same structural changes as in the homeotransplants. Transplantations of the rabbit pituitary accelerates sexual maturity even more rapidly, the genital system being mature after two transplantations begun in animals 17 days old. In two such animals only 36 hours elapsed between the first transplantation and the opening of the vagina. When only one half the rabbit pituitary was transplanted, however, the usual three daily transplantations were necessary to induce sexual maturity, suggesting that the rapidity of maturing is correlated with the amount of pituitary tissue implanted.

The anterior, not the posterior, lobe of the pituitary, when transplanted, hastens sexual maturity.

Mating. Physiologically as well as structurally, the changes characteristic of sexual maturity are brought about in the mouse by the pituitary transplants many days before they would normally appear. This is shown by the fact that these precociously developed animals will mate. In two mice receiving rabbit pituitary transplants, the only two thus far tested, mating, as evidenced by the presence of a plug and sperm in the vagina, took place on the 19th day of life, and within 48 hours after the first pituitary transplantation had been made.

[1] Smith, P. E., PROC. SOC. EXP. BIOL. AND MED., 1926, xxiv, 131-132; *Am. J. Physiol.*, 1927, lxxix, 114-125.

3464

The Regeneration of Rodent Peridental Membrane.*

T. D. BECKWITH, ADRIENNE WILLIAMS AND W. C. FLEMING.

From the Department of Bacteriology and College of Dentistry, University of California.

The work[1, 2] in which one of us (W. C. F.) has participated indicates that a certain degree of repair of peridental fibrous tissue in man may follow careful treatment of the pyorrheal pocket. Many points regarding the sequence of events in regeneration of peridental membrane, however, were left without explanation. Thus, it was decided to examine the possibilities of repair of this peridental structure in the experimental animal.

* This work was done in connection with the original California Stomatological Research Group. It was supported in part by funds from the Carnegie Corporation, the American Dental Association and the Associated Radiograph Laboratories of San Francisco.

If a dental bur be passed through the gum and alveolar process into the incisor tooth there is produced a local injury which includes destruction of the external soft tissue, alveolus, peridental membrane, cementum and dentine in order of sequence. If a series of animals be subjected to this operation, they may be sacrificed at varying periods afterwards, in order that an appropriate spacing may be obtained for subsequent examination regarding the various steps of destruction and repair which follow in each of the structures included. For this purpose we selected the rabbit and the guinea pig for a particular reason. The rodents are provided with continuously growing teeth. As a result the various structures will change in relationship for as the tooth continues to grow, an uninjured tooth surface will come opposite to the site of injury to the alveolar bone. For histological examination this presents advantages, since peridental repair is more likely to take place from an intact dental surface than from one which is fractured.

Two series of rabbits and two series of guinea pigs have been submitted to operation as described in the preceding paragraph.

Animals thus treated have been sacrificed at semi-weekly intervals over a period of 6 weeks. The tooth with its adjacent structures was sawed out immediately after death, fixed, and then prepared in serial longitudinal sections in celloidin by methods which are described by one of us (A. W.).[3] We have used both haematoxylin-eosin and Van Geisen stains for these.

Our results from these series of observations may be summarized as follows. Infection follows this operation in nearly all instances. The infectious process, together with the presence of necrotic detritus, stimulates the appearance of multinucleate osteoclasts within three days time. These break down alveolar bone, and this destruction is initiated on the inner surface of the process at a point just apical to the site of injury. Osteoclastic activity then spreads to other portions of the osseous structure but there is a decidedly obvious tendency for it to extend towards the apex. The destructive process, therefore, appears to follow the lymphatic stream rather than the main channels of circulation. Lysis of alveolar bone is attended by severing of peridental connective tissue. Subsequent to bone destruction, the peridental fibres which formerly were a portion of the bone at this point are also destroyed.

Attempts at regeneration of the peridental connective tissue fibres are evident during a period varying between 3 and 7 days after their destruction in each of the species of our experimental animals. The development of peridental fibres marks its inception by the appear-

ance of fibroblasts upon the cemental surface. These then undergo the usual fibroblastic development attended by lengthening of the nucleus and cytoplasm in a manner similar to that found in other portions of the body. The point of especial interest lies in the fact that growth of this tissue is begun at the tooth surface rather than from the alveolar surface. This is contrary to certain previous conceptions.

After reconstruction of peridental fibres has begun at the cemental surface, repair of bone commences. Osteoblasts appear. Cancellous bone is laid down about a fibrous net work. Fusion of fibres already formed precedes bone formation. Colloidal precipitation attends it as proven by the stain reaction of Van Giesen technique. Thus, following the genesis of the fibres at the cementum, the gap across to the bone is spanned and now the fibre becomes incorporated in the reforming alveolar process. Repair thus may proceed to completion.

This is a preliminary report.

[1] Hanford, W. H., Patten, C. O., Westbay, C., and Simonton, F. V., *Dental Cosmos*, 1923, lxv, 12-17.

[2] Fleming, W. C., A Clinical and Microscopical Study of Peridental Tissue Treated by Instrumentation. Paper delivered at Pacific Dental Conference, Portland, Oregon, June 25, 1926.

[3] Williams, Adrienne, *Dental Cosmos*, in press.

3465

Pulse Pressure, Its Probable Relationship to Stroke Volume.

J. MARION READ.

From the Division of Medicine, Stanford University Medical School.

Numerous investigators have shown that in hyperthyroidism the tachycardia varies in degree directly with the metabolic rate. It seems reasonable to suppose that this increased heart rate is an adaptation for increasing the cardiac minute volume, since the minute volume is known to be increased in this condition. Previously[1] I have pointed out that the pulse pressure also varies directly with metabolism. In Table I are shown the values obtained in 1000 observations of the pulse rate, blood pressure and metabolic rate made simultaneously under basal conditions. It will be observed that the rise in pulse pressure with increasing b.m.r. is due to rise in systolic pressure, since the diastolic pressure remains practically constant.