with all doses the average effect of intravenous injections of adrenalin on the blood pressure was greater in the rabbits than in the cats both in regard to the height and the duration of the rise.

We may then conclude that the difference in the effect of instillations is not dependent on greater sensitiveness of the iris of the rabbit and that the greater sensitiveness of the cats' dilator muscle to the action of adrenalin is not shared by all other smooth muscle.

28 (1206)

Proteose intoxications and body protein injury.

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Proteose injections in dogs cause well-known clinical reactions —vomiting, diarrhea, temperature reactions, low blood pressure, prostration and after large doses, an excess of antithrombin with incoagulable blood. A single proteose injection—for example one half a lethal dose—causes abrupt clinical reactions in a normal dog with apparent complete recovery within 24 to 48 hours. The nitrogen elimination curve in a fasting dog under such conditions shows a great rise in total urinary nitrogen. The apex of the curve usually falls on the second 24-hour period following the injection. This rise may be over 100 per cent. increase above the mean base line nitrogen level. It does not fall promptly to normal but declines slowly in 3 to 5 days or more toward the original base line. This speaks for a definite cell injury with destruction of considerable protein substance due to a single proteose injection. The disturbance of cell equilibrium is not rapidly nor promptly restored to normal.

A dog which has received previous proteose injections is somewhat immune or tolerant to subsequent injections of proteose. Such dogs, as a rule, show less intense clinical reactions and less rise in the curve of nitrogen elimination following a unit dose of standard proteose as compared with normal or non-immune con-

trols. The proteose used in these experiments was prepared as described from material obtained in cases of intestinal obstruction or of closed intestinal loops.

Dogs with isolated loops of small intestine show many evidences of intoxication. A study of the total nitrogen elimination shows a great rise above the normal base line minimum of this fasting period. This means that this intoxication is associated with a great destruction of body protein, and explains the high non-protein nitrogen of the blood which was observed and reported previously.

Dogs injected with sublethal doses of proteose will show a definite tolerance to subsequent injection, and will show much less acute intoxication after the isolation of a closed intestinal loop. Such immune or tolerant dogs show a much less pronounced rise in the nitrogen elimination curve during proteose intoxication of any type. This indicates that the tolerance or immunity to proteose gives more protection for the body proteins against the injury which these toxic proteoses inflict upon the body cells.

Complete duodenal obstruction combined with a gastrojejunostomy gives a chronic type of intestinal obstruction associated with little vomiting, which is peculiarly suited to metabolism study. Such duodenal obstructions show a definite and sustained rise in the curve of nitrogen elimination above the normal base line level. These dogs, too, are tolerant to injections of standard toxic proteoses.

Control ether anesthesia experiments show little if any rise in the curve of nitrogen elimination.

Control laparotomy experiments show a definite rise in the curve of nitrogen elimination, but a rise which is small compared with the rise noted in the intoxication of duodenal obstruction or isolated intestinal loops. It is highly probable that the tissue injury and disintegration associated with the wound reaction are responsible for the general reaction. We may assume that protein split products from the wound area are absorbed, and are responsible for the general reaction observed.

Metabolism studies on fasting dogs show that during the intoxication accompanying the formation of a subcutaneous abscess there is a marked increase in nitrogen elimination. This

increase is still further augmented for a short period after the abscess is incised, but during healing gradually returns to normal. This increased excretion of urinary nitrogen is accompanied by diuresis.

Acute pancreatitis from injection of bile in the pancreatic duct shows a similar metabolic disturbance.

Studies on fasting dogs suffering from acute pleuritis, pneumonia, acute endocarditis and distemper show that marked increase in nitrogen excretion is a constant phenomenon in these inflammatory processes. If one infection such as pneumonia is complicated by another infection such as endocarditis, the rise in nitrogen elimination is still further augmented.

In the above conditions, the blood non-protein nitrogen is increased, although the blood urea tends to remain relatively low.

These phenomena accompany acute inflammatory lesions caused by bacteria and also sterile lesions induced by an irritant (turpentine).

From the exudates in acute purulent inflammations toxic proteose-like substances have been isolated.

We wish to assume that the intoxications here studied are associated with a definite proteose intoxication, which is capable of initiating and continuing a profound injury of tissue protein. One index of this protein injury is the great and sustained rise in the curve of total nitrogen elimination.

29 (1207)

Botulism.

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In a previous report[1] it was shown that the formation of toxin by the *Bacillus Botulinus* is not dependent upon the presence of animal protein in the culture medium, but that in purely vegetable medium it may be formed with almost equal facility. The report was based upon experiments in which beans and peas were used, but later experiments have shown that corn and apricots are also suitable for the development of the toxin.