the staining of nuclei in liver cells. The latter author comments that in view of the numerous functions which the liver cells perform it is quite striking that there should be such a marked similarity in appearance in all the liver cells. Wilson[4] states regarding nuclei in general: "The nuclear framework undergoes great changes of staining-capacity in different phases of the cell-cycle and may even completely lose its affinity for the basic dyes, becoming purely oxyphilic like linin or general cytoplasm." He suggests further that the differences in the affinity of the nuclear framework may be interpreted as . . . "but passing phases, more or less marked and enduring, of one fundamental substance." A somewhat similar explanation is offered by him in regard to nucleolar affinities. This may lead to the view that the differences in the nuclear affinities observed in the liver cells are due either to their varying physiological state in life or to the particular fixative employed.

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Determination of the Amount of Blood in the Central Nervous System Following Injections of Hypertonic Solutions.

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The theory that the volume of blood and the volume of fluid within the cranium are inversely related to each other (Monro-Kellie-Burrows) has never been subjected to the test of the direct determination of the amount of blood in the central nervous system following dehydration after injections of hypertonic solutions. Wolff and Forbes[1] noticed contraction of the pial blood-vessels under such experimental conditions, while contrary to their observation Kubie and Hetler[2] described an increase in the color intensity of the brain cortex in color photographs taken before and after injections of 20-30% sodium chloride solutions.

Based on the observations of Voigt[3] that blood, brain and spinal cord do not retain colloidal silver but are free of silver 4 hours after the injection of collargol, the following method was applied for the

[4] Wilson, E. B., The Cell in Development and Heredity, 1925, 85. The Macmillan Company, New York.

[1] Wolff, H. G., and Forbes, H. S., *Arch. Neurol. and Psych.*, 1928, **20**, 73, 1035.

[2] Kubie, L. S., and Hetler, D. M., *Arch. Neurol. and Psych.*, 1928, **20**, 749.

[3] Voigt, J., *Biochem. Z.*, 1914, **63**, 409.

determination of the amount of blood in the central nervous system: Collargol (Heyden) was dissolved in distilled water, corn-syrup added as a protective colloid and the solution added to an equal volume of either 1.7% or 30% solution of sodium chloride or 100% solution of anhydrous dextrose. The collargol solutions in 0.85% or 15% sodium chloride or 50% dextrose respectively were injected intravenously into dogs under ether anesthesia, 8 cc. per kg. weight. Five to 10 minutes following the injection approximately 30 cc. of blood was taken from the femoral artery and shaken with a few milligrams of heparin to prevent clotting. Immediately thereafter the dogs were killed by puncture of the medulla oblongata. Both jugular veins, carotid arteries and the medulla oblongata *en masse* were ligated and brain and spinal cord removed. After drying at 120° for the determination of water, blood, brain and spinal cord were ashed with the Neumann method and the silver was determined volumetrically with the Vollhard method, m/50 solutions being used. The amount of blood in brain and spinal cord was calculated from the amount of silver found as demonstrated in the following example: Dog 13.6 kg., injected 108 cc. of 4% collargol in 0.85% sodium chloride.

30 cc. of blood used 17.25 cc. m/50 ammonium sulfocyanate.
78.8 gm. brain " 2.90 " " " " = 5.04 cc. blood.
14.5 gm. spin. cord " 0.25 " " " " = 0.43 cc. blood.

Table I will give the averages of the experiments:

TABLE I.

Injected	Weight			Amount of blood				% of Water		
				Brain		Spinal cord				
	Body kg.	Brain gm.	Spinal cord gm.	cc.	per 100 gm.	cc.	per 100 gm.	Brain	Spinal cord	Blood
0.85% NaCl 9 dogs	11.4	66.1	13.2	5.5	8.3	.91	6.9	77.2	67.8	78.4
15% NaCl 5 dogs	12.1	66.3	14.9	8.8	13.2	3.7	24.8	76.8	67.0	78.8
50% dextrose 5 dogs	10.5	75.6	13.3	5.3	7.0	1.9	14.3	77.7	67.1	78.4

It may be concluded that the dehydrating effect of the 15% sodium chloride solutions was more pronounced than that of the 50% dextrose, and that the amount of blood following dehydration after injection of 15% salt solutions was increased from 8.3 cc. per 100 gm. brain in the controls to 13.2 cc. in the dehydrated brains. Based on Ranke's figures of a total amount of blood equal to 6.6%

of the body weight, brain and spinal cord of dogs (without meninges) under ether anesthesia contain after injection of 0.85% salt solutions 0.9% of the total blood, after injection of 15% salt solution 1.6%, and after injection of 50% dextrose 1.1% of the total amount of blood.

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A Method for Accurately Locating Points in the Interior of the Brain.

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With the instrument devised by Horsley and Clark[1] it is possible to stimulate or destroy any desired point in the interior of the brain. When properly adjusted to the head of the animal by grasping devices inserted in the external auditory openings and the orbits, the base line of the instrument passes through the center of the external auditory meatus and through the lower border of the orbit. The zero horizontal plane is parallel to the base line but above it one-third of the distance from the interaural line to the vertex. The zero point is at the intersection of this plane and the midsagittal plane with one at right angles to them passing through the interaural line. The instrument is so constructed that it is possible to place the tip of a fine electrode at any desired position with reference to this zero point, for example, at a point 7 mm. to the right, 4 mm. rostral and 2 mm. dorsal to the zero point.

In order to use the instrument it is necessary to know the location of the point which is to be stimulated or to be destroyed by electrolysis, with reference to the rectilinear coordinates of the instrument. For this purpose we have prepared cats' brains in the following manner:

With the instrument in position on the head the cat was injected with 10% formalin. After the brain was thoroughly hardened *in situ* the skull was removed in certain small restricted areas. Through these openings perfectly straight 18 gauge copper wires were inserted with the aid of the instrument. Three wires were inserted horizontally from behind through the cerebellum and tentorial notch to the rostral extremity of the brain. These were

[1] Horsley, V., and Clark, R. H., *Brain*, 1908, **31**, 45.