

simultaneously with the other essential amino acids. This suggests a possible causal relationship between disturbed protein synthesis and cataract formation. Further investigations as to why disturbance of protein synthesis by the lack of essential amino acids other than tryptophane and histidine does not result in cataract formation is required.

Summary. Experiments with delayed sup-

plementation of tryptophane show that cataract formation in rats occurs even after consumption of relatively large quantities of tryptophane. It seems that like growth promotion, cataract prevention by this amino acid can be accomplished only when it is supplied simultaneous with the other essential amino acids.

16075

Simulated Auricular Flutter in the Electrocardiogram of the Dog.

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In the course of studies with epinephrine in the unanesthetized dog, undulations of the baseline at a rate of the order seen in auricular flutter developed in the electrocardiographic tracing. At first sight, the mechanism appeared to be auricular flutter. The coincident occurrence of tachypnea and retching during the recording of these electrical phenomena suggested the possibility that these undulatory waves might be extracardiac, caused by retching and tachypnea.

The possibility exists that similar records in man might, on occasion, be misinterpreted as auricular flutter. It thus appears advisable to present these records for publication.

In Fig. 1A are shown two sections of a continuous recording of lead 2 obtained in the dog after the intravenous injection of one mg epinephrine. In the first few cardiac cycles of the top strip regular undulations in the baseline at a rate of 356 per minute resemble the "F" waves of auricular flutter. This was associated with tachypnea of the same rate. The ventricular rate is 65 per minute. In the middle of the tracing during a period of transitory apnea, the undulations are absent, no P waves are seen, and the contour and rate of the ventricular complexes

are unchanged (the QRS and T waves are huge and upright). Toward the end of the top strip the phenomenon in the first part of the tracing recurs and continues during the first part of the second strip which was recorded 2 minutes later. In the middle of the second strip it is possible to identify P waves even though they are partially obscured by the undulations. Some of these are labeled. The ventricular rate at this time is 88 per minute and irregular. We are dealing here with a nodal rhythm followed by a sinus arrhythmia at a faster rate and the record is obscured by extracardiac artefacts simulating impure auricular flutter.

Fig. 1B is a tracing of the femoral arterial pressure in the same dog recorded with a Hamilton manometer simultaneously with a pneumogram obtained with a pneumograph strapped around the animal's chest. Below is a baseline recording time in seconds. The pneumogram shows post-epinephrine tachypnea at a rate of 306 per minute. In some instances, not seen here, these respiratory waves may even appear as noticeable fluctuations of the blood pressure within a single cardiac cycle.

Fig. 2 is a continuous electrocardiographic tracing (lead 2) obtained under similar circumstances in another dog. At the beginning

* The department is supported in part by the Michael Reese Research Foundation.

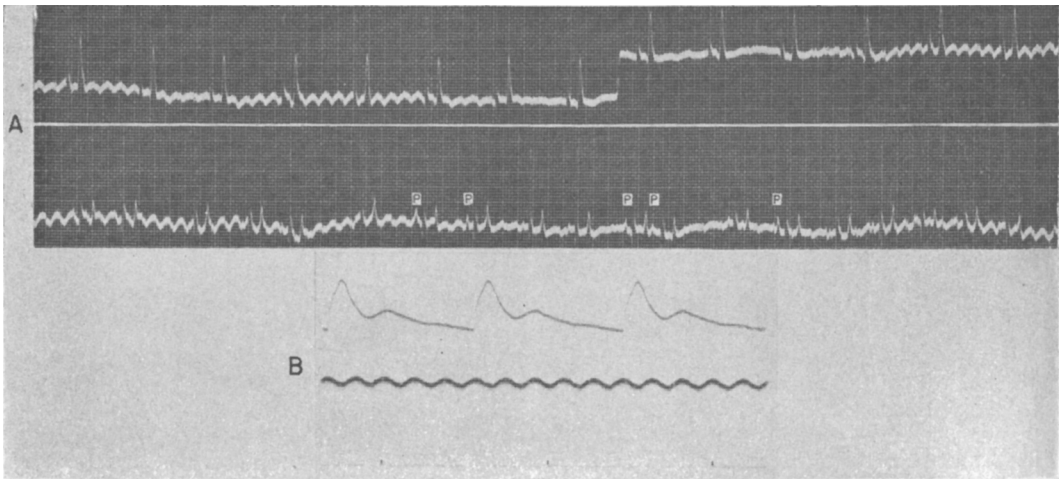


FIG. 1.

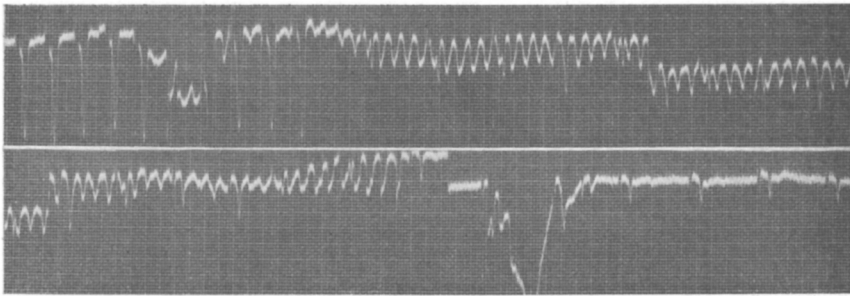


FIG. 2.

of the record ventricular tachycardia with a rate of 150 per minute is present with upright and prolonged QRS complexes (going off the record) and with deeply inverted T waves. Undulations of the baseline with a rate of 333 per minute begin in the middle third of the record and continue to the middle of the second strip. At times, they attain a huge size. When these undulations first appear, the ventricular rate slows abruptly to about 65 per minute, the configuration of the ventricular complexes changes, and the QRS becomes shorter in duration. No P waves are seen even at the end of the second strip when the undulations have disappeared. The baseline

undulations were observed to have occurred when the dog began to retch and vomit and are therefore probably attributable to artefacts caused by diaphragmatic movements (extracardiac artefacts). It appears that the ventricular tachycardia present at the beginning of the record broke at the onset of retching and was followed by A-V nodal rhythm.

Conclusions. Baseline movements which simulated impure auricular flutter developed following intravenous epinephrine injections. These are shown to be extracardiac in nature. They are induced by extreme tachypnea and the diaphragmatic movements associated with retching and vomiting.