arranged at the opposite side, in such a way as to permit a definite pressure to force the surface of the boards together. The spring can be adjusted so as to increase or decrease, within considerable limits of weight, the amount of force (weight) required to bring the board surfaces in contact. In the opposed surfaces of the boards platinum electrodes (plate and points) are so placed that perfect contact between them is effected when the boards are brought together and the circuit is closed. The electrodes connect with binding posts on the hinged side. A small dry cell is used. The entire apparatus, including bell attachment, may be placed on a surface 5 x 8¼ inches. The bell employed directly with the apparatus is a small one with delicate musical sound. Its ringing under a cage during a metabolism experiment does not disturb the animal. It is obvious, of course, that the apparatus can be connected with a bell in a distant room.

In the demonstration it was shown that the apparatus announced the deposit, in an ordinary urinary receiver placed on it, of volumes of water less than 5 c.c. The apparatus may be adjusted to announce a volume as small as 1 c.c. and may be made, in larger sizes, to announce the deposit of masses of any desired weight.

Various details of description that would show the particular value of the apparatus in other respects will be given in the paper soon to be published by Mr. Welker.

**51 (143). "Some observations on the presence of albumin in the bile": WILLIAM SALANT.**

The presence of albumin in the bile under pathological conditions has been noticed by several observers. Thus, Lehmann,[1] who examined post-mortem bile from the gall bladder in 100 cases, found albumin in nutmeg liver, fatty liver, and parenchymatous hepatitis. Pouchet[2] found albumin in the bile of six patients that died of cholera. Among recent observers may be mentioned Brauer[3] who has reported similar findings in typhus and parenchymatous nephritis. Hallauer[4] analyzed the bile in a number of

[1] Lehmann: *Centralblatt für die medicinischen Wissenschaften*, 1867, v, p. 172.

[2] Pouchet: *Comptes Rendus*, 1884, xcix, p. 847, also 1885, c, p. 220.

[3] Brauer: *Zeitschrift für physiologische Chemie*, 1903–'04, xl, p. 182.

[4] Hallauer: *Verhandlungen der medicinisch-physikalischen Gesellschaft*, Würzburg, 1904, p. 186.

cases. He found albumin in 5 out of 6 cases of cloudy swelling of the liver associated with pneumonia, miliary tuberculosis and sepsis; also in some cases of fatty liver, but none in cirrhosis of the liver. Experimentally, in rabbits, he obtained an albuminocholia after intravenous injection of albumose.

Within the past two years several other investigations on the experimental production of albuminocholia have been described. Brauer[1] in his paper "on the study of the liver," in the *Zeitschrift für physiologische Chemie*, reported the presence of albumin in the bile of a dog with a permanent biliary fistula after poisoning with ethyl alcohol and small quantities, 3–5 c.c., of amyl alcohol. At his suggestion Pilzecker[2] carried out a similar study on the bile of dogs with permanent gall bladder fistulas after poisoning with phosphorus and arsenic. His result seemed to corroborate the work of Brauer. Another interesting statement which both observers made was to the effect that albumin passes more readily into the bile than it does into the urine. In this connection attention was also called to the work of Hallauer and Gürber[3] who, after the intravenous injection of casein solution into rabbits, recovered considerable quantities of it from the bile as well as from the urine.

While not disputing the possibility of albuminocholia under the conditions of the experiments of Brauer and Pilzecker, it seemed to the author they have not proved that the albumin found in the bile was eliminated by the liver. It is just as possible that it was due to inflammation of the gall bladder and biliary passages which they observed on autopsy. To reduce the possibility of error from this source the writer carried out a number of experiments on dogs, each of which was under ether anesthesia, with a temporary biliary fistula. The neck of the gall bladder in each case was ligated previous to the introduction of a cannula into the common bile duct. The bile was collected and tested for albumin according to Brauer's[4] method. Either amyl alcohol or ethyl alcohol alone or a mixture of the two was injected into the stomach or small intestine. Adequate control experiments were also conducted. The collected bile was tested for albumin in both sets of experiments.

[1] Brauer: *Loc cit.*

[2] Pilzecker: *Zeitschrift für physiologische Chemie*, 1904, xli, p. 157.

[3] Hallauer and Gürber: *Zeitschrift für Biologie*, 1904, xlv, p. 372.

[4] Brauer: *Loc. cit.*

The results obtained were not uniform. Distinct cloudiness on boiling appeared in the bile of one experiment both before and after poisoning with amyl alcohol. On the other hand, in one of the experiments, the bile remained perfectly clear on boiling before and even after injection of amyl alcohol. After the administration of small quantities of amyl alcohol, *e. g.*, 5 c.c., there was no albuminocholia. Following the injection of 20–30 c.c., however, the bile became distinctly cloudy on boiling after slight acidification with acetic acid. In none of the experiments carried out as indicated were more than traces of albumin found in the bile. One special experiment, however, on a dog poisoned with ricin gave a different result. The dog received in three days two subcutaneous injections of ricin, 1 mg. per kilo each time. He was found dead the day after the last injection. The bile removed from the gall bladder showed the presence of a considerable quantity of albumin.

It seems probable, therefore, that the albuminocholia after poisoning with ethyl or amyl alcohol, as observed in animals with permanent fistulas, was due to irritation of the bladder and only slightly to lesions in the liver. The question whether albumin passes more readily into the bile than it does into the urine was also studied. The result in every case showed considerable quantities of *albumin* in the urine after poisoning with amyl alcohol.

A few experiments on rabbits have also been undertaken. Cantharidin or arsenic was injected subcutaneously until albuminuria or hematuria was induced. A biliary fistula was then made and bile collected. In none of these experiments was albumin found in the bile.