Discussion. The method of measuring the percentage admixture in cattle chimeras presented here is less tedious than cell count methods, has greater precision and is no more tedious than hematocrit methods, and requires much less reagent than either of these methods. All 3 methods depend upon the measurement of the percent cells remaining after hemolysis of one or the other cell types by appropriately chosen reagents, and each is subject to certain errors in this measurement. The spectrophotometric method requires that bovine oxyhemoglobin follow the Beer-Lambert Law of absorption, and that solutions of oxyhemoglobin in distilled water be stable in time with respect to absorption. Both these conditions have been carefully checked and found satisfactory.

By extensions of this method it should be possible to perform the differential hemolytic tests with less than 1.0 ml reagent (thus conserving further), and to measure the percent cells hemolyzed, as well as percent cells remaining, thus gaining twice as much information per test with little more work. Owen(6) used a spectrophotometer to measure transmittance of hemoglobin solutions after differential hemolyses of the red blood cells of irradiated mice injected with homologous erythropoietic tissue. It should be possible to apply our technic to studies of human blood cell chimeras(7) using a hemolytic rather than a hemagglutination system.

Summary. An easily performed and precise method for measuring degree of erythrocyte chimerism in cattle is presented. A spectrophotometer is used to measure transmittance of solutions containing hemoglobin of those cells remaining after differential hemolysis by appropriately chosen reagents.

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Effect of Secretin Given into Portal or Peripheral Vein.* (25160)

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Intravenously injected secretin is considered generally to equal the physiological effect of the hormone as liberated during digestion. However, there is reason to assume a difference in effect on the pancreas between these 2 ways of entrance of the hormone into the circulation, because a number of hormones seem to be inactivated in the liver. The naturally secreted secretin most probably enters the portal circulation and passes through the liver first, while in intravenous injection it passes the liver only after it has been diluted in the general circulation(1). This concept is supported by results obtained with vivdialysis by Necheles and Lim(2). Previous workers, using rather crude preparations of secretin, found a weaker response of pancreatic secretion following its injection into the portal vein than into a systemic vein(3). However, Mellanby(1) using a more purified secretin, found no such difference. Our attention was focused on this question when we were able to obtain a highly purified secretin labelled with I^{131}†; following its intravenous

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† I^{131} kindly supplied by S. Bocchieri, Abbott Radio Pharmaceuticals, Oak Ridge, Tenn, and Dr. R. K. Richards, Abbott Labs., North Chicago, Ill. Secretin was kindly supplied by Dr. R. M. Rice, Lilly Lab. for Clin. Res., Product E. G.-110-33A.

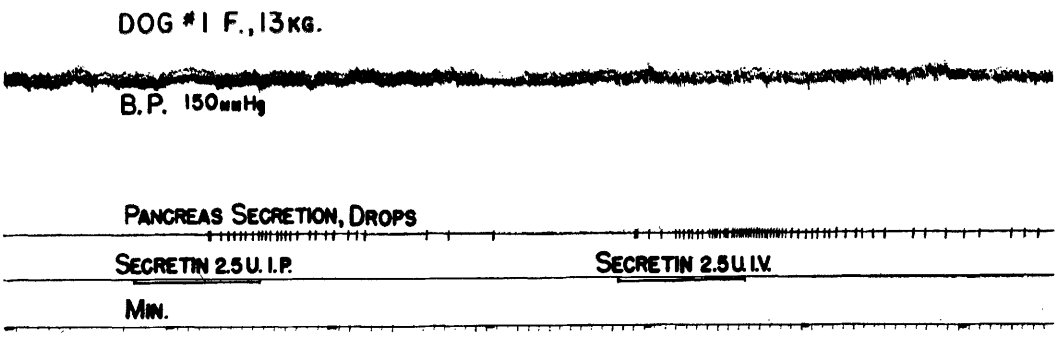

FIG. 1. Effect of secretin i.v and i.p. upon pancreatic secretion.

injection, we found only low concentrations of I^{131} in the pancreas and high concentrations in the liver. We assumed this to indicate a primary concentration of secretin in the liver and possibly a secondary release into the circulation and to the pancreas. Furthermore, we believe that the highly purified secretin that is available now may yield more valid results than preparations made before 1926.

Methods. Adult male and female mongrel dogs were anesthetized with intravenous Nembutal; cystic duct, accessory pancreatic duct, and pylorus were ligated, a plastic tube was secured in the main pancreatic duct and connected to an electronic drop recorder.‡ Carotid blood pressure was recorded with a mercury manometer. A fine polyethylene tube was introduced through mesenteric vein into the portal vein, and a peripheral vein, usually femoral, was cannulated. The animals were starved for approximately 16 hours, except 4 (No. 8-11 on Fig. 1) that were starved for longer periods of time. Doses of 2 to 10 units of secretin were given into each vein alternately (i.v. or i.p.). A total of 13 experiments were conducted on 11 dogs. Only such experiments are reported in which the blood pressure of the animal was stable above 110 mm of mercury (110-160 mm Hg). Secretin i.v. or i.p. did not affect blood pressure or respiration.

Results. In Table I in 11 out of 13 tests i.p. injection of secretin had distinctly less effect on pancreatic secretion than i.v. injection. The peak of secretion was reached in the first 10 minutes after secretin injection in most experiments, with little difference between the type of response to i.v. and i.p. administration, such as latent period or duration of secretion (Fig. 1). The peaks of secretory response to i.v. and i.p. injection of secretin were compared. If the response to i.v. secretin is 100%, the response to i.p. administration varied between 28 and 109% (above 100% in one animal only), with an average of 69.5% (stand. dev. ± 21.1); the difference is statistically significant. In one experiment in which secretin was injected into a major pancreatic artery, the response of the pancreas was very large. Two units of secretin i.v. did not stimulate the level of pancreatic secretion above control values (5 and 4 drops respectively in 30 minutes), while intra-arterial injection of 2 units of secretin produced a secretion of 62 and 46 drops respectively in 30 minutes.

Discussion. We know that a number of substances are inactivated in the liver. Among these most probably are substances absorbed

TABLE I. Pancreatic Secretion to I.V. and I.P. Secretin in 13 Experiments.

Secretin dose in mg	No. of drops—10 min. of max secretion I.V.	I.P.	I.P./I.V.
5	18	11	.61
5	41	27	.66
2.5	29	15	.52
5	92	88	.96
5	99	86	.87
5	10	6	.60
10	11	12	1.09
9	35	19	.54
9	81	23	.28
3	20	12	.60
3	30	21	.70
3	19	15	.79
3	17	14	.82
		Mean:	.695 (±.211)

‡ Elmac Engineering Co., Chicago, Ill.

from or liberated in the gastrointestinal tract (4). An enzyme(secretinase,5,6) which destroys secretin has been described and it is possible that it is present in the liver. Another possibility is that secretin is modified in the liver or stored there and released later. We conclude that the same amount of secretin given into the portal circulation does not have the same effectiveness in inducing pancreatic secretion as when administered into a peripheral vein. Secretin is considered(7) to play a role in neutralization of gastric HCl in the upper small intestine, but the results of our present work indicate that this mechanism may be less effective than hitherto believed.

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Adrenal Cortex and Frog Skin Potentials.* (25161)

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Previous reports demonstrate that in the wake of adrenocortical insufficiency there are alterations in size, shape and conduction velocity of spike potentials in frogs(1), in electrocardiograms(2), and electroencephalograms of humans(3), in electroencephalograms and spinal-cord conduction time and in nerve excitability of rats(4). The present study considers bioelectric potentials of the ventral skins taken from frogs previously subjected to varying concentrations of adrenal cortical substance as effected by adrenalectomy and by administration of whole adrenal cortical extract (ACE) to otherwise normal frogs.

Material and methods. Male 20-40 g frogs, *Rana pipiens,* were divided into 4 groups: *A*) normal, *B*) adrenalectomized, *C*) renal-damaged and *D*) ACE-injected frogs. Operations for adrenalectomy and for renal damage were performed, and the animals used experimentally as previously reported(5). Group *D* was given 0.01 ml ACE (Upjohn) 3 times/week for 4 to 5 weeks. Unpigmented belly skin was removed, rinsed and immersed in 50 ml Ringer at 22 to 28°C. All Ringer solutions were oxygenated and buffered at pH 7.4 with $NaHCO_3$. Thirty-forty minutes after removal, a given skin was placed in a holder similar to that used by Steinbach(6). All potentials were determined to nearest 0.5 millivolt (mV) with a potentiometer and an H-S galvanometer as null apparatus. The electrode half-cell system was calomel-saturated-KCl/saturated-KCl/Ringer-agar-agar/Ringer //skin//, and so on. Two minutes prior to each 10-minute reading, both sides of skin were flushed from a common reservoir with volume of oxygenated Ringer equal to 2 to 3 times that of capacity of reservoir. Skin potentials were followed for 1½ hours; in many instances, longer. The potentials tended to stabilize within *ca.* 60 minutes (Fig. 1).

Results. Results are summarized in Fig. 1, where mean potential values in mV are plotted as functions of time in minutes. Letters and numbers appended to each curve designate the 4 frog groups and number of animals used/group. Mean potential values, with their respective standard errors, for various groups at end of 1 hour are: *A*) -31.2 ± 2.2 mV, *B*)

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