the injection, as did those receiving the whole drug, with typical symptoms of arsenical poisoning.

Rats injected with fatal doses of the colloid fraction showed a reaction immediately after injection. The animals developed severe dyspnea, and in many cases prolonged apnea; there were clonic convulsions of the hind legs; in most cases there was a bloody exudate from the nose and mouth. Many animals died within 15 minutes, almost all within 3 hours. Animals living longer than 3 hours usually recovered.

These experiments indicate that it is the colloid fraction of these arsenicals which is responsible for the immediate toxic reactions, whereas the crystalloid fraction is less toxic than the whole drug and produces only delayed symptoms of arsenical poisoning when injected in toxic amounts.

The authors desire to express their deep appreciation to Dr. A. D. Hirschfelder for his valuable suggestions and constant interest in the progress of the work.

7046 P

Therapeutic Efficiency of Arsphenamine and Neoarsphenamine Fractions.*

E. HANSSEN AND HAROLD N. WRIGHT.

From the Department of Pharmacology, University of Minnesota, School of Medicine.

Biedermann, Hanssen and Wright[1] have shown that arsphenamine hydrochloride, sodium arsphenamine or neoarsphenamine may be separated by means of dialysis through viscose membranes into 2 fractions, the one consisting of particles which readily pass through the membrane (crystalloid fraction), the other consisting of particles which fail to pass through the membrane after repeated dialysis until no further arsenical passes through the membrane (colloid fraction). The technic and precautions used are similar to those described in the previous paper. In all experiments with sodium arsphenamine and neoarsphenamine it was found necessary to use 1/10,000 sodium formaldehyde sulphoxylate as a stabilizing agent.

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[1] Biedermann, A., Hanssen, E., and Wright, H. N., PROC. SOC. EXP. BIOL. AND MED., 1933, **31**, 172.

The previously reported study having shown that the 2 fractions of these semi-colloid arsenicals possessed markedly different properties in regard to toxicity, the present study was undertaken to determine whether or not these separated fractions possessed any differences in therapeutic activity.

The experiments on the therapeutic properties of the various arsenicals and their fractions were carried out on albino rats of the Wistar Institute strain, weighing 150-200 gm., and inoculated 24 hours before injection of the arsenical with approximately 300,000 organisms of *Trypanosoma equiperdum.*† Control animals were included in every experiment and these animals invariably died in 3 to 5 days. Test animals were not recorded as cured unless repeated microscopic examinations of the blood were negative for trypanosomes for 30 days after injection of the arsenical.

TABLE I.

Comparison of Separation of Neoarsphenamine Fractions with their Therapeutic Activity.

Sample	Dialysis			Therapeutic Activity		
	Colloid	Crystalloid	Ratio	Colloid	Crystalloid	Ratio
A_1	220 mg.	48 mg.	4.6	24 mg./Kg.	3 mg./Kg.	8.0
A_2	401 "	108 "	3.7	36 " "	7 " "	5.1
A_3	357 "	257 "	1.4	33 " "	8 " "	4.1
B_1	246 "	220 "	1.1	16 " "	9 " "	1.8

No. Experiments = 40
No. animals used = 800 approx.

The results clearly indicate that the crystalloid fraction of neoarsphenamine has a much higher therapeutic effect than that of the colloid fraction. In general, we have found that the smaller the amount of the crystalloid sample (first 24 hour dialysate) the higher the therapeutic efficiency. Thus in Sample A_1 above, the viscose membrane was relatively impermeable and the crystalloid fraction was found to have a very high therapeutic activity, only 3 mg./kg. being required as against 24 mg./kg. for the colloid fraction. In another experiment using the same brand and lot number but a very porous membrane the crystalloid fraction contained 323 mg., the colloid fraction 233 mg., ratio 0.7, and the therapeutic activity of the crystalloid fraction was found to be 11 mg./kg., and 13 mg./kg. for the colloid fraction, giving a ratio of only 1.2 in favor of the crystalloid fraction, a result agreeing well with the poor separation obtained.

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We have carried out a small number of similar experiments with sodium arsphenamine and find that the results obtained are qualitatively similar. In one experiment, for instance, the crystalloid fraction was found to be curative in doses of 2 mg./kg. while 7 mg./kg. of the colloid fraction were required.

The authors desire to express their deep appreciation to Dr. A. D. Hirschfelder for his valuable suggestions and constant interest in the progress of the work.