTENSIVE DATA ON SMALL POPULATIONS[1]

A METHOD which would facilitate the study of interrelationships among extensive clinical observations, physiological measures and test results was required for the investigation of reaction tendencies in psychopathic cases. In order that significant and suggestive interrelationships might be determined without too great expenditure of time and energy, we adopted a procedure which seems applicable in many fields of investigation where there are a great many data on, let us say, less than a hundred cases. Briefly, the method is to copy all data in tables on large sheets of draughtsman's tracing cloth, to cut the table into strips, one strip for each case, to arrange the strips according to any desired grouping or ranking in a printing frame, to blue-print the table thus arranged, and then to search the blue-printed table for measures differentiated by the grouping or ranking.

More specifically, it has been found practicable to list the names of the various measures on which data are available in a wide strip along the top of the table as a universal heading. The individual cases are listed at quarter inch intervals in a column at the left, and the data for each case are transferred to the row opposite the case name in the appropriate data columns. Holes are punched at a uniform distance from the two ends of each row of data before cutting the table into strips. A printing frame is constructed slightly larger than the table, with a row of small nails spaced at quarter-inch intervals on each side. The holes in the left end of the strips fit the nails along the left edge of the frame. A rubber band fastened through the hole in the right-hand end of each strip maintains a moderate tension when it is looped over an appropriate nail at the right of the frame. One of the rows of nails may be in a detachable section of the frame, so as to permit lifting the arranged strips for the insertion of a sheet of

[1] Report from the Behavior Research Fund and the Institute for Juvenile Research, Chicago, Series B, No. 192.

blue-print paper. A glass plate may be used to maintain a good contact between the strips and the sensitive paper. Thirty to ninety seconds exposure in sunlight is sufficient for medium speed blue-print paper. The sheets may be fixed by washing under running tap water. When purchased in fifty yard rolls, the blue-print paper for tables of convenient size, two or three feet by three feet, costs about five cents per table.

Any number of tables representing any groupings or any rankings of the data which are desired may be made with no more work than is required for a rearrangement of the strips. Groupings of the data may be conveniently separated by a white band on the printed table by placing an opaque strip in the frame between the groups. An inspection or an average of the groups in the columns under the various headings will often be sufficient to determine whether a relationship is worthy of further study.

If it is desired to study the data with regard to two different dimensions, they may be ranked according to the chosen variables, divided into appropriate groups, blue-printed, and the various columns of data cut and pasted on separate sheets to show the distribution of any desired third variable with respect to x and y.

CHESTER W. DARROW
BEHAVIOR RESEARCH FUND, AND THE
INSTITUTE FOR JUVENILE RESEARCH
CHICAGO, ILLINOIS

AN IMPROVED CAPILLARY MERCURY VAPOR LAMP

THE capillary mercury vapor lamp designed by Daniels and Heidt[1] has been extensively used in some radiation studies. With this use of the lamp we have introduced several changes in construction which have made it more practical and have extended its usefulness.

Instead of using quartz tubing of uniform diameter throughout, the part of the lamp above the upper pair of bulbs is made of tubing of inside diameter 0.5 mm larger than that of the remainder of the lamp. Through this capillary of larger diameter is introduced a short piece of graphite (fired pencil lead). Otherwise the lamp is arranged in the usual manner. In the completed lamp the graphite is caused, by slight tapping, to come to rest at the point where the capillary of smaller diameter begins, that is, at the base of the lower bulb of the upper pair. The piece of graphite now blocks the capillary and is in contact with the mercury column above and below. When the current is passed through the lamp the graphite, because of its high resistance, becomes very hot. Some of the mercury vaporizes and the arc starts immediately. By following the above procedure the lamp may be started as many times as desired.

The advantages of this self-starting lamp are: (1) the awkward procedure of starting the lamp with a flame or heater is avoided; (2) the lamp is started under water and is constant immediately; (3) breakage of lamps due to the sudden cooling of the exterior by water when they are started by the older methods is largely avoided; (4) when light of wave-length longer than 3100 Å is desired materials other than quartz may be used. It was found possible to use lamps constructed with special glass, thus cutting their cost to a few cents each.

It has also been practicable to fill these lamps with amalgams (Hg + Cd, Hg + Zn, etc.) of such composition that they can be used repeatedly without breakage. These amalgams supply light of wave-lengths not present in the mercury spectrum.

ALEXANDER HOLLAENDER
J. F. STAUFFER
UNIVERSITY OF WISCONSIN

SPECIAL ARTICLES

INVESTIGATIONS IN PUERTO RICO ON MANSON'S BLOOD-FLUKE INFECTION (SCHISTOSOMIASIS MANSONI)

AN intensive study of *Schistosoma mansoni* infection in Puerto Rico is being undertaken this summer by cooperative efforts of the School of Tropical Medicine of the University of Puerto Rico under the auspices of Columbia University and the Department of Tropical Medicine of Tulane University. The investigation has been made possible by grants from the Bailey K. Ashford Fund and the National Research Council.

Schistosoma mansoni is a unisexual blood-fluke living in the portal vessels of its host, usually man. It produces dysentery and later fibrous and papillomatous modifications of the intestinal tract and cirrhosis of the liver. The female worms lay large lateral-spined eggs into the mesenteric and rectal vessels, so that the majority of these eggs work their way through into the intestinal lumen and are passed in the feces. In water the eggs hatch and the emergent larva (*miracidium*) attacks and penetrates the soft tissues of the appropriate snail (species of *Planorbis*), in the "liver gland" of which a twofold

[1] Farrington Daniels and L. J. Heidt, *Jour. Amer. Chem. Soc.*, 54: 2381–2384, 1932.