fluids. This had to pass to the Continent and be re-dubbed the "buffer-salt effect" before receiving attention, and even now these earlier papers seem to be unknown to British workers on the subject, although their results would well repay a little consideration.

For example, the expression "buffer-salt" is quite misleading; the effect is not due to salts, for the very sufficient reason that there does not exist a sufficient quantity of sodium carbonates and phosphates in the plasma *in toto* to account for one-tenth of the protective influence, or to carry one-quarter of the carbon dioxide found in arterial blood. Salts cannot protect which are not there, and at least 90 per cent. of the protective action is due to the plasma proteins.

A most important point brought out by this earlier work which appears to have been quite forgotten is that all the inorganic salts of the plasma, including even the sodium chloride, are held in union by the proteins. It is this union which regulates the amount of salt in the blood with such a delicate precision. The excretory cells allow no excess of free salt in the circulating plasma, and it is this combining power of the proteins for salts which determines the value of physiologically "normal saline."

If the molecular concentration of mammalian serum be determined from the depression of its freezing point it will be found to be approximately equivalent to that of a one-sixth molecular solution of sodium chloride. If, now, the same serum be titrated with standard acid till neutral to an indicator such as methyl orange, and then with standard alkali till neutral to phenolphthalein, the range will again be found equivalent to a one-sixth molecular solution. Outside these two marginal limits very small additions of acid or alkali swing up or down the hydrogen ion concentration with enormous speed; within the limits large additions of acid or alkali produce only moderate effects.

Within these viable limits, marked out by the titratable value of the proteins, variations by accumulation of organic acids and alkali and carbon dioxide occur in varying conditions of health and disease, and the neuro-muscular and cardiac system may be chronically fatigued by such products. The soldiers investigated by Dr. Lewis may owe their condition to the strain of neuro-muscular fatigue induced by a physical training for which they are unfitted by nature. Apart from military training, the prolonged strain of war conditions is producing such an action on many people in civil life. Breathlessness, accompanied by disordered heart rhythm, is a prominent symptom, especially after any prolonged neuro-muscular exertion, in many persons bordering upon neurasthenia at the present time.

A variation in the balance of "reactivity" of the blood may also be present in the different forms of "shock." It has been shown by Roaf and Adamson that the serum proteins completely lose their osmotic pressure when acid is added to the serum till the equi-potential point or point of physico-chemical neutrality is reached. Bayliss has recently shown that colloids such as gum acacia or gelatine, which were demonstrated by the earlier work of Moore and Roaf to have a high osmotic pressure, possess the property of maintaining for much longer periods than purely saline solutions a higher blood pressure under shock conditions.

These and kindred problems are intimately connected with that protective mechanism in the blood plasma first described and measured in Britain under the term of "reactivity of the serum," and later reintroduced from Germany under the name of "Puffer-salzen" or "buffer effect."

REFERENCE.

¹ Moore, Roaf, and Whitley. *Proc. Roy. Soc., B*, vol. 77, p. 102 (1905); and Moore and Wilson, *Biochem. Journ.*, vol. 1, p. 297 (1906).

CARDIOPTOSIS.

BY

W. GORDON, M.D., F.R.C.P.,

PHYSICIAN, DEVON AND EXETER HOSPITAL.

I AM not sure whether the term "cardiopsis" has yet found its way into cardiology. I do not remember coming across it, and it is not in any of my textbooks. Yet I am sure the term would serve a useful purpose in focussing attention on a condition not unlikely (as in one instance here related) to be misinterpreted. The condition, of

which I can only speak from the clinical standpoint and from my limited experience, would appear to be one of undue laxity of the cardiac supports, such that, whilst the apex beat in recumbency is found about the normal position, in the fifth space, in the erect position it is located just below this, in the sixth space, without any evidence of other causes to account for the displacement.

In the first of the two following cases there was no sign of enlargement of the heart, although "enlarged heart" had been diagnosed, partly from the position of the apex beat in the sixth space; and in this case the dropped heart was associated with an obviously dropped kidney and a probably dropped stomach. In the second case there was moderate cardiac enlargement, although not so great as to seem to account for such a displacement of the apex beat in the erect position; a palpable spleen with normal temperature and no obvious blood changes in a fresh film, suggested in this second case a dropped spleen, but this could not be certainly diagnosed in the limited time at my disposal.

CASE I.

M. E., aged 21, suffered from attacks of "faintness," not, however, going to complete unconsciousness. He had had diphtheria badly at 1½ years old, followed by "paralysis of hands and feet," and could not walk till 3. He had had double pneumonia at 11 and a bad fall at 17; he had also been physically overworked, I think.

The chest was slightly deformed, the third and fourth rib cartilages on both sides being unduly prominent at their sternal junctions. Urine, lungs, and reflexes were normal. There was marked nephropsis on the right side, and the lower border of the stomach (which seemed, however, to be somewhat dilated) was close to the umbilicus. He was supposed to have "enlarged heart," but my examination gave the following results: In the erect position the cardiac dullness reached from the mid-sternal line only ½ in. rightwards and ¾ in. leftwards. The apex beat was quite obviously in the sixth left space, ¾ in. from the mid-line of the sternum. In the recumbent position the right margin of dullness was at the mid-sternum and reached leftwards 3 in. The apex beat in recumbency was obviously in the fifth space at about the edge of the dullness. There was no murmur in the recumbent position, but in the erect position a very local short systolic murmur was heard 1 in. outside the apex beat during inspiration only, being completely lost during sustained expiration.

CASE II.

J. S., 48, complained of weakness and occasional shortness of breath, had considerable rheumatoid arthritis, and was more or less a chronic invalid.

In the erect position the cardiac dullness reached rightwards to mid-sternum and leftwards to the left mammary line, 4 in. from mid-sternum; upwards to the fourth rib. The apex beat was unmistakably in the sixth space. In the recumbent position the dullness was, as usual, narrower, but reached as high as the third rib. The apex beat was definitely in the fifth space inside the left mammary line.

There was a systolic murmur, heard in both positions, louder after exertion and unaffected by respiration, where the fifth rib cartilage joined the sternum. Urine, lungs, and reflexes were normal. In the abdomen the splenic edge descended on inspiration about a fingerbreadth below the left ribs. The blood in fresh film seemed normal and the temperature was normal.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

THRESHOLD TESTS.

MUCH is to be learnt by investigating the thresholds for light and colour. Finding by routine examination that a normal standard, quite as uniform as that for visual acuity, exists, I have recently attempted to standardize a series of test objects which can be universally used for determining how near to, or how far from, the normal standard each individual eye is. In diseases of the retina, the choroid, and the optic nerve, very remarkable variations from the normal are found. But I have reason to believe that abnormal thresholds are not limited to diseases of the eye; marked changes in the thresholds are certainly to be found where the ocular implication is secondary. Thus, working with my test, my colleague, Dr. Walter Sinclair of Ipswich, pointed out that in several of his cases of retinitis of pregnancy the threshold for yellow was the only one attacked, but that very considerably. I found the same in the only case I have seen since. The threshold for yellow was reduced to recognition of the dilution 1 in 4, instead of the normal 1 in 32.

Though this can be no more than a hypothesis, I suggest that those who are not limited, like myself, to ophthalmic