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THE PROTEIN PROBLEM OF CHINA[1]

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PROTEIN INTAKE

THE protein problem of China implicates the nutrition problem of China as a whole. Our experience in the Far East leads us to believe that in normal times the question of sufficient calories usually takes care of itself. That is to say, in a closed area or in a large agricultural country undisturbed by much industry, when the population pressure is in equilibrium with the food supply, it would appear that people live or die, depending upon whether the supply of calories is sufficient or not. This is one reason incidentally why the problem of nutrition in China is such a fascinating one for the food economist; the equilibrium is such a simple straightforward equilibrium with very few side reactions. But aside from calories the question of protein is probably the first qualitative factor of importance. Our first set of data published about twenty years ago indicates a protein intake of approximately 80 grams per capita per day,[2] which figure subsequent studies have confirmed as an average statement of the protein intake.

THE RURAL DIET IS VEGETARIAN

A further accounting shows that about 95 per cent. of this average protein intake is derived from vegetable sources, while 5 per cent. is animal protein. One should hasten to explain that these figures are for the Chinese rural diet, which accounts for some 85 to 90 per cent. of the total population of the country. Please keep in mind that those who live in the more sophisticated centers, including those citizens of China whom we meet on the college campuses of this country, are accustomed to a dietary which approximates in character and variety that of the Occident.

[1] Paper presented at a Symposium on the Biological Value of Proteins, at the Cleveland Meeting of the American Chemical Society, April 6, 1944.

[2] W. H. Adolph, *Jour. Home Econ.*, 17: 1, 1925.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

A MANOMETRIC VALVE OR RESPIRATOR

THIS valve permits of a fully automatic increase and decrease in pressure, over a variable fixed range, in reaction or culture vessels or rooms; and it obviates the discharge of, and consequent replacement of, waste liquid from the valve. Mercury is added to the separatory funnel so as to establish a liquid level B, higher than the point of intersection E in the inverted glass Y (FGH). At this time the mercury is continuous from level B, down through the U tube LKF, and in the legs of the Y (FE and EG). The introduction of gas under pressure at N then forces the mercury in the Y down through the two legs (FE and EG), into the capillary GM and into one arm (FK) of the U tube FKL. As the pressure in the line RN approaches a maximum, the mercury initially contained in EG approaches the upper limit A of the capillary tube. When the pressure in the line exceeds the pressure

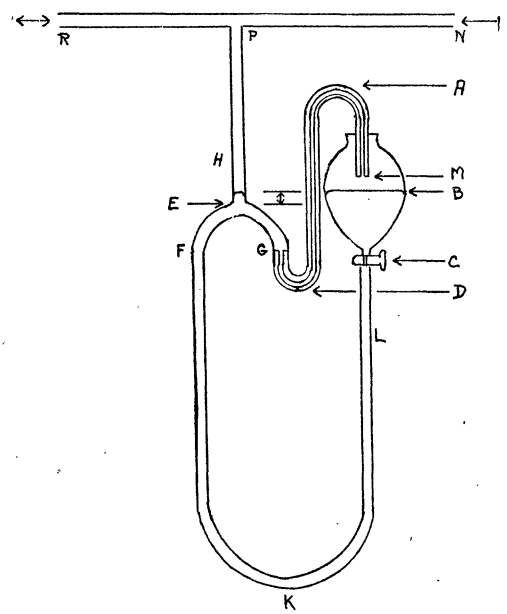

FIG. 1. A separatory funnel, a piece of capillary tubing, and an inverted glass Y are connected as illustrated.

represented by a column of mercury of vertical distance AD, all the mercury in the capillary spills over into the separatory funnel. The positive pressure in the line RN then drops as gas escapes through the now open capillary. The pressure of the mercury in the funnel then forces up the depressed mercury level in FK until the mercury once again spills over through FE into EG. The valve is thereby closed and the above cycle repeats.

The pressure range over which the valve operates is primarily a function of the vertical distance AD. Other variables, of which the rate of pressure increase and pressure decrease are a function, include: the rate of flow of gas into the line RN; the capacity of the chambers into which and out of which the gas flows through RP; the diameter of the capillary in the capillary tube; the capacity and angle of inclination of leg EG of the Y; the vertical distance EB which determines the hydrostatic pressure responsible for the return of the mercury from the funnel to the Y; and the setting of the stopcock C. These variables may be manipulated to suit one's purpose.

A valve of this type has been used to breathe cultures of microorganisms grown upon and within porous masses, that is, in the study of metabolizing masses which otherwise offer resistance to uniform aeration and temperature control. The rate of replacement of the gases in the reaction or culture vessels may be controlled by interposing a baffle between the line PR and the culture vessels, or by recirculating the gases expelled from the capillary at M, instead of permitting those gases to escape into the atmosphere. One of the obviously related uses for this respirator may be found in the study of respiratory quotients at gas-liquid-solid interfaces, in surface metabolism, as supplementary to the techniques in common use at the present time.

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BOOKS RECEIVED

KNAYSI, GEORGES. *Elements of Bacterial Cytology.* Illustrated. Pp. xxii + 209. Comstock Publishing Company. $3.50.

JACOBS, M. B. *Chemistry and Technology of Food and Food Products.* Vol. 1. Illustrated. Pp. xv + 952. Interscience Publishers, Inc. $10.50.

MACY, RUDOLPH. *Organic Chemistry Simplified.* Illustrated. Pp. viii + 431. Chemical Publishing Co., Inc. $3.75.

NORWOOD, WILLIAM FREDERICK. *Medical Education in the United States Before the Civil War.* Pp. xvi + 487. University of Pennsylvania Press. $6.00.

RICH, ARNOLD R. *The Pathogenesis of Tuberculosis.* Illustrated. Pp. xxiv + 1008. Charles C Thomas. $10.50.

ROBINSON, CLARK SHOVE. *Explosions: Their Anatomy and Destructiveness.* Illustrated. Pp. vii + 88. McGraw-Hill Book Company. $1.50.

ROYS, RALPH L. *The Indian Background of Colonial Yucatan.* Illustrated. Pp. vii + 244. Carnegie Institution of Washington. $1.75, paper cover—$2.75, cloth binding.

SCHRADER, FRANZ. *Mitosis. The Movements of Chromosomes in Cell Division.* Illustrated. Pp. x + 110. Columbia University Press. $2.00.

WISE, LOUIS E. *Wood Chemistry.* Illustrated. Pp. x + 900. Reinhold Publishing Corporation. $11.50.