gen was estimated by the quantitative method of Kerr and Blish.⁸ Examination of the table shows that in cases of myeloid leukemia in which the white blood cell counts are high there is more nucleotide in the white blood cell fraction than in the red blood corpuscle fraction.

Table II contains an example of a case of myeloid leukemia upon which a serial study of the nucleotide nitrogen content has been made coincident with the regression of the white blood cell count. It will be noted that during the 20-fold decrease in white blood cell count with an approximately constant red blood corpuscle count there is a 2-fold decrease in nucleotide nitrogen content of the whole blood.

TABLE II. Nucleotide Nitrogen Content of the Whole Blood of a Patient with Myeloid Leukemia. (Serial semples taken during the regression of the disease)

Date 1935	Nucleotide nitrogen per 100 cc. whole blood, mg.	Hemoglobin %	Red blood corpuscles, millions	White blood cells
10/29	9.6	50	2.93	460,000
10/31	7.3	54	3.20	390,000
11/16	4.8	67	3.68	24,000

8721 C

A Bile Fistula Procedure in the Rat.

Fern G. Harrington, Joseph D. Greaves* and Carl L. A. Schmidt.

From the Division of Biochemistry, University of California Medical School, Berkeley.

In this laboratory the rat has been found to be a very useful experimental animal for purposes of studying bile function. Large numbers of animals may be used. Moreover, the rat is not particularly subject to infections, and special aseptic operative procedures do not need to be employed in preparing bile fistulas.

The internal bile fistula technique which has been found useful in dogs cannot be applied to the rat. This animal has no gall blad-

³ Kerr, S. E., and Blish, M. E., J. Biol. Chem., 1932, 98, 193.

[•] E. R. Squibb and Sons Fellow.

der nor a cystic duct, thus making a cholecystonephrostomy¹ impossible. The size of the structures involved prevents the making of a direct anastomosis between the bile duct and the kidney pelvis. The pancreatic ducts empty directly into the bile duct of the rat. Any bile fistula procedure must utilize only the upper portion of the bile duct so as to leave the pancreatic system intact.

Two bile fistula techniques in the rat have been described. In the first operation² an anastomosis between the bile duct and the lower colon is made with the aid of a small silver cannula. With proper care such animals live in good health for extended periods of time. The second operation³ makes use of an artificial gall bladder which is inserted directly into the abdominal cavity. The original procedure has been modified by placing the glass bulb under the skin on the right side of the rat. The silver cannula which is inserted in the bile duct is connected to the glass vessel by means of a small parlodion tube. The second opening in the glass bulb communicates to the outside, thus permitting withdrawal of bile.

In the latter procedure rats live for only a short period of time when the bile is drained regularly. If the external opening is plugged to prevent loss of bile, the animals will survive for periods up to 6 weeks despite the extensive tissue destruction which results from the icteric condition. Administration of bile or of sodium chloride solution to the rat by stomach tube will prolong the life of the animal for a period of only 3 to 4 weeks. This, together with the danger of infection, makes the technique of no value when it is desired to prolong the experiments over periods of several months.

A more recent procedure which has been successfully employed in this laboratory consists in anastomosing the bile duct to the vas deferens by means of a silver cannula. In the rat the testes are embryologically formed well up in the body cavity and are then gradually drawn into the scrotum by shrinkage of the ligamentum gubernaculum testis. The vas deferens in the adult rat has considerable length. After sectioning the ligamentum gubernaculum testis, the vas deferens can be extended as far as the liver.

A median incision is made along the linia albia, the right testicle is drawn up from the scrotum, the ligamentum gubernaculum testis is cut, and the spermatic artery is tied. The mesentery between

¹ Kapsinow, R., Engle, L. P., and Harvey, S. C., Surg. Gynec. and Obs., 1924, 39, 62.

² Greaves, J. D., and Schmidt, C. L. A., J. Biol. Chem., 1933, 102, 101; Am. J. Physiol., 1935, 111, 492.

³ Sawyer, L., and Lepkovsky, S., J. Lab. and Clin. Med., 1935, 20, 958.

the vas deferens and the spermatic artery is cut so as to leave the blood supply to the vas deferens intact. The vas deferens is hemisectioned at a high level. A small silver cannula about the size of a No. 22 hypodermic needle is inserted into the duct with the aid of a stilet and tied in place with a silk suture. The vas deferens is then severed from the epididymis and the testicle is removed. The vas deferens can now be made to extend well towards the liver. The bile duct is doubly ligated at a level above the point of entrance of the major pancreatic ducts and semi-sectioned just above the ligature. The remaining end of the cannula is inserted into the bile duct. The end of the vas deferens and the bile duct are brought together and the cannula is tied in position. The bile duct is sectioned between the ligatures, and the abdomen is closed surgically.

The success of the operation can be demonstrated by injecting a saline solution of rose bengal into the jugular vein. This dye is normally excreted through the bile and in this case should appear in the urine.

It has been possible to keep rats operated by this technique in apparent health for a period of 3 to 4 months. With cannulas of the size given above it is possible to carry out the operation on rats as small as 150 gm. body weight. Rats as small as 60 to 70 gm. may likewise be operated upon provided smaller cannulas are used. The operation eliminates the danger of infection which is present in the 2 other techniques. It permits the complete exclusion of bile from the intestinal tract. However, the technique is applicable only to male rats.

8722 P

Spectral Region of Photosensitivity in Hydroa Aestivale Seu Vacciniforme with Porphyrinuria.

HAROLD F. BLUM AND LLOYD E. HARDGRAVE. From the Division of Physiology, University of California Medical School, Berkeley.

Many attempts have been made to produce typical lesions in Hydroa patients by exposure to light, but few, if any, have succeeded in demonstrating a definitely increased sensitivity to light. Nevertheless, it has been very generally assumed that such patients