(2) in experiments on vascular hypersensitivity.

On the other hand, the mechanism of the action of ACTH in allergic encephalitis might be purely at a vascular level. It has been shown by Soffer *et al.*(14) that ACTH suppresses the Schwartzmann phenomenon when administered prior to the provocative injection. This phenomenon is admittedly not anaphylactoid in nature, and its cause is to be found in a profound alteration of vascular reactivity(14). Pathologic studies of allergic encephalomyelitis(5) show that the lesion begins in and around the blood vessels from which it spreads into the nervous parenchyma. Therefore, it is possible that by modifying the vascular reactivity in a manner similar to that observed by Soffer(14), ACTH protects the nervous tissue against the development of encephalitis lesions. This hypothesis is, at present, the object of further investigation in guinea pigs and in monkeys.

Although the relation of experimental encephalomyelitis in animals to human disease is still controversial, it would be of interest to investigate the action of ACTH, or of cortisone, in the prophylaxis of post-vaccination encephalitis and in the prevention of relapses of certain acute forms of multiple sclerosis, two types of human disease in which pathogenic factors similar to those operating in the experimental encephalomyelitis of the guinea pig are presumably playing a role.

Summary. Timely administration of adequate doses of ACTH shows an inhibiting action upon the occurrence of clinical manifestations and the development of pathological lesions in experimental allergic encephalomyelitis of the guinea pig.

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The Determination of Radioactive Iodine in Biologic Material.* (18208)

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Most of the methods for the determination of radioiodine in the presence of organic material are insensitive and time-consuming. The purpose of this paper is to describe a method which obviates to an appreciable extent these disadvantages.

Reagents and apparatus. Sulfuric acid, 18 N; potassium permanganate; oxalic acid, saturated aqueous solution; lithium arsenite, a solution containing 0.74 g of arsenious oxide (As_2O_3) and 1.20 g of lithium hydroxide (LiOH) per 100 cc of solution; modified Chaney distillation unit(1,2); Geiger-Müller beta ray counter, with appropriate scaler.

Experimental. The material (blood, urine or tissue) to be analyzed is placed in a 500 cc pyrex digestion flask to which is added 1 g of potassium permanganate and 18 cc of 18 N sulfuric acid for each 50 mg of organic material. (Caution: The addition of undiluted concentrated sulfuric acid to permanganate is dangerous.) As carrier, 1 cc of a solution containing 1 mg of sodium iodide per cubic centimeter is added to the flask. The flask is heated by either a gas flame or an electric heater until dense white fumes form (186°-190°C). The flask is then cooled, 25 cc of distilled water is added and

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TABLE I. Recovery Experiments with I^{131} by Distillation Procedure.

Material			Controls			Experimental			
Solvent	I^{131}, μc	I^{127} μg	Samples	Mean counts per sec.	Stand. error	Samples	Mean counts per sec.	Stand. error	Diff.
				Radioiodide					
Water	.02	.1	5	36.91	±.35	10	38.01	±1.40	+1.10 ± 1.44
"	.02	.1	4	30.10	±.32	10	28.27	± .36	—1.83 ± .48*
"	.02	.1	4	46.90	±.33	10	43.00	± .49	—3.90 ± .58*
Urine	.02	.8	4	54.53	±.46	10	52.24	± .59	—2.29 ± .75*
Serum	.015	.04	4	38.82	±.68	10	36.55	+ .30	—2.27 ± .74*
				Radiothyroxine					
Water	.009	.25	4	30.01	±.28	10	30.38	± .20	+0.37 ± .34
Urine	.01	1.4	4	35.03	±.35	10	36.00	± .42	+0.97 ± .55
Serum	.008	.4	4	23.48	±.18	10	23.63	± .12	+0.15 ± .22
				Radiodiiodotyrosine					
Water	.01	.1	4	30.35	±.22	10	29.83	± .19	—0.22 ± .29
Urine	.018	1.55	4	51.48	±.74	10	51.19	± .34	—0.29 ± .81
Serum	.012	.19	4	36.76	±.39	10	35.51	± .46	—2.25 ± .60*

* A significant loss.

distillation into a Chaney still(1) started. As moisture appears in the trap of the distilling unit, 1 cc of lithium arsenite solution is introduced into the trap, after which the condenser is attached. When the water starts to condense and return to the digestion flask, 10 cc of oxalic acid solution is added dropwise. Distillation is continued for 5 minutes after decolorization of the permanganate occurs. At the end of this period of distillation, the fluid in the trap is drained into a small beaker and the trap plus receiver rinsed 3 times with 2 cc of distilled water. The beaker is placed on a steam bath until the water is completely evaporated. The residue is then taken up in 2 cc of water, and ½ or ¾ of the solution transferred to a nickel-plated cup planchette. The planchettes are dried under an infra-red heater and the radioactivity determined by a thin mica window beta ray counter and scaler. The amount of radioactivity represents ½ or ¾ of the amount in the original sample and the appropriate correction is made. No correction is needed for self-absorption since there are only 10 to 15 mg of solids present. Computation in terms of microcuries of I^{131} is made in the usual way by simultaneous comparison with a sample of a standard.

Results. The procedure was evaluated by performing recovery experiments using radioiodide, radiothyroxine and radiodiiodotyrosine added to water, urine, serum and various animal tissues. The total amount of I^{127} in these solutions or mixtures was so adjusted as to be approximately the same as that ordinarily present in these tissues or fluids. The purpose of this precaution was to evaluate adsorption losses, since such losses on glassware such as pipets may be appreciable when small amounts of iodine are handled. The amount of radioactivity in all experiments varied from .01 to .02 microcurie since this amount of radioactivity gave a counting rate of from 40 to 100 times background. The solutions were made up so that in the case of water and urine 5 cc aliquots were transferred to the digestion flasks and in the case of the serum 1 to 2 cc aliquots were used. In each recovery experiment 10 aliquots were run. As controls, aliquots containing the same amount of radioactivity were added to a mixture of 1 cc of lithium arsenite solution plus 10 cc of water and the solution evaporated over the steam bath in precisely the same procedure as used for the experimental runs. The results of these recovery experiments are shown in Table I. The overall recovery varied between 94 and 103%. The uniformity of the individual values, indicated by the small standard error of the mean, was such that a loss of 4 to 5% indicated a significant loss. The values that represent significant losses are starred in Table I.

The recovery of I^{131} in the presence of

TABLE II. Recovery of I^{131} in the Presence of Tissue.

Tissue	Wt of sample, g	Recovery of I^{131}, %
Skin	1	101.7
Adipose tissue	1	98.1
Liver	1	99.3
Spleen	1	90.6
Kidney	1	96.5
Adrenal	.073	96.5
Ovary	.053	116.2
Pituitary	.014	99.7
Brain	1	100.6
Smooth muscle (ileum)	1	96.4
Striated muscle	1	91.5
Blood	1	92.3
Thymus	.55	98.5
Thyroid	.017	93.7
Feces	1	93.1

various tissues was determined by the addition of 1 cc of a solution containing .008 microcurie of I^{131} and 0.1 μg of I^{127} per cubic centimeter to 15 tissues of the rat. Various tissues were chosen because the presence of volatile substances in certain tissues might easily affect the recovery of I^{131}. The results of this experiment are shown in Table II, which indicates that satisfactory recovery was achieved in each instance in spite of the fact that only one sample was determined.

Comment. The procedure just described is an adaptation and a modification of the Chaney method for the chemical determination of iodine in biologic material with a few changes necessary for isotope measurement. The method has proved to be useful because of its convenience and sensitivity. Twenty samples can be digested and distilled conveniently and the radioactivity determined the following day. Because of the small amount of solids in the distillate, very satisfactory planchettes† always result, and corrections for self-absorption are unnecessary. The over-all sensitivity of this method was computed to be 30% by comparison with a uranium beta ray standard, that is, 30% of the beta radiation of the sample is recorded by the apparatus. With this sensitivity, as little as 3 x 10^{-5} microcurie of radioiodine per cubic centimeter of serum may be determined accurately at a counting rate 10 times the background. It is therefore possible to determine the concentration of I^{131} in serum of patients during a half-life of I^{131} following administration of doses of about 20 microcuries of radioiodine.

Summary. A convenient and accurate method for the measurement of small amounts of I^{131} in biologic material is described.

† For planchettes nickle-plated cups 2.5 cm in diameter and 0.25 cm deep are used. These are placed in a brass holder at a distance of 8 mm from the Geiger-Müller tube. The Geiger-Müller tube is shielded throughout by an inch of lead. With this shielding the cosmic and incidental radiation background varies from 0.2 to 0.3 count per second. The shielding for the Victoreen tube was designed by Dr. M. M. D. Williams, Division of Biophysics and Biophysical Research, and Mr. Dana Rogers, Division of Engineering, Mayo Clinic, to both of whom the authors are greatly indebted.

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Replacement of Pantothenic Acid by the *Lactobacillus bulgaricus* Factor in Rat Nutrition.* (18209)

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The existence of a factor essential for the growth of *Lactobacillus bulgaricus* (Sarles) and *Lactobacillus helveticus* 80 has been re-

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