ACUTE FORMALDEHYDE POISONING.

BY

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FORMALIN, a 40 per cent. solution in water of the gas formaldehyde, acts, when taken internally, as an irritant poison, but its toxicity and the symptomatology are still little known. Of the few cases described in the literature, an imbecile, aged 26, died thirty-two hours after swallowing between 1 and 3 oz. (30 to 89 c.cm.) of a 4 per cent. solution of formaldehyde.¹ Gerlach's patient,² a girl, aged 21, survived a dose of 2 to 2½ oz. (60 to 70 c.cm.) of 35 per cent. formaldehyde; and Zorn's case,³ a man of 44 years, about ½ oz. (15 c.cm.) of a 35 to 40 per cent. solution. Klüber⁴ described the symptoms of a man who drank an unknown quantity of formalin and recovered. These last two cases were referred to pretty fully in the BRITISH MEDICAL JOURNAL, 1901, vol. i, EPITOME, Nos. 42 and 300. Levison⁵ had a fatal case of a man, aged 60, who lived only twenty minutes after swallowing an unknown quantity (estimated at 2 to 3 oz.) of commercial formalin.

The case now recorded is as follows:

A married man, a brushmaker, aged 63 years, who had been a heavy drinker for about forty years, was off work and drinking on April 15th and 16th, 1912, and left home about 8 a.m. on April 17th without taking any breakfast. He was seen, about 9.15 a.m., when near a well in a public park, to become rapidly ill. He staggered, doubled up over a low railing, and retched viscid mucoid material. He was put on a seat and grew rapidly unconscious, with body stretched out and head bent back over the seat. It is not certain from the description if this was or was not opisthotonus, a condition induced in animals by injection of formalin. The man was supposed by bystanders to be in a "fit," and was laid out on the grass with collar loosened. He was breathing "heavily," with chest heaving and eyes rolling, and was perspiring moderately. Accounts differ about pallor or flushing of the face. No convulsions or twitchings of muscles were noticed, nor was any attention drawn to coldness of hands and face. After being unconscious for about fifteen minutes he gradually became conscious, and when seen by a policeman at 10 a.m. refused to give his name, saying nothing was the matter with him, and denying having drunk from a bottle seen in his pocket. The policeman, after smelling the contents of the bottle, at first had the impression that he could detect the same odour in the man's breath. The man did not again vomit, but was now suffering very severe abdominal pain, causing him at intervals to double up almost on his hands and knees. There was some froth about his mouth, but no discoloration of the lips or mouth was noted. He staggered along with assistance for about 100 yards, then fell to the ground writhing with pain, and relapsed into unconsciousness, from which he did not again emerge.

At 11 a.m. he was admitted to hospital, unconscious, intensely collapsed and almost pulseless. His skin was pale, cold, and clammy. The mouth was opened with a gag, but showed no discoloration, and did not smell of formalin. All reflexes were absent on admission, except the corneal reflex, which was lost also in a few minutes, and respiration stopped. The stomach was washed out, stimulants given, and artificial respiration applied, but death occurred at 11.53 a.m.

On the man's person were found a written message clearly pointing to suicide, and a 6-oz. bottle containing 3½ oz. (108 c.cm.) of formalin, found by analysis by the iodine method to contain 34 per cent. of formaldehyde as well as a little deposit of paraformaldehyde. This was proved to have been given by the Sanitary Department to the man's wife for disinfecting purposes four years previously. She then used at least half the quantity of formalin missing from the bottle. She has the impression that she used about three-quarters, but is not so certain of this. It is unfortunate that the police authorities did not order a *post-mortem* examination, but the information as above given was collected from reliable witnesses.

There can be no doubt that death was in this case due to swallowing a quantity, not exceeding 1 oz., of commercial formalin. The man, though thin, undersized, and probably of low vitality from alcoholism, was not known by his family or medical attendant to suffer from any organic disease. He had never had any kind of "shock," and there is no history of epilepsy in the family.

In the cases described there seems to have been considerable variation in the symptoms, due probably in part to the dosage. Here the points of interest are the tendency to vertigo, the unconsciousness, and the greater implication of the respiratory than the circulatory system, all

of which occur in most of the cases quoted. The predominance of cerebral symptoms, leading to early death, gave little opportunity for the development of signs of irritation of the kidneys and the alimentary canal, apart from the intense pain in the latter and the initial vomiting. This case confirms the deduction to be drawn from the others that formaldehyde is really a potent poison, probably differing little in degree of toxicity from carbolic acid.

REFERENCES.

¹ Bock, *Indiana Med. Journ.*, 1899, vol. xviii, p. 122. ² Gerlach, *Muench. med. Woch.*, 1902, p. 1503. ³ Zorn, *ibid.*, 1900, p. 1588. ⁴ Klüber, *ibid.*, 1900, vol. xlvii, p. 1416. ⁵ Levison, *Journ. Amer. Med. Assoc.*, Chicago, 1904, xlii, p. 1492.

A SCHEME FOR MEDICAL BENEFIT.*

BY

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BECAUSE we are unanimous in the statement of the conditions we require if we are to work in the Government way, it does not of necessity follow that we think the Government way is the most business-like, efficient, or economical that could be adopted. All we say is that, given the form, we must have certain essential conditions.

The normal form of medical benefit that the framers of the Act undoubtedly contemplate is, of course, contract or club practice. This is the very system that for twenty years and more doctors have been kicking at, and although, granted adequate safeguards and pay, it can be both efficiently and profitably carried out, yet few will be bold enough to say that it constitutes, even under the best auspices, an ideal relation between patient and doctor.

Again, speaking broadly, the Act gives medical benefit to insured persons only, and uninsured women and children have no share. Inasmuch, however, as this measure is "an Act for the prevention and cure of sickness," it is perfectly clear to medical men, and indeed to any one whose mind is informed by biological knowledge, that the best way to attain the object thus indicated in the title of the Act is to make provision first and foremost for the medical care of women and children.

Here, then, are two shortcomings—I should rather say capital errors—of the Act the adoption of contract practice and the exclusion from medical benefit of uninsured women and of children.

The British Medical Association report on club practice a few years ago, and the Majority and Minority Reports of the Poor Law Commissioners all took for granted the inclusion of the dependants, the women and children, in the medical benefits provided by the legislation for which these documents were supposed to pave the way. It is strange that this very proper assumption should have been falsified.

But, it may be asked, very pertinently, suppose women and children are included, how is it possible to provide medical care for all this enormous mass of population? Where is the money to come from? How could it all be done?

Considerations such as these appear to checkmate any attempt at more elaborate and more expensive medical provision. Let us, therefore, survey the board, and see if by some adjustment we cannot achieve victory in the face of defeat.

First, let us consider how doctoring is actually provided for the women and children. They have taken singularly little part in the friendly society movement. Provident dispensaries have certainly made a provision for medical attendance on women and children; but the areas of their success are very local and patchy, and do not extend. Public medical services have made, so far, no very deep or widespread impression on the problem. The National Deposit Friendly Society has the great advantage of offering to any doctor whom the patient may select a payment for work done. Part of the fee is paid from the patient's own deposit and part from the pool to which he

* This paper was prepared for the Section of Medical Sociology of the Annual Meeting at Liverpool, but the author was prevented from reading it by the prolongation of the Representative Meeting, of which he was a member.

also contributes. But when his deposit is exhausted he is out of benefit. So that the scheme is not really an insurance.

All these and many more agencies form a network throughout the country, but a network with such a large mesh that the bulk of the women and children escape it.

There remain the hospitals and private practice.

The hospitals are based on the mediaeval idea of charity—all giving for the sake of the good work, and no payment except voluntary gifts in gratitude, and those to the institutions, not the doctors. The hospitals have fulfilled a function which the world can only wonder at and admire, and I think that the average layman can only faintly understand the self-sacrifice still willingly given—and not all for the sake of advertisement—to these ancient institutions. They are so essential still to the nation that the hand of legislation—though it has to some extent, perhaps, undermined their stability—yet dare not touch their fabric.

But the hospitals do not undertake the work of domiciliary treatment.

Private practice remains. There is no relation between doctor and patient which, on the whole, is so mutually satisfactory as that in private practice. There is complete free choice of doctor, and the power of changing medical adviser is only restrained by good feeling and common-sense. Amongst the less well-off classes the chief difficulties are financial.

Now, having reviewed the board, what move can we make which, by effecting a combination of pieces, will retrieve the position?

I think that the grand aim we should set before us is to preserve the essential features of private practice. I venture to think that the whole profession would be well advised to unite in maintaining that relation, not only in the case of women and children, to which I have just been especially referring, but also in that of men.

I would respectfully invite attention to a simple and easily understood scheme which, to all appearance, combines the apparently conflicting requirements of private practice and insured medical benefit.

First, there should be free choice of doctor from the *Medical Register*, subject to the consent of the doctor in each case. Then, as in the National Deposit Friendly Society, there should be payment for work done, on a standard tariff. Contract terms imply the underwriting of the health of the nation by individuals. Medical attendance on these terms must often be either ruinous or rotten.

In regard to the accounts, forms, similar to the fortnightly returns of Poor Law medical officers, should be used. The squares opposite the names could be filled up in a few minutes from day to day. The letter "H" by the convention adopted, indicates a visit to the patient's house; "S" that the patient was seen at the surgery. The extras would also have to be recorded, and the completed form sent at the end of the fortnight to the proper authority. As every entry on the form would have a fixed value, according to the tariff, no further book-keeping would be required.

The Authority,* who would thus be able to record the sums due to the doctors every fortnight, would pay the accounts quarterly. The labour of sending out bills, the worry and expense which often attends their collection, the collector's salaries or percentages, the court fees, and the bad debts, would thus all become things of the past.

Now as to finance from the insured person's point of view. First, I suggest that the money allocated to him in respect of medical benefit under the Act should be pooled, and the pool held by the Authority as a fund for use, as I shall explain.

* *The Authority*: I mean the Board that manages the business, as distinct from the professional part of the scheme. In the present state of affairs we do not know what this will be, so I use a general term. It may be medical or lay, or a combination. I favour the last, with the lay element predominating—on the analogy of a Hospital Board of Governors. It is not undignified to work with a lay board there; why should it be in a wider or national system? The Insurance Committee—like the County Association in military matters—seems a reasonable authority so far as its general status is concerned; but it should have no more to do with actual medical work and control than the County Association has to do with the officers of the army and the discipline of regiments—that is, *nil*. A business body to manage business matters, and a profession to manage its own professional matters, is the ideal to be kept in mind.

Next I suggest that the insured person himself be liable to the Authority for the cost of the medical benefit he and his dependants receive, up to a maximum limit per annum, and that this limit should be fixed in relation to his average weekly wage. The financial stability of the scheme depends on correctly fixing that proportion. Only experience in working would determine what it should be. Probably it would be best to begin with a rather high figure and give a rebate, if necessary, of 50 per cent., to those who come too near the poverty line. For instance, subject to that concession, it might be well to fix a man's maximum liability for himself and his family at two weeks' wages in any one year. Beyond this the pooled fund would take on the liability.

Let us see how this would work out in a given case. Take the instance of a man supporting a wife and several children, and let us suppose that he is earning £1 a week. Let us assume further that at present he is in a club, for which he pays a sum which works out at 5d. a week, and that for this he gets, amongst other and more costly benefits, the right to the services of the club doctor for his own illnesses. And suppose, further, that he employed the same, or some other, doctor as the private medical attendant of his wife and family. How would his position compare, under the scheme which I have suggested, with his present one?

In the first place he would lose his right to free medical attendance for himself personally, and he and the members of his family would all be on the same footing. But, to set against this loss, he would gain the limitation of his liability in respect of his family. Whereas in a given year his doctor's bill for his wife and family might at present easily rise to such a sum as £5, under the scheme being considered he would at most be liable for £2. However many or long were the illnesses of himself and his family during the year, the cost beyond that figure would fall on the insurance funds. Supposing, further, that an illness were a long and tedious one, for which his power of paying adequately would, under the present régime, be soon exhausted, under the proposed scheme he would know that the doctor, in continuing to attend, was not doing so out of mere charity, but that he was being paid for everything he was doing on a business footing.

Now, how is the Authority to recover this liability? I suggest it should do so by requiring or inviting the insured person, on effecting insurance, to create a reserve or savings bank fund, earmarked for himself alone, and equal in amount to his maximum liability; and that it should retain itself the right to draw on this reserve in case of the insured or his family receiving medical benefit. Thus the payments required under the Insurance Act and those required by this deposit would replace those he made to his club and to his family doctor under former circumstances.

The reserve could be created by paying the sum down, or by a system of deferred pay, which could be worked by the co-operation of large employers of labour in the case of their employees, or by weekly instalments. I suggest such instalments as would complete the deposit of the reserve in one year, that is to say, weekly instalments of one fifty-second part of the total. In view of the security offered by payment in advance, I think you can afford to give a rebate of one-tenth of the total.

Thus, still considering the case of the working man with £1 a week, his liability would be £2, less one-tenth, that is to say, £1 16s. On effecting insurance he would, in addition to 4d. under the Act, have to pay each week towards his deposit one-fifty-second part of £1 16s., that is to say, 8d. roughly, or shilling in all. Therefore we have arrived at this, that instead of 5d. a week to the club and an unlimited family doctor's bill, he would under this scheme pay 1s. a week during the first year. After that year, supposing there had been no illness, he would revert to the 4d. After illness had exhausted the deposit, he would, if and when at work, be obliged to bring the deposit up to its full figure by again paying the full 1s. a week.

Many families show from time to time, for a lustrum or even a decade, a clean bill of health. During such periods the deposit would grow by the interest it produced in the hands of the Authority, and would afford a provision for the illnesses of later years.

Further, I wish here to recall a suggestion made by Mr. Lloyd George, that members of solvent friendly societies

should use certain moneys released from their funds by the operation of the Act, towards providing medical benefit for women and children. The capital value of the amount so released is £5 per head. I would endorse that suggestion, and place the interest of that sum each year, automatically, whether there were illness or not, to the member's deposit account.

The deposit account should be the property of the member, held in trust by the Authority. If unexpended it should be returnable to his family at his death, or to the member himself if he left the country.

The broad principle of this scheme would, I think, result in the best features of private and family medical practice being preserved, whilst the irritating features, so far as they are financial, would be largely avoided. Doctors would be paid on a business footing, yet no patient would be liable for more than a moderate fraction of a week's wages at any one time. Therefore there would be no serious reason or excuse for not coming for medical assistance early in illness. A patient now frequently says, "I did not want to start doctoring because I was afraid of a big bill." That fear would be banished under this scheme. There would be deterrent enough to prevent vexatious claims, time-wasters of doctors, and malingering, that canker of friendly society funds; but it would be light enough to be no bar to early betakement to a doctor by women and children, as well as the employed person of whom the Act makes so much.

Further, the apportionment of payment for attendance on insured persons who constantly change their abode, which constitutes a very serious difficulty under the scheme assumed by the Act—namely, capitation—becomes a perfectly simple matter if each doctor is to be paid just what he does according to the tariff. A gipsy or a canal man will be as easy to provide for as the village blacksmith.

The cost of the greater part of the long and serious illnesses would fall on the insurance funds; that of short and trivial illnesses would be borne by the insured themselves.

Excessive attendance by a doctor would not be encouraged or accepted by the patient. Such, I apprehend, are some of the advantages.

Of course, I assume a £2 wage limit. That is necessary to bring the scheme into accordance with the policy of the British Medical Association; but really I cannot see why, were the whole tariff fixed proportionately, a higher wage limit should present any difficulty.

The difficulties are of diverse character, but I group them together chiefly because it seems possible that the solution of them all is to be sought in the same direction.

Difficulties of the Scheme.

(a) Malingering	} After the deposit has been exhausted.
(b) Excessive attendance	
(c) Excessive demands for attendance	
(d) Provision for consultations.	
(e) Provision for special forms of treatment.	
(f) Inspection, necessary under any insurance scheme.	

I make the following proposal for dealing with all these with the utmost diffidence. It is merely tentative, and does not necessarily bear an integral relation to the foregoing portions of the scheme.

The proposal involves the formation in each insurance area of a district medical staff, to consist of a body of consultants similar to the staff of a large general hospital. It would be, so to speak, "a hospital without walls," its sphere of work the patients who were referred to it by the doctors practising in the insurance area.

A practitioner would request a consultation with a member of the staff because he desired his assistance or advice in a difficult case, or if the patient was malingering.

Again, it might be the patient who desired a second opinion, and the ready means of obtaining a highly skilled and indubitably authoritative one which the district medical staff would supply, would obviate many of those cases in which one doctor is asked to supersede another at the present time on totally inadequate grounds.

Also, if the Authority suspected a doctor of over-attending a patient whose account had come on to the pool it might request a consultation. The illness would in that case be a long one, and the consultation would have a medical, as well as a disciplinary, value. The subject is unpleasant, but it has to be faced, as the advocates

of payment for work done have been taunted with the difficulty it refers to. May I here say, shortly, that the mere fact of the existence of a system of disciplinary consultations would check the need for their use.

I had hoped to bring into this paper some mention of provision for the higher and special departments of medical work; to suggest that, for instance, a skilled ophthalmic surgeon, as a member of the district medical staff, might hold an eye clinic in a convenient centre, such as a market town, once a week—say, on market day; that his clinical assistants should be two or three general practitioners from the neighbourhood, adequately paid for their afternoon's work; that the interest and efficiency which constant association in work with a colleague of undoubted distinction would bring into their professional lives would be reflected in the rest of their practice; that such arrangements might be developed in other departments of medical work; and that the expert work of school clinics would be more economically and better carried out by such arrangements.

But time does not permit. Still, let me say this, that any scheme requires the creation of a vast mass of machinery, both administrative and clinical, and it is surely in the interests of national economy that this machinery should not pick out merely the insured members of households, but that it should include the women and children. Only so can you begin at the beginning to secure the objects avowed in the title of the Act, "the prevention and cure of sickness."

THE REFORM OF HOSPITAL OUT-PATIENT DEPARTMENTS.*

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I HAD the privilege of working some eighteen months ago with a committee appointed by the combined Liverpool and Birkenhead Divisions whose duty it was to draw up a report on the working of the out-patient departments, with special reference to the Liverpool medical charities. It is therefore with pleasure that I incorporate in my paper the conclusions arrived at by that committee.

The Majority Report of the Royal Commission on Poor Law states that: The benefits of the voluntary hospitals are largely taken advantage of by the well-to-do classes (Conclusion 8, Part v, chapter i). The report of the Royal Commission on the Poor Law (Scotland), in reference to the city of Edinburgh, states that the low membership of friendly societies amongst a thrifty people can hardly fail to be connected with the large medical charities in Edinburgh. There is practically no attempt on the part of the inhabitants to provide medical aid for themselves on a provident basis.

These recent investigations clearly indicate that a good deal of abuse must be present, a fact to which every general medical practitioner can testify.

In preparing statistics of the seventeen large voluntary hospitals in Liverpool and Bootle, it was found that in the year 1908 the number of out-patients was over 228,000, and the number of attendances over 700,000. The total estimated population of Liverpool and Bootle was 821,644, so that the proportion of one person in every 3.6 (3½) of the citizens of Liverpool and Bootle sought charitable medical out-relief in 1908, and this was quite exclusive of over 77,000 cases treated under the Poor Law.

Naturally, in the distribution of such an enormous amount of medical charity there is ample room for abuse, and on inquiry as to the measures taken to prevent the abuse it was found that at some hospitals no special precautions were taken at all; at other hospitals it was left to the medical staff; and at other hospitals a clerk, an out-patient Sister, or a dispenser made some inquiries as regards each patient. To any one who has given special attention to the work it means that in Liverpool, I am sorry to say, very little is done to prevent abuse, and in my opinion the only people who think that no abuse, or

* This paper was read in the Section of Medical Sociology of the Annual Meeting at Liverpool, but owing to a misunderstanding was omitted from the report of the proceedings of the Section published in the JOURNAL on August 3rd.