

his own intimate circumstances, will claim the prime consideration of the Ministry. Equally there can be no doubt that, since we constitute the specially trained and most experienced administrators in public health, the Ministry will give us every opportunity and encouragement to lend a hand in the work of reconstruction.

Progress in Water Purification.

By SIR A. C. HOUSTON, K.B.E., C.V.O., M.B., D.Sc.

(ABSTRACT.)

THE lecturer first dealt with the sources of water supply and their characteristics, and then proceeded to describe in detail some of the chief circumstances which have modified our ideas as regards water supply. Next he pointed out that remarkable progress has been made in our recognition of the importance of (1) the *disease-carrier*, (2) guarding against *accident*, (3) considering the question of *dose* and its nature in relation to actual infection, (4) *interpreting results* in relation to all the circumstances of the case, (5) discovering *new* or *modified processes of treatment*, and (6) studying *algal and other growths* in water; but by far the most significant sign of the times is the *triumph of expediency over sentimentality* and the *recognition that almost any water can be purified to any standard required*.

The effect of this has been seen in a hundred different ways.

For example, *Aberdeen* recently secured the assent of Parliament to a scheme for purifying the Dee by a system of lime treatment, storage and filtration, thereby saving a capital cost of over £100,000 on alternative proposals.

Sheffield has just received the sanction of Parliament, subject to reasonable restrictions, to a proposal which is unique in the history of waterworks procedure. Briefly, the River Don is to be re-used after purification and back-pumping eleven miles up the river, and the pure moorland water, which used to flow as compensation water down a foul watercourse, is to be used as part of the domestic supply of that city. The saving on an alternative scheme is said to be considerably over £2,000,000.

London has saved over £10,000 a year on coal by gravitating chlorinated river water directly or indirectly on to the filter beds.

Rotherham was permitted to re-utilize, at all events as a war measure, and subject to chlorination methods of treatment, the strongly censured and dis-used Ulley gathering grounds.

Accra (Gold Coast Colony) has at last solved a most perplexing water problem. Here the storage of highly impure swamp water at a temperature of 80° F. led to a serious deterioration, due to excessive development of ob-

noxious growths. By the adoption of the excess lime method all the microbes of epidemic water-borne disease are destroyed and the development of undesirable growths completely restrained.

Our *Armies* all over the world have largely escaped the ravages of cholera, typhoid and other water-borne diseases by bold chlorination methods of water treatment. The saving in life and money thereby effected is beyond calculation.

It would seem as if the death-blow had been given to all unnecessary costly water schemes, but this does not mean that we are necessarily embarking on a voyage of danger or false security.

On the contrary, it is probable that any novel proposals, however attractive economically, will be rejected by Parliament unless it can be shown that they confer *additional* epidemiological safety.

It is dangerous to forecast future probabilities, but, on current indications, chlorination has come to stay. The reasons are not far to seek. Putting on one side sentimental considerations, which influenced the lecturer more seriously in 1905 at Lincoln than in 1919, there are no tangible objections to the use, under scientific supervision, of chlorine compounds for waterworks purposes, beyond questions of taste. The problem of taste is most important as it is indefensible, exceptional cases apart, to provide a water supply which is repugnant to consumers. The solution of the matter is not simple, as in some cases it seems as impossible to provoke a taste as in others it is difficult to evade it.

Apart from taste, the advantages of chlorination are obvious.

It is a very cheap method of treatment, and the bacteriological results are eminently satisfactory.

In view of these circumstances, it may be of interest to describe some of the methods of chlorinating water.

[The lecturer then proceeded to describe, with the aid of slides, the chief methods of chlorinating waters.]

There does not seem to be any appreciable difference between chlorine and bleaching powder solution as regards taste, and in respect to dose the same may be said, provided this is based on the available chlorine in the two substances.

Pressure of time prevented the lecturer from entering into many interesting questions relating to taste, dose and results, but anyone interested in the matter will find them dealt with in his reports on the subject of chlorination.*

* "Studies in Water Supply." (Messrs. Macmillan & Co.)

"Rivers as Sources of Water Supply." (Messrs John Bale, Sons & Danielson, Ltd.)

"Rural Water Supplies and their Purification." (Messrs. John Bale, Sons & Danielson, Ltd.)

Metropolitan Water Board Reports, 11th, 12th and 13th Annual Reports and 12th Research Report. (Messrs. P. S. King & Son, Ltd.)

Perhaps before leaving the subject of sterilization a few words may be said on *super-chlorination* and *de-chlorination*.

In most cases we rely on a dose of chlorine just sufficient to kill the microbes of water-borne disease, with a duration of contact long enough to allow all the active chlorine to be used up before the water reaches the consumer.

In certain cases, however, stronger doses may have to be used, owing, for example, to the contact being unavoidably too short or the water specially dangerous, or, curiously enough, sometimes because complex questions of taste are involved, and then super-chlorination and de-chlorination are most useful methods of treatment. For dechlorination a solution of sodium sulphite, or bisulphite, or of sulphurous acid gas, may be successfully used, and the lecturer's experience has been that if a taste develops, it is with intermediate rather than with large or minute doses of chlorine.

Whatever may be our views as regards the undesirability of choosing a new supply which requires chlorination for its purification, it is highly probable that in certain directions the use of chlorinated waters will be extended. For example :—

(1) In *augmenting existing supplies*. There are many cases where an existing supply is barely sufficient to meet current needs, but in which the immediate requirements hardly merit the carrying through of a costly new scheme of water supply. In many instances the difficulty could be solved by utilizing local sources of supply, which may be impure, but which could be rendered safe by chlorination. Here no questions of taste would be likely to arise, as the mixture of chlorinated (in small amount) and non-chlorinated waters (in large amount) would in all probability be tasteless. Sometimes the same solution of the difficulty could be reached by using existing sources of supply which had been abandoned, owing to pollutions, before the advantages of chlorination had come to be recognized.

(2) In *tidying over emergency periods*. In the case of many works, particularly those which filter river water directly, there are periods when the filtered water results show marked signs of deterioration. This is due usually to a combination of causes, *e.g.*, extreme cold and heavy floods. In very cold weather the consumption of water may rise to an abnormal extent, due to burst pipes, taps left running all night, etc. This leads to greatly increased rates of filtration, and the filtering arrangements may be temporarily disorganised, due to this cause and to the bad effects of frost. If, as well, the water to be filtered is specially impure, it is small wonder that the filtered water results show marked signs of deterioration. Although the results are usually at their worst during the cold winter months of the year, there may also be periods of deterioration in the summer when the consump-

tion of water rises to a material extent as the result of hot weather and drought. Of course, these difficulties may be overcome by greatly increasing the filtration area, but this is a very costly expedient, if normally the results are quite satisfactory with the existing number of filter beds. On the other hand, the temporary chlorination of the supply during periods of stress, either before or after filtration, but preferably the latter, is an economical solution of a difficult problem.

The Co-ordination of Local Health Administration.

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(Abstract.)

A CENTRAL Ministry of Health will do little good unless it is well supported at the periphery. There are in England and Wales 1,840 Local Sanitary Authorities, 62 County Councils, 319 Local Education Authorities, 641 Boards of Guardians, 142 Insurance Committees, 237 Pensions Committees, and many Authorities under the Lunacy and Mental Deficiency Acts. Apart from these, there are many Medical Officers doing local work who are appointed by Central Government Departments, *e.g.*, Certifying Factory Surgeons, Medical Officers under the Aliens Acts, and Medical Officers of the Board of Trade.

Most of the different authorities are entirely independent, and, except as a result of local circumstances, have a different personnel. The areas of the Boards of Guardians and the Local Sanitary Authorities have no relation to each other; some Local Sanitary Authorities have two or three Poor Law areas within their boundaries; some Unions include portions of the areas of 6 or 7 Local Sanitary Authorities.

The County Councils are not Local Sanitary Authorities, yet within recent years increasing amounts of public health work are being done by them, *e.g.*, they administer the Midwives Acts, although large Urban District Councils within the County area may be administering well-conceived schemes for promoting child welfare.

Local Education Authorities are concerned with infectious diseases amongst the scholars, so are Local Sanitary Authorities, and if the School Medical Officer and Medical Officer of Health are different persons, friction may arise.

The School Medical Officer is concerned with the welfare of a child until it leaves school at 14 to 18 years of age, the Certifying Factory Surgeon to