Average Differences.

Carotid artery—torcular =CO₂ 4.01 per cent.; O 4.76 per cent.
 —femoral vein=CO₂ 8.11 per cent.; O 11.91 per cent.

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REPORT ON

THE EFFECTS OF REPEATED HÆMORRHAGES ON THE COMPOSITION OF THE BLOOD.

By ARTHUR H. WHITE, L.R.C.P. & S.I.

(From the Pathological Department, University College, London.)

THE quantity of blood withdrawn was in each instance carefully estimated, and analyses of the various constituents were made, and then twenty-four hours afterwards a further careful bleeding and series of analyses and so on. The number of the successive bleedings in the case of the individual dogs varied from two to four. The analyses comprised the amount of water and solids, total proteids, fibrin, ash and ether extract, while in addition estimations were made of the corpuscular elements, the quantity of hæmoglobin, the specific gravity, and the coagulability. Investigations were made of the nature and character of the blood corpuscles, and also in one or two instances the histological changes in the glands, marrow, spleen, liver, etc., were partially examined.

Naturally in a research of this kind necessitating the immediate and simultaneous estimations of so many different things, some of the methods employed were not of the most exact nature, though sufficiently exact to give an approximate idea of the alteration; mostly, however, the method of analysis was as precise as possible—this being especially true in the cases of the water and solids, specific gravity, total proteids, fibrin, and ether extract.

The various points which I reported last year in regard to the disturbance in the relationship of the water and solids, the reduction in the specific gravity and in the proteids, the progressive increase in the fibrin, etc., have been amply confirmed by my later results, and are now ready for publication.

Below is a table giving the full results in the case of one of the dogs.

In addition to these results certain facts which bear on the question of blood regeneration have been elicited, and with regard to the regeneration or replacement of the red corpuscles, it would appear that in certain cases when the serum becomes too poor in solids there seems to occur at first an actual dissolution of many of the red corpuscles which had been left. This certainly appeared to have resulted in one case twenty-four hours after an excessively large quantity of blood had been taken away, as the reduction in the number of the corpuscles was far greater than was warranted by the amount of blood lost.

With regard to the histological changes in the organs resulting from these acute hæmorrhages I can as yet report no definite results. I may, however, mention that in two of the cases, one of which was the animal referred to above, the amount of blood pigment in the spleen and liver was larger than normal. There is, of course, always a marked decrease in the number of corpuscles, but this only affects the red, as there is almost always a marked leucocytosis.

For the examination of the blood on each occasion of bleeding from a dozen to a dozen and a-half coverslip preparations were prepared according to Ehrlich's method, and subsequently were stained with all the various stains recommended by Ehrlich and his pupils for the exhibition of the various classes of granules, but were singularly productive of negative results. Despite the increase in the white corpuscles I found that so far as the eosinophile granules are concerned the cells containing them were certainly not more than proportionately increased; this is quite in accordance with Ehrlich's statement that in acute leucocytosis the eosinophile cells are, if anything, lessened. The neutrophile granules I never found either in the normal or altered blood; Ehrlich himself states they do not occur in dogs' blood.

The increase in the number of leucocytes seems to be chiefly, if not altogether, due to an increase of the so-called polynuclear leucocytes, for in these cases they form, instead of the normal 75 per cent. or thereabouts, in some instances as much as 95 per cent. of the whole. Nucleated red corpuscles I never found unless in cases where the animals had been bled three or four times, and then only exceedingly rarely.

With regard to the hæmatoblastic crisis said to occur after hæmorrhage, I can say that in many instances there would appear to be an increase of the blood plates, in some few cases a marked increase. Whether such elements, however, previously existed in the circulating blood, or only appeared in the blood after withdrawal, is a matter of doubt.

REPORT ON

THE ACTION OF DRUGS ON THE LEUCOCYTES OF THE BLOOD.

By GEORGE WILKINSON, M.D.

(From the Pathological Laboratory of University College, Liverpool.)

I.—CHANGES IN THE NUMBER OF LEUCOCYTES.

DURING recent years several observers have recorded certain changes which take place in the number of the leucocytes of the blood of animals after the injection, either subcutaneously or directly into the circulation of bacteria, bacterial products, nuclei, peptone, and other substances. Acting on the suggestion of Professor Boyce, to whom I take this opportunity of expressing my thanks for much kind assistance, I have performed a series of experiments with a number of drugs, which were administered to rabbits by hypodermic injection, with the object of observing any changes that might occur, not only in the total number of leucocytes in the circulating blood, but also in the relative proportion of the mononuclear and polynuclear varieties.

	Blood Lost.		Weight of Dog in Kilos.	Specific Gravity.	In 100 parts of Blood.					Coagulation Time.	Hæmoglobin to Standard	Number of Red Corpuscles in 1 c.mm.	Proportion of White to Red.
	Grammes.	Percentage of Body Weight.			Solids.	Proteids.	Fibrin.	Ash.	Ether Extract.				
Normal blood	0.0	0.00	18.4	1052	17.85	15.04	0.37	0.81	0.13	—	94	5,730,000	1:690
Twenty-four hours after 1st bleeding ...	508.5	2.76	17.5	1048	17.06	14.53	0.41	0.81	—	45 to 50	66	4,490,000	1:457
„ „ „ 2nd „ ...	284.5	1.62	17.4	—	14.44	13.00	0.52	0.50	0.17	150 to 160	54	3,170,000	1:352
„ „ „ 3rd „ ...	252.0	1.44	17.2	1042	12.26	11.47	0.63	0.69	—	65	38	1,380,000	1:150
„ „ „ 4th „ ...	654.0	3.80	*	—	—	—	—	—	—	—	—	—	—

* On this occasion the animal was bled to death.