use of neosalvarsan and the dyes indicated in column 1. The general conclusion that may be drawn from this table is that the presence of dyes has not had any marked effect upon the penetration of arsenic from neosalvarsan into the brain and cord. On the other hand, the presence of the arsenic in the spinal fluid has been markedly increased. The therapeutic possibilities of a condition of this kind have not yet been satisfactorily worked out.

These investigations are being continued with the idea of showing that there are several factors that must be continuously considered in regard to the application of arsenicals in the treatment of various types of syphilis. In the first place, the *quality* of the arsenic which has penetrated, is more important than the *quantity* of arsenic which has penetrated. The physical condition of the arsenic which has reached the lesion is a factor that must be determined in order to evaluate the proper therapeutic index of a given drug. Furthermore, the antibody formation is a feature which is of equal importance in relation to the various types of treatment which are to be employed.

211 (2734)

The chemical composition of the vitreous humor of animal eyes.

By MARTIN COHEN, JOHN A. KILLIAN and NANNETTE METZGER.

[*From the Departments of Ophthalmology and Laboratories, New York Post-Graduate Medical School and Hospital, New York City.*]

A survey of the literature revealed but incomplete data on the chemical composition of the vitreous humor. It was therefore deemed advisable to determine in this body fluid the concentration of some of the compounds known to occur in the blood and cerebrospinal fluid. This work represents a preliminary step in the study of the humors of normal and pathological human eyes. The use of the microchemical methods has made possible the more extensive analysis of the vitreous humors of individual eyes.

Analyses were made of the vitreous humors of the eyes of oxen, horses and pigs. The eyes were removed, without trauma,

from the animals immediately after slaughter. The aqueous humor was withdrawn by a syringe, and the entire vitreous shelled out through an incision in the sclera of the posterior part of the eyeball. After rupturing the membrane, the vitreous was poured upon a C. S. and S. filter paper No. 595, and covered with a watch glass. The filtrate was taken for analysis. All material analysed was fresh. Not more than 45 minutes elapsed between the death of the animal and the beginning of the analysis. The oxen and pigs were young animals, but the horses ranged from 12 to 20 years. The horses were killed instantaneously by a shot into the brain. All animals were free from disease.

The analytical studies included determinations of total solids, specific gravity, proteins, non-protein nitrogenous compounds, chlorides, sugar, phosphorus, sulphur, potassium, sodium, calcium, lactic acid and the ether soluble fraction. All results are reported in terms of mg. of these components to 100 cc. of the filtrable portion of the vitreous. The figures reported in the table are averages of from 6 to 12 determinations. With the exception of sulphur, phosphorus and the ether extract, all determinations have been made upon the humors of individual eyes. For sulphur, phosphorus and the ether extract the humors of several eyes were combined so that 100 cc. were obtained for each of these analyses.

TABLE—Chemical composition of the vitreous humor of animal eyes.

Constituents	Oxen	Pigs	Horses
Specific gravity	1.004		1.003
Total solids (gm. per 100 cc.)	1.11	1.11	1.01 to 1.12
Total nitrogen	21.5	19.9	17.8 to 35.7
Nonprotein nitrogen	15.7	13.6	14.2 to 32.3
Protein nitrogen	6.9	6.3	3.4 to 3.6
Total protein	39.3	39.3	21.2 to 22.5
Urea nitrogen	9.9	8.8	8.0 to 20.0
Amino acid nitrogen	1.8	2.8	2.1 to 3.0
Uric acid	2.8	0.45	1.0 to 2.0
Creatinine	1.1		
Creatine	1.6		
Sugar (as glucose)	39.	30.	71.
Chlorides (as NaCl)	678.	705.	656.
Total sulphur	4.	4.5	2.
Total phosphorus	2.	3.3	
Sodium	301.	318.	311.
Calcium	7.9	7.9	8.5
Potassium	27.9	35.4	24.5
Total ether extract	10.		
Lactic acid	14.8	17.5	17.0

All figures, except for specific gravity and total solids, are for mg. per 100 cc.