susceptible to the subsequent transplantation of the Brown-Pearce tumor, and likewise failed to enhance its growth and spread. These results are in contrast to the marked enhancement in the incidence, growth and spread which constantly ensues when rabbits are treated with a material from the Brown-Pearce tumor 2 weeks before transplantation of that tumor.

11033 P

Respiratory Exchange of the Fresh Water Annelid, Tubifex.

FRED G. BRAZDA. (Introduced by Howard H. Beard.)

From the Department of Biochemistry, Louisiana State University School of Medicine, New Orleans.

During an investigation to determine the availability of Tubifex tubifex as a test-object for certain pharmacological studies it was desired to define the magnitude of its respiratory exchange.

The method of Warburg[1] for measuring oxygen utilization (Q_{O_2}) and that of Dickens and Simer[2] for determining the respiratory quotient (R.Q.) were used. An aqueous medium containing NaCl—0.32%, KCl—0.007%, $CaCl_2$—0.00074%, and $NaHCO_3$—0.005%, possessing a pH range from 7.0 to 7.1, was used in the experiments. An atmosphere of oxygen, since it was found to be as suitable as air, was used for the sake of expediency in calculations. The most suitable temperature for these experiments was found to be 30°C; a few determinations were made at 25°C.

In most experiments preliminary anesthesia with chloretone (0.2%) was used to free the animals from mud and to sort them. Anesthesia lasting no more than 10 minutes was induced well in advance of the experiment. The data obtained from several comparative experiments indicate that such anesthesia induced long before the experiment did not modify appreciably the nature of the respiratory exchange.

The animals were arbitrarily divided into two categories based on length: small—about 2 cm; large—about 7 cm. No attempt to segregate the animals on a basis of sexual phase was made.

Utilization of Oxygen: In 12 determinations the average utilization of oxygen (Q_{O_2}) by small worms at 30°C was 1.49 cmm O_2

1 Warburg, O., *Über den Stoffwechsel der Tumoren*, Berlin, 1926.

2 Dickens, F., and Simer, F., *Biochem. J.*, 1931, **25**, 973.

per mg dry weight per hour when the animals were previously fasted for 16 hours. The average Q_{O_2} (4 determinations) for small worms previously fed glucose for 16 hours was 2.19. The experimental medium for the latter contained 0.2% glucose.

The addition of glucose to the experimental medium had little effect on the Q_{O_2} of small worms previously fasted 16 hours. The average Q_{O_2} (3 determinations) was 1.39.

The average Q_{O_2} of fasted small Tubifex at 25°C was 0.83 (9 determinations), whereas at 30°C it was 1.49 (12 determinations). In the case of large worms the average Q_{O_2} (9 determinations) at 25°C after a 16-hour fast was 0.80; at 30°C it was 1.03 (average of 10 determinations). The utilization of oxygen at 30°C by fasted small worms is in excess of that at 25°C by about 80%. This is greater than would be expected on a basis of the rule which postulates a two-fold increase in reaction velocity with a temperature rise of 10°C. In the case of the large worms the analogous increase was only about 30% and so is smaller than the increase expected because of the elevation in temperature. Furthermore, the utilization of oxygen by small worms is almost 45% higher at 30°C than that of large worms similarly treated; yet, at 25°C the difference is small.

The results are additionally of the nature of the average because during the determinations as many as 30 small worms or 15 large worms were placed in each of the experimental vessels.

Respiratory Quotient: An average of 4 determinations of the respiratory quotient (R.Q.) of small worms at 30°C fasted for 16 hours was 0.86. One of the values was abnormally high for some unaccounted reason and thus elevated the average. The average of the remaining 3 values was 0.81. When small worms were previously fed glucose for 16 hours and placed in an experimental medium containing 0.2% glucose their average R.Q. (6 determinations) was 0.89. In the case of small worms which were previously well fed, then fasted for 16 hours, and transferred to an experimental medium containing 0.2% glucose the average R.Q. (3 determinations) was 0.84.

The R.Q. of large worms fasted 16 hours and without glucose in the experimental vessels was 0.75 (average of 3 determinations). When glucose was added to the experimental medium the R.Q. was 0.81 (only one determination).

A comparison of the respiratory quotients leads one to suspect that a relatively short fasting period followed by the addition of glucose to the medium in the experimental vessel causes the R.Q. to be elevated only slightly. Prefeeding of the animals with glucose tends

to elevate the R.Q. The disparity between minima and maxima under similar experimental conditions is often great enough to indicate a difference in the quality of metabolism. This fact can be ascribed to a difference in antecedent nutrition of the individuals constituting the groups in separate experimental vessels. The magnitudes of the R.Q. in each case imply the conventional aerobic utilization of food substances.

Prefeeding of the animals with glucose in conjunction with the presence of glucose in the experimental vessels tends to increase Q_{O_2}. Analysis of the R.Q. values reveals, also, that this increase in the utilization of oxygen consequent to the accessibility of glucose is associated with a change in the nature of the R.Q.

The magnitude of oxygen uptake determined indirectly by the method of Dickens and Simer was satisfactorily comparable with that determined directly by the method of Warburg under analogous conditions.

11034 P

Conversion of Sulfanilamide into *p*-Hydroxylamino-benzenesulfonamide by Ultraviolet Irradiation.

LAWRANCE E. SHINN, EDNA R. MAIN AND RALPH R. MELLON.
From the Western Pennsylvania Hospital, Institute of Pathology, Pittsburgh, Pa.

In a previous publication[1] the authors demonstrated that solutions of sulfanilamide and certain related compounds were endowed with anticatalase activity following irradiation with ultraviolet light. It was suggested in a subsequent paper[2] that this activity might result from the formation of either the *p*-hydroxylamino derivative or free hydroxylamine in the irradiated solutions. Taking hydroxylamine as a standard, it was calculated that the activity found could be explained by the conversion of about 2% of the sulfanilamide in an irradiated 8 mg % solution into the active compound. At that time no evidence was available to show that the assumed derivatives were actually formed under the conditions described. With a method recently developed by Rosenthal and Bauer,[3] it has been possible to

1 Main, E. R., Shinn, L. E., and Mellon, R. R., PROC. SOC. EXP. BIOL. AND MED., 1938, **39**, 272.

2 Shinn, L. E., Main, E. R., and Mellon, R. R., PROC. SOC. EXP. BIOL. AND MED., 1938, **39**, 591.

3 Rosenthal, S. M., and Bauer, H., *Pub. Health Reports*, 1939, **54**, 1880.