Volwiler and associates(6,7) stress the importance of hepatovenous congestion and increased liver lymph flow, and McKee *et al.*(8) have shown the effect of serum protein and salt on ascites production. In the present study an attempt was made to correlate the development of ascites with an increase in the portal vein pressure, a decrease in serum albumin, or with the degree of liver damage as shown in the microscopic sections or the bromsulfalein test. Examination of Table I reveals that there was no consistent correlation found between any one of these factors and the degree of ascites formation in the dogs in this experiment. This finding would suggest that the formation of ascites more likely was due to a combination of factors rather than to any single one.

*Summary.* 1. A successful technic for individual ligation and division of the hepatic veins in the dog is described. 2. Complete occlusion of the hepatic veins is uniformly fatal in dogs. However, if a porta-caval shunt is also done, the dogs will survive. 3. Fifteen dogs prepared in this manner were studied, and 66% of them developed a significant elevation of the portal pressure. 4. Ascites developed in 53% of the dogs, but the ascites could not be correlated with the increased portal pressures, decreased serum proteins, or pathological changes in the liver.

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## Some Relationships Between Intracranial Pressure and EEG Frequency in Cats.* (20161)

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This report describes some relationships existing between intracranial pressure and the EEG pattern in the curarized, unanesthetized cat.

*Methods.* Each cat was anesthetized with vinyl ether (Vinethene), and a wide midline skull exposure made. Four small holes were drilled through the skull, one over each parietal region and one over each side of the cerebellum. These holes were so placed as to center approximately over the motor cortices and cerebellar lobes. Screw-in type EEG electrodes were placed in these holes. Each animal was then tracheotomized and injected with dihydro-beta-erythroidin hydrobromide§ to eliminate muscle activity and then placed on artificial respiration. A number 18-gauge spinal needle was then inserted into the cisterna magna through the foramen magnum and the needle connected by means of a short rubber tube to a Statham strain gauge pressure transducer. The output of the transducer activated a high-gain amplifier coupled to a

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§ Courtesy Merck and Co., Rahway, N. J.

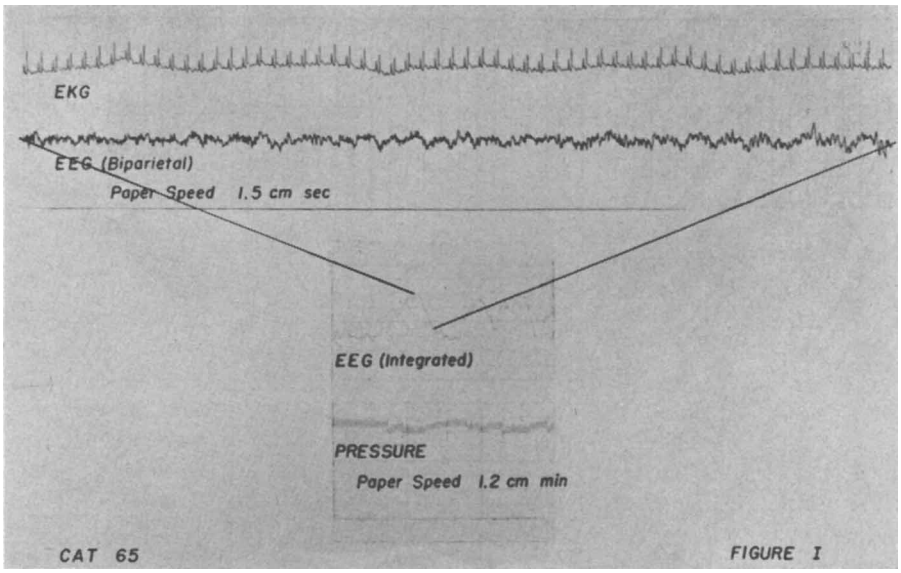


FIG. 1. Normal ambient atmospheric pressure. Decrease in EEG frequency is associated with increase in intracranial pressure, and vice versa.

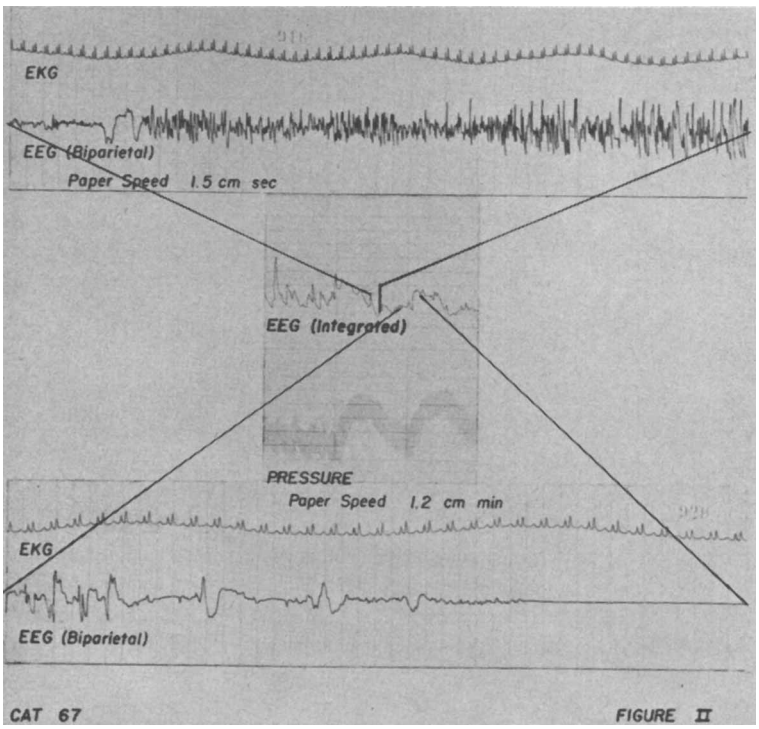


FIG. 2. Increased ambient atmospheric pressure. Decrease in EEG frequency is associated with decrease in intracranial pressure and vice versa.

power amplifier driving a Brush magnetic pen-motor. The entire pressure system was then filled with normal saline and calibrated against a water column of known pressure. Thus, a continuous ink-line representation of intracranial pressure was obtained. In about

one-third of our experiments, a brass tube of ¼-inch diameter was screwed into a threaded hole in the skull over the dura of the parietal region and connected directly to the pressure transducer.‖ Care was taken to avoid puncturing the dura. The pressure recordings obtained from the epidural space were similar to those obtained from the cisterna magna. Since the cisternal technic was simpler than the epidural, it was adopted as routine. Electroencephalograms were recorded on a Grass type III-B machine. In addition to the ink written electroencephalogram, a recording of the instantaneous average frequency of the brain waves was obtained by feeding the output from the Grass machine into a frequency analyzer designed by C. W. Goodwin. The output of the frequency analyzer was also recorded with a Brush magnetic pen-motor.

*Results.* With the animal exposed to normal ambient atmospheric pressure, control observations showed a quite consistent inverse correlation between the variations in EEG frequency and intracranial pressure. In 7 out of 8 experiments, a decrease in EEG frequency (25-30/sec to 15-20/sec) was associated with a rise (20% to 50%) in intracranial pressure, and vice versa (Fig. 1). In the eighth experiment, both the EEG frequency and the intracranial pressure varied directly with each other. When the animals were introduced into a pressure chamber where the ambient pressure as well as the partial pressure of inspired oxygen was increased(1), seizure activity was noticed in the EEG and a reversal in the relationship between EEG frequency and intracranial pressure took place. During the low frequency-high amplitude seizure activity period the intracranial pressure fell, and during the inter-seizure phases when the EEG reverted to high frequency-low amplitude activity, the intracranial pressure went up (Fig. 2). In only one experiment were these relationships reversed.

A few experiments were performed under conditions of normal atmospheric pressure in which seizures were produced by the intravenous administration of 1,5-pentamethylenetetrazole (Metrazol). The correlation between the two variables was the same as that observed during hyperoxic seizures.

Findings similar to ours were reported by Guillaume and Janny(2) in man. They made continuous intracranial pressure recordings which demonstrated rhythmic changes at a rate of 6 to 12 per minute; no EEG recordings were made.

*Summary.* 1. In the curarized, unanesthetized cat, the EEG frequency varies inversely with the intracranial pressure. 2. During seizures induced by high partial pressures of oxygen or by Metrazol, the intracranial pressure varies directly with the EEG frequency. 3. No explanation for our findings is offered at present.

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