TABLE I. Twenty-Four Hour Urinary Excretion of Ascorbic, Dehydroascorbic, and Diketogulonic Acids by Rats before and after Exposure to 800 r X-Ray Irradiation.

Fraction determined	No. of analyses		Avg 24 hr excretion, μg with S.D.		
	Control	Irradiated	Control	Irradiated	"F"
AsA	89	77	347 ± 269	477 ± 490	4.64*
DHA	89	77	34 ± 37	88 ± 80	31.6 †
DKA	89	77	19 ± 38	63 ± 79	21.8 †

* Probability of variance ratio "F" less than .05, greater than .01.
† " " " " " " " .01.

environmental temperatures, the daily variation in excretion was great. The increase in AsA excretion was too slight to be statistically significant. The increases in the 2 oxidized forms were about 150% for DHA and 230% for DKA, roughly comparable to the increases obtained from cold stress, and statistically highly significant.

Discussion. The increased urinary excretion of oxidized forms of AsA in 2 forms of stress as widely different as cold environment and X-ray irradiation would seem to indicate that this may be a general response to stress. The mechanism of the production of DHA and DKA in the body, and the site of this production, remain to be established.

Summary. 1. Adult albino rats were exposed to 800 r single dose total body X-ray irradiation. 2. Urinary excretion of dehydroascorbic acid increased 150% after irradiation, diketogulonic acid excretion increased 230%. 3. The increase in excretion of oxidized ascorbic acid in the urine may be a general response to stress.

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Blood Volumes of Ducks Using Human Serum Albumin Labeled with Radioiodine. (19955)

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For the past 70-odd years the literature has abounded with reports of various technics for blood volume determinations. One of the most widely used and undoubtedly one of the most precise methods involves evaluation of the plasma dilution of injected radioiodine (I^{131}) labeled human serum albumin(1,2). Using various technics blood volumes have not only been reported for the human, but also for the cat(3), dog(4), goat and horse(5), rabbit(6), and rat(7). The authors have in several of their investigations found a need for similar data on the duck, *e.g.*, in a more quantitative pathological evaluation of avian malaria in ducks(8), in a study of the normal hematology of the duck(9), in the evaluation of the hematological effects of toxic agents in the duck(10), and in a recently developed method for determination of the life of the duck erythrocyte(11).

Further study along several of these lines

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is in progress. Since apparently no studies of blood volume exist for the duck, we are reporting our findings.

Experimental. Radioiodine (I^{131}) labeled human serum albumin (supplied by Abbott Laboratories, North Chicago, Ill.) was prepared in isotonic saline to concentration of about 1.5 μc/ml. Intravenous injections into the leg vein were made at a level of 0.3 to 0.6 ml/kg of body weight. 5 ml blood samples were withdrawn from the heart for the volume determinations, whereas 2 ml samples were taken from the leg veins of the larger ducks used in time-concentration studies. Withdrawals for the blood volume determinations were made within 15 minutes following injection. *Hematocrits* were determined using standard tubes with centrifugation at 2500 r.p.m. for 30 minutes. Radioassay was done on 1 ml samples of plasma after air drying in planchettes at room temperature. Standards were prepared by using labeled albumin diluted with human plasma. Radioassay technics used have been reported(12). Counting was sufficiently long to give a probable error of $\pm$ 1%. Calculations of the volumes were made as follows: Plasma volume (ml) = Total counts injected/Counts in 1 ml plasma, Blood volume (ml) = Plasma vol (ml)/100-hematocrit (%). White Pekin ducks, varying in age from 3 weeks to 1 year and in weight from 150 to 2038 g, were used. Food and water were available to them at all times. Gross *precipitation tests* were made by mixing varying portions of labeled albumin with duck plasma, incubating at 37°C, and studying grossly and microscopically for evidence of precipitation. Estimate of the fraction of radioactive iodine in the injected material which was dialyzable was made by dialysis of the injected material against 3 volumes of isotonic saline and radioassay of the dialysate.

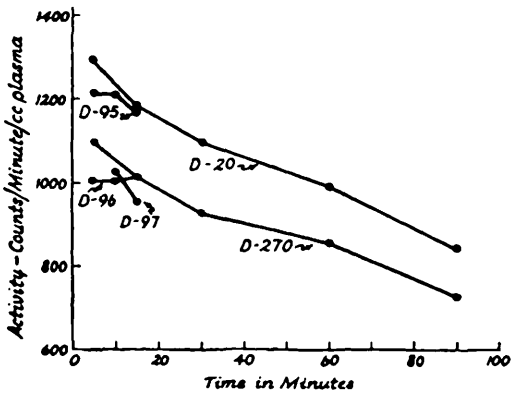

FIG. 1. Time-concentration studies of radioiodinated human serum albumin in 5 adult ducks.

TABLE I. Mean Plasma and Blood Volumes with Stand. Errors of the Mean for 3 Groups of Ducks.

Wt. g	No. of ducks	ml plasma/ kg body wt	ml blood/ kg body wt
150- 450	24	69.4±1.52	107 ±2.34
700-1100	10	64.5±1.02	102.1±1.79
1100-2060	8	55.2±1.23	86.3±1.58

Results and discussion. The time-concentration studies on 5 large ducks are summarized in Fig. 1. It will be noted that the drop in concentration is rather sharp; however, it has been assumed that values taken within the first 15 minutes after injection will be suitable for volume determinations.

Data giving the mean plasma volumes, mean blood volumes and standard errors of the mean are listed in Table I. It will be noted that in the duck the blood volume per unit weight is larger for the smaller birds.

The results of the dialysis of labeled albumin revealed that 3.7% of the activity is dialyzable; since a large portion of even this small fraction could be expected to remain in the circulation for longer than 15 minutes, it has been assumed that the dialyzable fraction does not introduce a sizable error. All precipitation tests were negative.

Summary. Blood volume determinations were performed on 42 ducks of various weights, using radioiodinated human serum albumin. The blood in ml per kg body weight in young ducks weighing 150-450 g is 107 ± 2.34. For the intermediate group weighing 700-1100 g it is 102 ± 1.79. In young adult birds weighing 1100-2000 g it is 86.3 ± 1.58. Several supplementary procedures were carried out to test the propriety of this method in the duck.

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Concentration Changes in Urinary Electrolytes Produced by Mercurial Diuretics.* (19956)

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Mercurial diuretics usually produce an increase in sodium and chloride excretion by increasing the urine volume and by increasing the urinary electrolyte concentrations. Under certain conditions mercurials can decrease urinary sodium and chloride concentrations. An attempt will be made to define the conditions which determine these different changes in urinary electrolyte concentrations.

Methods. Both anesthetized and unanesthetized dogs were used. Anesthesia was produced by means of an intravenous injection of 30 mg of pentobarbital per kg and the depth of anesthesia was kept constant by infusing 0.3 to 0.4 mg of pentobarbital per kg per minute. The dogs received infusions of 3% glucose or 2% sodium chloride. The constant rate of infusion was varied between 1.8 and 17 cc per minute per m^2 of body surface. Para-aminohippurate (PAH) clearance at low plasma concentrations was considered to be the renal plasma flow (RPF) while inulin or creatinine clearance was used as an index of glomerular filtration. Sodium and potassium were determined in plasma and urine by means of an internal standard or a Beckman flame photometer. Chloride was determined by the method of Van Slyke and Hiller(1). In general, the methods used were essentially similar to those used in a previous study(2). The experiments on unanesthetized animals were conducted on trained female mongrel dogs weighing 18 to 22 kg. Isotonic saline infusions were given into a leg vein and blood specimens were obtained from an external jugular vein. Urine was collected by means of a self retaining soft rubber catheter. About one hour following the start of the saline infusion, 0.1 unit of pituitrin was injected intramuscularly and enough pituitrin was added to the infusion fluid to give a constant injection rate of about 200 milliunits per hour. After pituitrin had been injected for approximately one hour, 8 mg per kg of mersalyl was given together with glutathione or cysteine. The procedures and analytical methods used in these experiments were essentially the same as those described for the anesthetized group

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