

genic" individuality. Sensitivity to it alone, or in combination with but one other genus seldom occurs. In the total of 58 patients who did not react to *A. retroflexus* 57% reacted to *S. kali*. In the group reacting to *A. retroflexus* 79% of the total reacted also to *S. kali*. It thus appears that the pollen of *S. kali* and *A. retroflexus* possesses one or more factors—possibly similar to group antigens among bacteria—common to the majority of the other species. In view of the fact that but 25 patients (less than 20%) of the total of 144, reacted to but one of the 3 genera—*Atriplex*, *Chenopodium* and *Salsola*—it is suggested that the pollen extract of each species contains many minor "antigenic" properties typical of the great majority of the other species, even though they be members of different genera. These findings apparently lend support to the botanic classifications and indicate a method for studying biologic relationships.

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Persistence of Accelerated Rate in Isolated Hearts of Thyrotoxic Rabbits: Response to Iodides, Thyroxine and Epinephrine.

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Acute experiments with thyroid products, either on the intact animal or upon isolated tissues, have been uniformly unsuccessful in reproducing the phenomena of hyperthyroidism. The advent of crystalline thyroxine has demonstrated that most of the non-specific results have been due to proteins and other impurities in the material used. In hyperthyroidism induced by thyroid feeding and in spontaneous hyperthyroidism in the human, tachycardia is one of the most characteristic features. It has been ascribed variously to mechanical causes, to nervous influences, to the overwork incident to a heightened metabolism, to toxic damage of the heart and to an increased production of epinephrine. Upon removal of the cause of hyperthyroidism or discontinuance of thyroid feeding the heart rate falls gradually, over a number of days, to normal. During the course of the experiments reported below it was found that the hearts and auricles of thyroid-treated animals, when isolated, continued to beat at a much faster rate than similar preparations ob-

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tained from normal animals. This seemed to indicate the persistence of the specific thyroid effect on the isolated tissue and was the basis for a comparison of certain pharmacological reactions of the two types of hearts.

Healthy rabbits were used in all experiments. Some were fed thyroid gland (desiccated and powdered) in doses varying from 0.104 to 0.390 gm. daily over periods varying from 2 to 81 days. Others received Thyroxin (Roche) by intramuscular injection every second day in doses sufficient to average from 0.05 to 0.15 mg. daily over periods varying from 6 to 25 days. Weight, heart rates and temperatures were followed at frequent intervals. The usual tachycardia, rapid loss of weight, tachypnoea and sometimes increase of temperature and diarrhoea were observed. The animals were killed by a blow on the head and the hearts quickly removed and set up in the Lehendorff apparatus and perfused with oxygenated Ringer-Locke's solution at 35°C. and adjusted to pH 7.4. In other experiments the auricles were dissected free under iced Ringer-Locke's solution and set up in a Dale bath of 100 cc. capacity which could be quickly emptied and refilled with Ringer-Locke's solution adjusted to pH 7.4 and kept at 35°C. Warmed oxygen was bubbled continuously through the solution in which the auricles were suspended.

The contractions of the preparations were recorded on a revolving smoked drum. Spontaneous rhythm commenced in every instance upon perfusion with or immersion in the warm Ringer-Locke's solution and persisted until the experiment was terminated. Control tracings were first made and the conditions of the experiment then altered by the addition of different drugs and solutions. Determinations of the pH of the solutions were made frequently. Coronary flow was measured directly by collecting the perfusate over known periods of time as it was discharged from the heart.

Results. Averages of the maximum rates of the normal preparations and those from thyroid treated animals will be found in Table I. They were registered early in each experiment after the preparations had settled down. The usual tendency to a gradual

TABLE I.
Average Maximum Rate per Minute of the Isolated Hearts and Isolated Auricles of Normal, Thyroid-fed and Thyroxinized Animals.

	Normal	Thyroid-fed	% Inc.	Thyroxinized	% Inc.
Isolated Hearts	145 (16 Exp.)	224 (6 Exp.)	54.4	183 (6 Exp.)	26.2
Isolated Auricles	125 (21 ")	187 (5 ")	49.6	—	

decrease in rate over a period of hours was observed in each instance, the decrease being of similar degree both in normal preparations and those from thyroid-treated animals.

It is obvious that the preparations from hyperthyroid animals beat at a much faster rate than those from normal animals. This was a constant and striking phenomenon which persisted throughout each experiment.

The effects of various drugs and solutions are summarized below: Iodine and iodides in concentrations of 1:100,000 to 1:4,000,000 had no significant effect on the isolated auricles but caused moderate decrease in rate of 5 of 11 and in amplitude of 8 of 11 isolated hearts. There was no difference in the response of normal preparations and those from thyroid-treated animals. No constant changes were observed in coronary flow.

Thyroxine and desiodothyroxine, in acute experiments, had no constant effect on normal preparations or on those from thyroid-treated animals.

Preparations from thyroid-treated animals responded to epinephrine with increases in rate and amplitude (*percent*) similar to those of the normals. Acceleration of rate (*beats per minute*) was greater in the former preparations than in the normals. There was no difference in sensitivity to high dilutions (1:100,000,000) of epinephrine.

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Effect of Withdrawal of Vitamin-A on Leukocyte and Differential Count in the Albino Rat.

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It is generally accepted that animals deprived of Vitamin A develop a characteristic susceptibility toward infection.¹ Suppurative lesions of the upper respiratory tract, sinuses and middle ear occur

¹ McCollum, E. V., *J. Am. Med. Assn.*, 1917, **68**, 1379; Drummond, J. C., *Biochem. J.*, 1919, **13**, 95; Macy, Icie G., Outhouse, J., Long, M. L., and Graham, A., *J. Biol. Chem.*, 1927, **78**, 152; Sherman, H. C., and Burtis, M. P., *Proc. Soc. Exp. Biol. and Med.*, 1928, **25**, 649.