their investigations: Calgonizing, Chromium, Cotton Yarns, Draft, Slag, and Tar Acids.

During the calendar year 1939, 7 bulletins, 26 research papers and 54 other articles came from the institute. Thirty-two United States patents and 35 foreign patents on fellowship inventions proceeded to issue. The total publications for the 29 years ended December 31, 1939, have been 18 books, 140 bulletins, and 1,734 journal contributions; 755 United States patents and 811 foreign patents were granted during the same period. Bulletin No. 4 in the institute's bibliographic series, which was published in the fall of 1939, lists the books, bulletins, journal contributions, and United States and foreign patents of the institutional membership, 1911–1938, inclusive.

W. A. HAMOR

MELLON INSTITUTE,
UNIVERSITY OF PITTSBURGH

SPECIAL ARTICLES

FACTORS AFFECTING THE INSULIN CONTENT OF PANCREAS

IN 1939 Best, Haist and Ridout[1] reported that fasting or feeding fat produced a fall in the insulin content of pancreas of rats and that the subsequent provision of a balanced ration led to the restoration of the insulin level to normal values.

Similar experiments have been carried out in hypophysectomized rats. The insulin content of the pancreases of rats 26–66 days following the removal of the pituitary glands was slightly less than that of intact animals fed *ad libitum,* but did not significantly differ from that of control animals receiving the same caloric intake. The average values obtained were 20.4 units of insulin per group of 10 rats for the hypophysectomized animals and 20.1 units of insulin per group of 10 rats for the "paired-fed" controls.

Feeding fat for one week to hypophysectomized rats led to a fall in the insulin content of pancreas in those which survived. This decrease was slightly greater than that of the control group. Feeding a balanced diet for 7 days to hypophysectomized rats previously fed fat for one week led to the restoration of the insulin content of pancreas to normal values.

These experiments demonstrate that the lowering of the insulin content of pancreas as a result of feeding fat and the restoration to normal as a result of feeding a balanced diet can be obtained in hypophysectomized rats. It is suggested that the production and liberation of insulin, according to the need for it, can be regulated by the pancreas in the absence of the pituitary gland.

We have recently found that partial pancreatectomy in dogs produces no change in the insulin content of the pancreas unless enough pancreatic tissue has been removed to cause diabetes. In this case the insulin content shows a marked decrease.

The daily administration of insulin to fasted rats decreases the insulin content of the pancreas to levels appreciably lower than those secured by fasting or fat feeding alone. These findings, considered in conjunction with histological results, suggest that the β cells of the islets of Langerhans are "rested" by fat feeding, fasting and insulin administration.

R. E. HAIST
C. H. BEST

DEPARTMENT OF PHYSIOLOGICAL HYGIENE,
UNIVERSITY OF TORONTO

[1] C. H. Best, R. E. Haist and J. H. Ridout, *Jour. Physiol.,* 97: 107, 1939.

TOXICITY OF EXTRACTS OF THE POSTPARTUM RABBIT UTERUS[1]

IT is unusual that crude saline extracts of a tissue are toxic on administration to animals of the same species. Extracts of the postpartum rabbit uterus, however, taken one to fifteen hours after delivery, were found to be extremely toxic to normal rabbits.

In some unpublished data obtained in this laboratory, it was observed that the uterus of the pregnant rabbit becomes markedly edematous two to three days before delivery, and that this edema slowly recedes during the next six to eight postpartum. Four different, crude, saline extracts were made from such edematous uteri, taken within fifteen hours after delivery. These were prepared so that 1 cc of solution represented one-half gram of tissue. They were then injected into a total of 15 animals. Death resulted within 2 minutes in 12 animals on intravenous injection of 8 cc or less. Of the remaining two animals, one survived a 10 cc injection but succumbed on the following day after administration of an additional 1 cc. The second animal survived a 10 cc injection but also died on the next day after being given an additional 4 cc.

These extracts were also toxic when administered intraperitoneally, although a large dose was required and a longer time elapsed before death occurred. Three animals injected by this route were given three daily doses of 10 cc and each succumbed after receiving a total of 30 cc.

Extracts prepared in the same way from uteri of non-pregnant animals were not toxic. Four such extracts were injected intravenously in daily doses of 10 cc until two animals each received a total of 50 cc, a

[1] Aided by a research grant from the University of California.

third 60 cc, and a fourth received 70 cc. These animals exhibited no ill effects from this treatment. Also, extracts of liver and of muscle from postpartum animals were without effect even though extracts of edematous uteri from the same animals were strongly toxic.

Since a postpartum rabbit uterus contains a toxic factor when administered to normal animals, it was considered possible that a postpartum rabbit with its edematous uterus intact would be less susceptible to uterine extracts known to be toxic than would a non-pregnant animal. To this end, extracts of known toxicity were injected into four rabbits, two on the day before delivery, a third on the day of delivery, and the fourth, one day postpartum. Death occurred in all of these after injections of less than 8 cc, indicating that these animals were no less sensitive to the toxic factor than were non-pregnant animals.

The symptoms immediately preceding death in all these animals were strikingly similar to those described in anaphylaxis, although none of the animals used had been previously sensitized. Autopsy of four animals indicated that the pathological changes also were similar to those found after anaphylactic death. The similarity in both symptoms and pathological changes to those of anaphylaxis, and the reported relation between anaphylaxis and histamine suggest a possible explanation for the toxicity of saline extracts of postpartum uteri. Experiments now under way indicate that the presence of large amounts of histamine or a histamine-like substance may be responsible for the toxicity of such extracts.

BORIS KRICHESKY
WILLIAM POLLOCK

UNIVERSITY OF CALIFORNIA,
LOS ANGELES

THE BIOLOGICAL ACTIVITY OF SYNTHETIC PANTOTHENIC ACID

FOR some time we have been interested in the chick antidermatitis factor content of rice bran filtrate ("Vitab" Type II), which has been demonstrated to be a rich source of this vitamin.[1] In this connection the recently reported determination of structure and synthesis of pantothenic acid by Williams and Major in SCIENCE[2] is of considerable interest. Since a microbiological method for the estimation of this factor is available,[3] rapid methods of assay are at hand to further the chemistry of pantothenic acid, which is regarded as identical with the chick anti-dermatitis component of the B complex.[6] We have synthesized β, β-dimethyl-α-hydroxy butyrolactone, condensed it with β-alanine and measured the activity of the product microbiologically. Representative results are presented in Table 1.

TABLE 1

COMPARATIVE MICROBIOLOGICAL RESULTS BETWEEN "VITAB" TYPE II RICE BRAN FILTRATE AND SYNTHETIC PANTOTHENIC ACID

cu mm rice bran filtrate	cc N/10 acid above blank	cc. diluted sample synthetic pantothenic acid	cc N/10 acid above blank
0.05	1.0	0.5	1.7
0.1	2.2	1.0	2.9
0.15	2.8	1.5	4.1
0.2	3.6	2.0	5.0
0.3	4.7	3.0	6.7
0.5	5.5	5.0	7.4

The crude synthetic product was assayed at a level of 0.28 micrograms per cubic centimeter. This may be compared with the pantothenic acid content of rice bran filtrate ("Vitab" Type II), which is indicated to be 20–27 "filtrate factor units" per gram.[1] This corresponds to approximately 0.4–0.5 milligrams of pantothenic acid per cubic centimeter. Since 0.28 micrograms of the crude synthetic product (1.0 cc diluted sample) stimulated the production of the same amount of acid as 0.15 cu mm of rice bran filtrate supplying .06–.075 micrograms of pantothenic acid, the yield of pantothenic acid was approximately 25 per cent. If the unnatural isomer is inactive, however, the yield was approximately 50 per cent.

On the basis of the above comparative data, it is seen that good agreement was obtained between the expected values for the biological activity of pantothenic acid as supplied by rice bran filtrate and the crude synthetic product. These results agree substantially with those of Woolley,[7] who utilized "partially synthesized" pantothenic acid. In any case it is evident that significant biological activity resulted when our synthetic pantothenic acid was assayed by the microbiological method.

HARRY H. WEINSTOCK, JR.
AARON ARNOLD
EVERETTE L. MAY
DONALD PRICE

NOPCO RESEARCH LABORATORIES,
NATIONAL OIL PRODUCTS COMPANY,
HARRISON, N. J.

[1] T. H. Jukes and S. Lepkovsky, *Jour. Biol. Chem.*, 114: 109, 1936; T. H. Jukes, *Jour. Biol. Chem.*, 129: 225, 1939.

[2] R. J. Williams and R. T. Major, SCIENCE, 91: 246, 1940.

[3] The microbiological method of assay was made available to us through the courtesy of Dr. R. J. Williams in advance of publication. It is a modification of the Snell and Strong procedure for the estimation of riboflavin (see footnote 4) and was presented at the meetings of the Society of Biological Chemists, New Orleans (see footnote 5).

[4] E. E. Snell and F. M. Strong, *Ind. Eng. Chem., Anal. Ed.*, 11: 346, 1939.

[5] E. E. Snell, D. Pennington and R. J. Williams, *Proc. Soc. Biological Chemists*, New Orleans, 1940.

[6] D. W. Woolley, H. A. Waisman and C. A. Elvehjem, *Jour. Am. Chem. Soc.*, 61: 977, 1939; T. H. Jukes, *Jour. Am. Chem. Soc.*, 61: 975, 1939.

[7] D. W. Woolley, SCIENCE, 91: 245, 1940.