

***Drug Treatment of Disease*****TONICS**

BY

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Fashions change in drugs as in diseases, and it cannot be denied that tonics have acquired a distinctly old-fashioned flavour. People no longer seek toning-up because they feel slack; on the contrary, their friends compliment them on their good health when they look relaxed, and the general wish is for something which will promote this desirable state of hypotonia. However, the word tonic must not be taken too literally, since, with the possible exception of strychnine, none of the ingredients of the traditional tonic has the pharmacological effect of increasing tone. Perhaps a tonic is best defined as a preparation given to promote a feeling of well-being; under different circumstances, therefore, it may contain drugs which stimulate and drugs which soothe.

The layman regards a tonic as a medicine which speeds up the process of recovery from serious illness or operation or from the exhaustion of chronic anxiety and overwork, and he may also expect it to increase his resistance to disease. He may be right inasmuch as his health depends partly on the state of his mind, which in turn may be influenced by his faith, but there is no pharmacological basis for his beliefs. It is true that vitamins, hormones, and minerals such as iron do correct the metabolic fault of patients who lack them, but such powerful remedies should be used as specific therapy and not as part of a general tonic. To use them in blunderbuss fashion is always wasteful and occasionally harmful.

**Glycerophosphates**

These were originally prescribed in the early days of biochemistry when it was discovered that the lecithin in the central nervous system contains its phosphorus in this form. There is, however, no evidence that glycerophosphates taken by mouth exert any pharmacological or metabolic effect whatever, and probably their only virtue is that they are non-toxic and do no actual harm. They form the basis of some of the expensive proprietary tonics still widely taken.

**Strychnine**

This was the most popular of the older tonic drugs, and indeed Hutchison (1926) stated that nux vomica was at that time "perhaps the most widely prescribed drug in the pharmacopoeia." One may well wonder whether in another thirty years it will still be prescribed at all, since proof is lacking that in therapeutic doses it has any pharmacological effect except perhaps as an aperitive "bitter." However, of the traditional tonics a mixture containing nux vomica and perhaps another of the bitters such as gentian is probably as good as any and has the merit of being cheap and harmless. A suitable prescription is:

Sodium bicarbonate	...	...	10 gr. (0.6 g.)
Tincture of nux vomica	...	...	5 minims (0.3 ml.)
Infusion of gentian to	...	...	½ oz. (14 ml.)

Taken in water three times daily before meals.

**Iron**

This was included in many of the older tonics such as Easton's syrup (syrup of ferrous phosphate with quinine and strychnine) and was no doubt responsible for any lasting benefit resulting from them. It is probably wiser, however, not to prescribe such iron-containing mixtures as general-purpose tonics. Iron is of benefit only to those who need it and should be administered to them in the preparation most likely to be quickly efficacious when the cause of the deficiency has been established or is at least under investigation. If taken indiscriminately by patients vaguely off colour it may delay the diagnosis of a bleeding ulcer or cancer of the alimentary tract by temporarily correcting the anaemia; if the patient is not short of iron, its only possible effect is a needless digestive upset.

**Vitamins**

The administration to undiagnosed pale people of vitamin B<sub>12</sub> or liver extract injections, or oral preparations containing liver, folic acid, or hog's stomach extract, either alone or, even worse, combined with other haematinics, must be roundly condemned, since this hinders the diagnosis of pernicious anaemia, prevents its efficient, supervised, and lifelong therapy, and so encourages the development of the permanent changes of subacute combined degeneration of the spinal cord.

The claim that vitamin A, usually taken combined with vitamin D in halibut liver oil capsules or cod liver oil emulsions, will raise resistance to infections such as the common cold is not supported by the facts, and, though these vitamins are toxic only if very large doses are taken, much of their considerable cost might well be saved without endangering the public health.

There is no scientific warrant for giving any of the vitamins as a general tonic, but there are of course many indications for their administration to patients who are convalescent or suffering from chronic diseases. Thus, there may be inadequate intake of vitamins from restricted diet, poor absorption as a result of gastrointestinal disease, impaired synthesis in the gut due to antibiotic therapy, or increased metabolic requirements resulting, for example, from barbiturate therapy.

The toxic effects of chronic barbiturate intoxication (depression, mental confusion, slurring of speech, nystagmus, and ataxia) may be related to the fact that barbiturates retard carbohydrate metabolism by inhibiting pyruvate oxidation, and during long-term barbiturate therapy it is probably wise to give vitamin B complex—for example, tab. aneurin. co. fort., *B.N.F.*, which contains aneurin (thiamine) hydrochloride 5 mg., riboflavin 2 mg., nicotinamide 20 mg., and pyridoxine 2 mg. Moreover, toxic confusional states, whether due to barbiturate poisoning or other causes, sometimes clear up rapidly after the intravenous administration of vitamins B and C in large doses—for example,

"parentrovite," two ampoules of each of the high-potency mixtures, which are mixed together before injecting, containing aneurin hydrochloride 500 mg., riboflavin 8 mg., pyridoxine 100 mg., nicotinamide 320 mg., and ascorbic acid 1 g. in 20 ml. But these are specific indications. Vitamins are not tonics.

#### Alcohol

The earliest drug used by man for inducing a sense of well-being was alcohol, and for general purposes it is probably still the best. There can be little doubt that it is the favourite tonic prescribed by doctors for themselves or their colleagues. There are of course important contraindications, notably liver disease and gastro-intestinal disorders, and it is unwise to recommend the use of alcohol to people of unstable or self-indulgent temperament or to those oppressed by feelings of inadequacy.

#### Amphetamine Sulphate

This is a powerful stimulant of the central nervous system, increasing mental activity and making the patient feel more energetic and cheerful. Optimum dosage must be found for each individual and it is wise to start with 2.5 mg. by mouth, if necessary increasing the dose to 10 mg. two or three times daily. Idiosyncrasy is occasionally seen, a state of acute excitement bordering on mania being induced by as little as 10 mg. Side-effects are common and include dryness of the mouth, headache, restlessness, insomnia, and loss of appetite, and the well-being induced by the drug is sometimes followed a few hours later by an increased feeling of fatigue. However, it is a useful drug for the treatment of depression during convalescence, and, though it may be habit-forming, withdrawal after prolonged administration does not induce severe physical symptoms such as occur with the true drugs of addiction. There would appear to be no significant difference in the clinical effects of amphetamine and dexamphetamine.

*Methyl Phenidate Hydrochloride* ("ritalin") is a central nervous stimulant like amphetamine, but does not have the sympathomimetic actions of the latter and so does not raise the blood pressure. It is also said to cause less restlessness and tension. On the other hand, it is usually not so effective in improving the patient's sense of well-being. The dose is 10 mg. twice daily, and, like amphetamine, it should not normally be given after 4 p.m. or insomnia may result.

*Pipradrol Hydrochloride* ("meratran") is very similar in its actions and clinical effect to methyl phenidate and is given in doses of 2 mg. two or three times daily. It is doubtful if these two drugs have any important advantages over the more familiar and very much cheaper amphetamines, but they may be given a trial when the latter cause troublesome side-effects.

#### Tranquillizers

These drugs have been discussed previously in this series (Sargant, 1958; Vogt, 1958), but brief reference may be made to the value of combining a sedative such as the short-acting barbiturate amylobarbitone with amphetamine. This combination suits patients who are tense, anxious, and low-spirited better than either drug alone. Average doses are amylobarbitone 32-64 mg. ( $\frac{1}{2}$  to 1 gr.) and amphetamine 5 mg., but there is wide individual variation of response to both drugs, so that the dose of either or both should be changed until the

best effect is achieved. Proprietary tablets containing the two drugs, though convenient, are expensive and do not permit this fine adjustment in dosage.

#### Conclusion

Tonics may be helpful in making a patient feel temporarily better, but they cannot restore vitality destroyed by chronic anxiety and overwork or take the place of adequate convalescence after serious illness. They should not be a vehicle for specific remedies used indiscriminately and are usually none the worse for being simple and inexpensive.

#### REFERENCES

- Hutchison, Sir R. (1926). *Elements of Medical Treatment*, p. 113. Bristol.  
Sargant, W. (1958). *Brit. med. J.*, 2, 1031 and 1095.  
Vogt, M. (1958). *Ibid.*, 2, 965.

## ROYAL SOCIETY OF HEALTH

### CONGRESS AT HARROGATE

The 66th Health Congress, convened by the Royal Society of Health, was held at Harrogate from April 27 to May 1 with Lord COHEN OF BIRKENHEAD as its president and an attendance of over 3,000. This year, after the inaugural sessions, the Congress broke up into eleven specialist sections to debate subjects ranging from radiation protection to the press and health education. There were also the customary meetings of the five conferences. The conference of medical officers of health discussed the notifiable infectious diseases.

#### Intangible Returns for Health Expenditure

In his inaugural address Lord Cohen said that, whilst it was known that this country spent over £600m. a year on its National Health Service, and that more millions were spent on private medical advice and purchase of drugs and other treatment, the income was in the intangible terms of health and happiness, which in turn determined productivity and our material prosperity as a nation.

Lord Cohen went on to review the great changes in demographic and disease patterns since the beginning of this century, and the triumphs of both curative and preventive medicine, whose results could be seen in the changed needs for hospital provision. These successes in the control of disease rested on a tripod of endeavour—prevention, cure, and research; and these in turn depended on two relatively modern ideas, the first that the body was a mechanism which could be investigated by the methods and instruments of physics, chemistry, and biology, and the second the concept of the "cause of disease." Recently the emphasis in causation had been shifting to the concept of "the seed and the soil," and the realization that specific factors were not in themselves sufficient causes but that ways of life also contributed to the genesis of many diseases. The triumphs of curative medicine stemmed largely from the recent additions to the therapeutic armamentarium, but, however effective the treatment of disease, the major contribution to the nation's health would rest essentially on preventive measures.

#### Irrationality of Public Response

The proviso was that those who would benefit should co-operate. However weighty the evidence might be, psychological factors must not be overlooked; public reaction was often irrational and bound up with emotion when the principle of freedom of choice for the individual seemed to be involved, as had been shown in the resistance