committee has been exceedingly active, and its report presented at this meeting, which will be published in detail in *Chemical and Engineering News* and reprinted as a separate document, will bring much important and useful information to the chemical profession.

The secretary's office has been especially concerned with, and active in, problems affecting the proper allocation of chemists and chemical engineers in the country's war effort. It is quite definitely recognized and admitted that the normal place for chemically qualified men is in the "production army," for it is there that true patriotism requires them to serve. Without them, the combat forces simply can not be supplied with the materials and implements of warfare. On the whole, Selective Service has functioned efficiently. General Hershey and his corps of assistants are exceeded in efficiency and intelligence by no other group in the Army or Navy. The local boards are made up of patriotic citizens and, for the main part, of intelligent citizens. It would be surprising if all the 6,600 local boards contained men who were capable of judging the importance to the war effort of graduate chemists and chemical engineers. Many mistakes have been made. Several hundred chemists and chemical engineers, including some with seven years of training and additional years of experience, have been inducted into the Army and are now functioning as stretcher bearers, orderlies, pharmacists' clerks, and in other necessary occupations, but occupations in which high-school graduates could function with equal efficiency. As a consequence, their years of special training and experience are lost to the country. For reasons which no one can explain, there are apparently no channels in the War Department through which this man power can be assigned to chemical work, either in the production or combat armies. The situation is just as serious as if graduates of West Point were assigned to the ranks as privates. All efforts to remedy this situation have completely failed, in spite of the fact that the entire matter has been forcefully presented to high authority. In many instances, also, students of chemistry and chemical engineering have not been allowed to complete their courses, which procedure is certain to deplete future supply should the war continue. These mistakes, however, have been caused by a few of the local boards only, and are not the rule. When appeals are properly made, and when details can be sent in time to Selective Service Headquarters, deferment for service in the "production army" is usually secured. Once inducted, the best trained chemists and chemical engineers are simply "genus homo" and at present nothing can be done toward utilizing their qualifications in the country's service.

In contacting local boards, employers should call attention to Selective Service Memoranda I–347, I–398 and I–405. If the men who have been called in the draft are necessary men in work essential to the national health, safety and interest and to the war effort, the employer should make every effort to see that deferment is allowed. If the local board refuses, the case should be immediately appealed to the Appeal Board. When an appeal is taken but not before, if the employer will send to the secretary's office a copy of Form DSS 42A used in the appeal together with the selectee's number and local board number and address, the case will be referred to Selective Service Headquarters in Washington for such advice and recommendation as the premises may warrant. Such appeals, when justified, have usually been granted. Eliminating previously mentioned errors, chemists and chemical engineers of America, with the exception of the group brought into the Army through their commitments as reserve officers, are serving the nation's war effort where they feel they can serve best.

The American Chemical Society has to-day a list of 60,000 individuals who, at least, believe themselves to be chemists or chemical engineers with data as to the training and experience of each. It has been of inestimable value to the society, and has greatly helped to implement its aid to both the production and combat armies.

CHARLES L. PARSONS,
Secretary

SPECIAL ARTICLES

SOME PRECOCIOUS DEVELOPMENTAL CHANGES PRODUCED BY ADRENAL CORTICAL HORMONES

THE more important functions ascribed to the adrenal cortical hormones are their ability (a) to maintain life, (b) to maintain at normal the carbohydrate levels in the tissues and (c) to maintain at normal levels the sodium, potassium and water balance in adrenalectomized animals. On the other hand, excessive amounts of these hormones may be presumed to be present in patients with adrenal cortical tumors, who may show marked bodily changes, the most pronounced of which are modifications of the sexual characteristics. These are attributed to the endocrine secretions of the tumor, among which have been identified several of the sex hormones (Reichstein, Kendall). When these tumors occur in fully grown adults, it is difficult to delineate changes other than those upon the sexual functions. However, in

a case reported by Fraser,[1] an adrenal cortical tumor in a one-year-old male child not only resulted in precocious development of the secondary sexual characteristics but also in precocious skeletal and dental growth. The epiphyses at one year were similar to those in a five-year-old child and the dentition was that of a three-year-old child. These changes may be due to the sex hormones alone, to the adrenal cortical hormones alone or to a combination of these.

The purpose of the present report is to record the changes produced upon newborn rats by certain of the adrenal cortical hormones during the period when the greatest postnatal developmental changes normally occur.

Over 200 newborn albino rats of the Sherman strain were employed. Experiments were performed in which either desoxycorticosterone acetate (DCA)[2] in sesame oil or commercially available aqueous adrenal cortical extracts[3] were injected subcutaneously. These rats were controlled by injections of equivalent amounts into litter-mates of either sesame oil or Ringer's solution. The sexes were about equally divided in the experimental and control groups. A group of 32 newborn rats was observed during the same period, but the rats received no injections whatever. The DCA was injected in daily doses of 0.25 or 0.50 mg and the adrenal cortical extracts in daily doses of 0.1 to 0.6 cc. Within the first 24 hours of life, the preparations, especially DCA, proved toxic and resulted in a high mortality. However, when the injections were begun after the first day, there was no evidence of toxicity and no consistent difference was noted on the body weight between the hormone-injected and the corresponding control litter-mates. Hair growth, determined merely by gross observation, was uninfluenced.

In the hormone-injected rats the incisor teeth erupted approximately on the ninth day of life, which was always about 24 hours earlier than in the control litter-mates. Two to 3 days later the lower lip could be separated easily from the adjacent gingiva, revealing a large extent of the incisor teeth. At this time the lips of the control litter-mates were not as well developed and still firmly attached.

The eyelids of the baby rats began to separate at approximately two weeks of age. The eyes of the hormone-treated rats invariably opened 1½ to 3 days before those of the litter-mate controls. It was quite striking to see the hormone injected baby rats with eyes wide open, when the eyelids of every one of the litter-mate controls continued tightly sealed.

The precocity, as evidenced by the advanced eruption of teeth and opening of the eyes, is based on gross observation. It is believed that many other changes may be taking place which require more detailed study.

Growth hormone, the sex hormones and some other substances which have been injected into baby rats did not influence the time of eruption or of eyelid opening. These experiments will be detailed in a more complete communication.

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[1] I. Fraser, *Brit. Jour. Surg.*, 27: 521, 1940.

[2] Kindly supplied by Ciba Pharmaceutical Products, Inc., and Roche-Organon, Inc.

[3] Three preparations of aqueous adrenal cortical extract were used. One was kindly supplied by the Upjohn Company. We are also indebted to Mr. L. Caplan, of the Comptroller's Office, Inspection Division, City of New York, for a generous supply of Eschatin and of Wilson's Adrenal Cortex Extract.

LACTATIONAL PERFORMANCE AND BODY WEIGHT*

FIGURE 1 shows the relation of milk-energy production to body weight in mature animals of different species: dairy cattle (average of 368 "good" cows), dairy goats (average of 7 "good" goats) and white rats (average of 5 excellent rat mothers).

The data are generalized by the equation $Y = aW^b$ in which Y represents milk-energy production and W body weight.

The value of b, the slope of the fitted line on the logarithmic or percentage grid, is about 0.7: the differential percentage increase in milk-energy yield is 0.7 as rapid as the corresponding percentage increase in body weight; increasing body weight 1 per cent. increases milk-energy yield 0.7 per cent.

The precise numerical value of the slope b varies with the relative "dairy merit" of the animals. The significant fact is that milk-energy production tends to vary with W^b and the value of b is 0.7 ± 0.1.

This is significant because the minimum maintenance cost (basal energy and endogenous nitrogen metabolisms), weights of neuro-endocrine organs, cross-section areas of the circulatory and respiratory vessels, circulation and ventilation rates, external and nutritive and excretory surfaces vary in similar manner.[1] These percentage parallelisms bring out a fundamental unity in apparently diverse structures and functions.

The fact that these structures and functions tend to vary with $W^{0.7}$ rather than with $W^{1.0}$, might have been inferred from geometrical and mechanical considerations. Geometrically viewed, surfaces tend to vary

* Contribution from the Department of Dairy Husbandry, Missouri Agricultural Experiment Station, Journal Series No. 822.

[1] *Univ. Missouri Agr. Exp. Sta. Res. Bulls.* 328 and 335, 1941.