

wing-beat under a variety of experimental conditions. Many hundreds of reliable measurements may be accomplished on each individual during intermittent flights having durations of 3 to 5 seconds, separated by adequate periods of rest (about 20 seconds). Under carefully controlled conditions the variability of such determinations on a single individual is generally less than one per cent. For 24 strains of *Drosophila* the coefficient of variability among different individuals of single strains was found to average 3.10 per cent.⁸ Useful information in regard to metabolism and fatigue can be obtained in terms of the progressive changes in wing-beat frequency during continuous flight.⁵ The principle of the apparatus has also been adapted for measurements correlating wing-beat frequency with respiratory exchange.⁸

LEIGH E. CHADWICK

ANESTHESIA LABORATORY OF THE HARVARD
MEDICAL SCHOOL AT THE MASSACHUSETTS
GENERAL HOSPITAL, BOSTON, MASS.

LEIGH E. CHADWICK

DEPARTMENT OF PHYSIOLOGY,
UNIVERSITY OF ROCHESTER SCHOOL OF
MEDICINE AND DENTISTRY

THE COAGULUM-CONTACT TECHNIC IN TRAUMATIC RUPTURE OF THE LIVER IN DOG AND MAN

At the suggestion of Dr. W. Wayne Babcock, it was decided to extend the principles involved in the coagulum-contact technic of skin grafting¹ to the control of bleeding and the promotion of healing in traumatic injuries of the liver and spleen. In the past it has been customary to sew the opposing surfaces of the liver together. This frequently promotes rather than controls bleeding. Likewise the packing of the injured field is often complicated by bleeding at the time the packing is removed. The new method presents neither of these difficulties.

Equal quantities of plasma and cell extract (autogenous, homologous or heterogenous) are mixed together just before using. The bleeding surfaces of the liver which are to be joined are exposed and the mixture is rapidly brushed over both surfaces with a sterile camel hair brush. The surfaces are firmly held together for about three minutes. They are then released and will adhere firmly to one another. If the bleeding is still present in poorly apposed parts, some of the mixture is brushed over these areas and left to coagulate. If there is profuse bleeding the brush may

⁸ L. E. Chadwick and D. Gilmour, *Physiol. Zool.*, 13: 398-410, 1940.

¹ M. E. Sano, *Am. Jour. Surg.*, lxi, 105-106, 1943. This new method of skin grafting using plasma and cell extract to form an adhesive and growth-stimulating coagulum is being used not only at Temple University Hospital but at other hospitals with very good results.

be held over the site of bleeding for one to two minutes. On microscopic examination, three days later, fibroblasts are seen to have proliferated in the coagulum formed. Five days after operation, small sinuses appear in certain sections. By the end of ten days, it is often difficult to find the line of incision on gross inspection of the specimen. Microscopically, one finds these areas well organized with very little evidence of damage to the adjacent liver cells.

Damaged surfaces of liver will adhere to one another on pressure without the interposition of plasma and extract. However, oozing does not stop so readily and when profuse bleeding occurs at the inner angle of two opposed surfaces where it is difficult to exert pressure, it is almost impossible to stop the bleeding by pressure alone. While adhesion has been 100 per cent. when using the plasma-extract mixture on fifteen dog livers and one human liver, the liver in three (or 20 per cent. of the cases) had to be restuck when no plasma-extract was used. In no case did the dog bleed to death with either method.

Similar experiments have been carried out on the spleens of dogs. Here the plasma extract gives definitely superior results but neither method is as satisfactory as in the liver. Due to the intrinsic structure of the spleen itself, infarctions are apt to occur. Again, no death actually occurred due to hemorrhage but healing was slow and unsatisfactory.

This new method is extremely simple and uses the physiologic principles of blood clotting and wound healing thus eliminating any extraneous factors which might complicate and endanger the individual's life in some other way. It is hoped that this method may be of use in the treatment of war wounds.

MACHTELD E. SANO

CLARENCE A. HOLLAND

DEPARTMENTS OF PATHOLOGY AND SURGERY,
TEMPLE UNIVERSITY HOSPITAL AND
SCHOOL OF MEDICINE

BOOKS RECEIVED

- EDDY, SAMUEL and THADDEUS SURBER. *Northern Fishes with Special Reference to the Upper Mississippi Valley*. Illustrated. Pp. xi + 252. The University of Minnesota Press. \$4.00.
- JAMIESON, GEORGE S. *Vegetable Fats and Oils*. Pp. 508. Reinhold Publishing Corporation. \$6.75.
- MACDUFFEE, CYRUS COLTON. *Vectors and Matrices*. Pp. xi + 192. Open Court Publishing Co., La Salle, Ill. \$2.00.
- Pain*. Research Publication of the Association for Research in Nervous and Mental Disease. Illustrated. Pp. xii + 468. Williams and Wilkins Company. \$7.50.
- RAINVILLE, EARL D. *Intermediate Differential Equations*. Illustrated. Pp. vi + 211. John Wiley and Sons. \$2.75.
- SPICER, WILLIAM M., WILLIAM S. TAYLOR and JOE D. CLARY. *General Chemistry Problems*. Illustrated. Pp. v + 120. John Wiley and Sons. \$1.25.