Results. Tissue analyses are summarized by the means in Table I. Almost every mouse tissue had a slightly lower water content and higher carbon content than the corresponding rat organ. Within each species, tissues rich in carbon (*e.g.* near the top of Table I) were generally poor in water; the converse was equally true.† From this inverse correlation and from the observation that tissues of grossly fat mice were invariably richer in carbon than those of lean mice, we infer that variations in tissue carbon reflect chiefly differences in the tissue lipid content, relative to the stores of protein and carbohydrate. This impression is supported by the invariably high carbon level in brain (lipid-rich) and in bile and adrenal gland (sterol-rich). Of course any material with a large inorganic ash is correspondingly deficient in carbon (*e.g.* feces). Analyses on gross subdivisions of the central nervous system suggest that concentrations of carbon and water vary progressively and reciprocally along the cerebrospinal axis. Probably these variations among portions of the brain and cord parallel the ratio between carbon-rich white matter and water-rich grey matter.

Summary. Soft-tissue concentrations of organic carbon and of water were measured in male rats and mice. Both the method and results (Table I) are thought to be useful to the radiocarbon biochemist.

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† Because carbon is expressed only in terms of the dry-tissue weight, this inverse correlation is not fatuous.

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Analysis of Micro Quantities of Sweat for Sodium Chloride by Conductivity Method.* (22091)

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The collection and analysis of small quantities of sweat is an important tool in assessing the mineraloid activity of the adrenal cortex. However, the small amounts which are collected by the most practical technics(1) make analysis of the diluted material by flame photometry or chemical means quite difficult. Even if meticulous care is taken to thoroughly clean glassware, small amounts of sodium are extracted from the glass itself(1). To prevent this, the glassware must be silicone coated and the water freshly distilled. Special precautions must be taken in the handling of the unknowns. This imposes further limitations on the value of the sweat test for clinical and investigative use. To obviate the difficulties inherent in the chemical analysis of such dilute quantities of sodium, the use of radioactive sodium has been suggested(2). The concentration of chloride in the sweat increases with the rate of sweating and parallels the concentration of sodium. Either chloride or sodium can be used as a measure of adrenal cortical activity in the absence of an abnormal salt intake. The potassium concentration falls as the perspiration rate increases(3). But the relationship of the fall of potassium to the rise in chloride is a linear one. Because of the linear relationship between the excretion of sodium, potassium and chloride, it seemed feasible to

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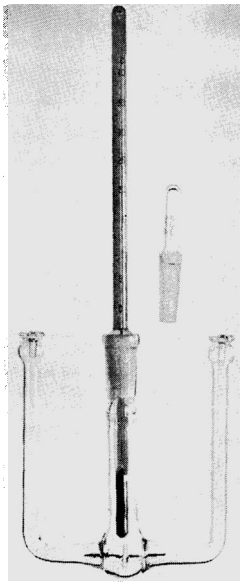

FIG. 1. Henry cell with small volume capacity. Wire leads are placed into side arms filled with mercury.

measure total electrolytes by the conductivity method and express them as NaCl since this element constitutes well over 90% of the total electrolyte concentration of rapidly secreted sweat.

Method. Conductivity was measured by a resistance measuring device which is modification of the Wheatstone Bridge.† This instrument has a sensitivity capable of determining one part of sodium chloride in two million parts of water. A special Henry type conductivity cell was constructed with a volume of only 5 cc total (Fig. 1).‡ It has a cell constant of approximately 0.1. It is cleaned with detergent and rinsed with distilled water. It is dried by washing with alcohol and ether or acetone. There is no necessity to obtain highly purified distilled water since the initial conductivity of the water is determined and is subtracted from the conductivity of the water after the sweat has been introduced. This difference is due to conductivity of the sodium chloride in the sweat itself. We have found that more stable readings can be obtained when the water in the cell initially contains a very small amount of sodium chloride. Also, the solution in the Henry cell can be used over again after making one determination since the blank reading is subtracted from the final reading. If the same solution is used over again, care must be exercised lest the concentration of electrolyte exceed the range of the cell being used. Sweat is collected in a 10 λ pipette and diluted with 5 cc of distilled water in the Henry cell. The content of the pipette is thoroughly transferred by rinsing with the distilled water in the cell. A Henry cell has the advantage over a dip type of cell in that it allows for complete transfer without spillage. The dilution technic described allows for a final accuracy within 3% if the blank value for the distilled water is subtracted.

Results. Utilizing the same dilution (1/500 as given above) a chart can be constructed which relates the observed conductivity of the diluted material to the actual concentration of sodium in the sweat. Known standards of sodium chloride were prepared and diluted 1/500. The initial conductivity of this water

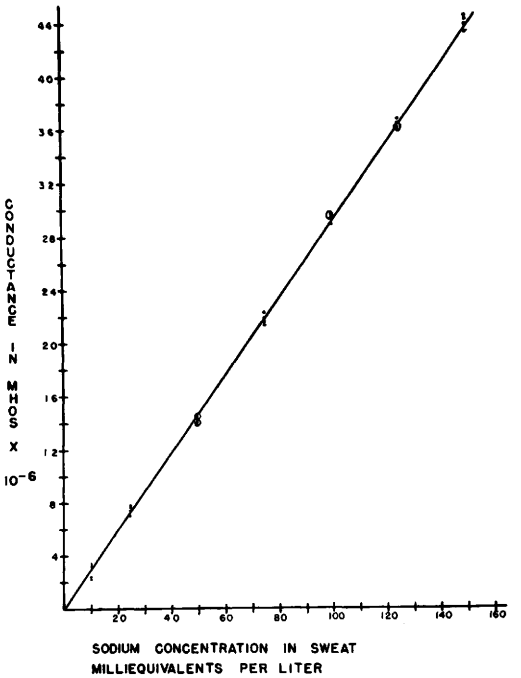

FIG. 2. Relationship between conductivity in Mhos and sodium chloride concentration of 1/500 diluted sweat. Initial (blank) conductivity of water has been subtracted from observed value.

† Leeds Northrup Model No. 4866.

‡ Made for us by Delmar Scientific Laboratories, Chicago, Ill.

was subtracted from the final reading so that this increased conductivity measured in Mhos was directly related to the sodium chloride concentration. Fig. 2 was prepared from determinations of known concentrations of sodium chloride. There is a linear relationship between conductance§ and sodium chloride concentration.

The standard error was calculated from 20 determinations on a standard solution containing 125 me/L. The dilutions were made with the micropipette in a manner identical to the handling of actual sweat. The deviations of these determinations were used to calculate the standard error of the mean. The standard error of the mean was 3.8 x 10^{-7} Mhos which corresponds to less than 4 milliequivalents. These determinations were done with a dip cell. The accuracy has been further increased by the use of the Henry cell.

Summary. The fact that the ionic content of rapidly secreted sweat consists almost entirely of sodium chloride make feasible use of conductivity measurement to determine the sodium chloride content of micro quantities of sweat. This method has a high degree of accuracy and is at the same time simple and rapid.

§ Conductance is the reciprocal of ohms and is expressed in mhos.

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A Method for Collection of Micro Quantities of Rapidly Secreted Local Sweat.* (22092)

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In many diseases it is recognized that disturbances in salt and water metabolism occur(1). It is not known whether the salt retention or losses which are seen as manifestations of some diseases are caused by variations in the minute to minute blood levels of mineraloid hormone activity. These gaps in our information arise from the fact that there is no simplified clinical and investigative tool for testing the overall activity of the salt hormones of the adrenal cortex and other organs. Urinary hormone assays of aldosterone can at best measure only gross changes which occur over a 24-hour period. It is a painstaking laboratory examination which can be done only in a few specially equipped research laboratories. The demonstration by Conn(2) that the concentration of sodium or chloride in perspiration mirrors the mineraloid activity of the adenal cortex provided the basis for the achievement of such a practical test. Most investigators have used hot rooms and other forms of thermal stimuli to produce diaphoresis, and have collected the sweat from an extremity in a water tight envelope made of plastic or thin rubber. The difficulties inherent in this method of sweat collection are obvious. Aside from the difficulties of collection, the electrolyte concentration of sweat has been shown to be dependent upon the rate of sweating. For this reason, it is best to measure the electrolyte concentration at the maximal rate of sweat production(3). It is also essential to be able to take frequent collections of small samples which are unmixed with a large dead space volume of a different concentration. Dole *et al.*(4) have devised a small chamber which contained an absorbent filter paper. Sweat was induced in the skin under the chamber by the injection of a parasympatheticomimetic drug in this area. While this has greatly simplified the collection of

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