10 mm. human embryo in the Minnesota collection in which prospective absence of the left kidney could be explained on the basis of absence of the left ureter. In this specimen, which is being reconstructed for publication, the somewhat dilated left Wolffian duct terminated at the level of the pylorus. On the opposite side, the Wolffian duct had reached the cloaca and had given rise to a ureter which, in turn, had united with the blastema of that side to form the right kidney. Attached to the latter, on its left side, was the rudimentary blastema of what would normally have been the left kidney. In spite of its contact with the good kidney, the left blastema was unable to differentiate into tubules in the absence of the left ureter.

Associated with this anomaly and probably underlying it, was an arrested development of both mesonephroi. Instead of the normal 35 to 38 tubules on a side, the left Wolffian body contained 12 glomeruli, the right one 17. Below the last of the tubules, the Wolffian bodies contained progressively larger posterior cardinal veins—especially on the left side—which, in the region of the umbilical arteries were in contact with the metanephric blastemas and undoubtedly aided in bringing these anlages together in the form of a potential horseshoe kidney.

So far as the writer is aware, this is the first description of the critical stage in the development of unilateral renal agenesis in man. This case, together with the experimental evidence cited, would seem to substantiate the theory that at least one cause of congenital absence of the kidney is lack of formation of the ureter following arrested development of the Wolffian duct and body.

5910

Simultaneous Oscillographic Records of Sound Waves and Electric Variations in the Brain During Avertin Anesthesia.

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(Introduced by A. T. Rasmussen.)

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In a preliminary experiment under Avertin anesthetic the Wever-Bray experiment was repeated and their findings verified. The apparatus was an ordinary audio-frequency amplifier with head

phones. The need for a more accurate record of the impulses from the nervous system was apparent. We first turned our attention to improvements in the amplifier. It was necessary to obtain a maximum of amplification with a minimum number of tubes. To meet this requirement we selected a resistance coupled circuit employing 2 four element type '24 tubes, in the first 2 stages and one type '47 pentode tube as an output. The screen potential of the second tube was varied by a wire potentiometer as a control of amplification. To prevent power loss on the output an output transformer suitable for the pentode was used.

For making permanent records a Westinghouse multi-element moving coil type oscillograph offered most promise of flexibility. The secondary of the output transformer was selected to match the "super-sensitive" strings of the oscillograph. These strings have a sensitivity of approximately .002 ampere per inch deflection with a resistance of 8 ohms. The oscillograph is supplied with 2 of these elements and 2 "standard" elements which may be used for timing or other purposes. Two of the above amplifiers were constructed and checked to make certain that they gave very nearly identical curves on the 2 super-sensitive oscillograph strings. The completed set up affords an undistorted output from below 80 to more than 10,000 cycles, and in the range from 80 to 1000 cycles an input potential of 50 micro-volts will give an output deflection of one centimeter with a quite steady base line and a sufficiently flat response. One amplifier and string were used for the electrical changes from the ear and the other was attached to a microphone pickup so that sounds could be photographed simultaneously from microphone and preparation.

Using the above apparatus we first operated from below, drilling through the base of the skull directly over the trapezoid body, and obtained responses with the active electrode on the surface of the medulla in this region without any injury to the brain tissue. The ear was now stimulated at given frequencies from a loud speaker unit driven by a General Radio oscillator (Type 377B). The responses recorded were strongest in the region of the auditory fibers and corresponded in frequency and in relative amplitude with the input.

We next operated from the dorsal aspect, immediately caudal to the tentorium, damaging as little as possible the cerebellum, placing the uninsulated tip of the active electrode in the region of the caudal portion of the inferior colliculus. In this case there was a definite localization of the point of maximum intensity and that point was

on the contralateral side from the stimulated ear. Having set the electrode in this region and obtained records showing the usual frequency correlations, we hardened the brain with the electrode *in situ* and sectioned in order to locate more exactly the position of the exposed electrode tip. This was found to be in the region corresponding to the position of the lateral lemniscus.[1]

From the above animal, using head phones, we were able to hear tones up to 3000 d. v. per second although at too low an intensity for photographing on the oscillograph.

The authors present these data without intending to commit themselves as to their meaning. They offer a more accurate and reliable check on some of the previously published experiments.

5911

A New Colorimetric Method for the Determination of Soluble Fluorides.

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Soluble fluorides in neutral solution react with Fe^{+++} to give a complex which does not develop a color with the various reagents for iron. Guyot,[1] Greef[2] and Treadwell and Köhl[3] have developed a colorimetric titration method for fluoride based on this fact. Our efforts have been directed towards the application of this principle as a method for the determination of fluorides colorimetrically. We have used thiocyanate, salicylic acid, 8-hydroxy quinoline, and acetylacetone as reagents for the development of color with the excess iron added to a fluoride solution. We have found acetylacetone to be the superior reagent because the others either give colors which are not stable to light, or the amount of fading induced by varying concentrations of fluoride is erratic. Our present method of procedure is as follows: The solution containing the fluoride is rendered just acid to phenolphthalin and diluted to 100 cc. To each of two 25 cc. volumetric flasks is added 1 cc. of a freshly prepared solution of $FeCl_3$ containing 0.3 mg. Fe/cc. and 1 cc. of a

[1] Davis, H., and Saul, L. J., *Science*, 1931, **74**, 205.

[1] Guyot, *Comptes Rendus*, 1870, **71**, 274; 1871, **78**, 273.

[2] Greef, *Ber.*, 1913, **46**, 2511.

[3] Treadwell and Köhl, *Helv. Chem. Acta.*, 1925, **8**, 500.