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THE INFLUENCE OF ALCOHOL IN THE SERVICES.

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BEFORE considering the subject of the influence of alcohol in the army, I think it advisable to define the position that I venture to take up as regards the consumption of alcoholic beverages in general; and this entails a reference, however brief, to the physiological aspect of the question.

Alcohol is both a food and a poison; that is to say, it can be oxidized within the body into carbon dioxide and water, so producing heat and energy, and therefore acting as a food; while, if taken in excess, after a preliminary and transient stimulating effect, it soon acts as a powerful depressant, and eventually as a paralyser of the nerve centres.

As to its use as a *food*, there are so many other articles of food of equal, and greater, value as a source of heat, and free from the peculiar characteristics of alcohol, that it cannot be considered either necessary or advisable simply from the dietetic point of view. As an *adjunct to food*, on the other hand, there can be little doubt that it may act beneficially by stimulating the flow of the saliva and gastric juice, in the way of a condiment or appetizer, taken in strict moderation, according to the apostolic injunction; but this applies to the elderly or weakly, or to the sick, not to the healthy nor to the young and vigorous, such as compose the naval and military forces, whose case we are now considering. For the healthy young adult, it must be admitted, or asserted, that alcohol is in no way, and under no circumstances, a necessity; perfect health and vigour of body and mind can be maintained without any indulgence whatever in alcohol in any shape or form.

I.

The question as to whether alcohol is to be regarded as a food in any accurate sense has been much debated in recent years; and as there are differences of opinion, and considerable divergences of statement in the current literature on the subject, the position taken up by the present speaker may be shortly defined.

Liebig had long ago suggested that alcohol is an aliment analogous to sugar, and capable of being similarly burned up in the system, with the production of heat and energy. But many observers, finding that it is excreted in the urine, perspiration, and expired air, came to the opposite conclusion—namely, that it is not utilized in the body, and is therefore in no true sense a food. It was especially Perrin who endeavoured to show (1864) that alcohol does not become oxidized within, but only passes through, the system, "fixing itself momentarily in the nerve centres, which it excites or intoxicates, to be slowly eliminated afterwards by the skin, lungs, and kidneys," either as alcohol, or oxidized only to a very small extent in the state of aldehyde. It was also found, or thought to be found, that under the influence of alcohol the quantity of carbon dioxide expired was diminished, and this appeared to support the opinion that alcohol is not oxidized within the body. Subsequently, however, Anstie, Dupré and others, Parkes and Wollowicz (1870–72), determined that alcohol is excreted unchanged only when it is taken in relatively large quantities; and that when the amount is small, oxidation and utilization do really take place within the body, the alcohol acting as an aliment—not, of course, a tissue-former, but a producer of heat and energy. Owing to the difficulty of making exact quantitative determinations of the substances excreted, very different results have been arrived at by different observers; and it is only within quite recent years that the question can be said to have been definitely settled on physiological evidence; even now there are many authorities who hold a view contrary to that here set forth. Sir Thomas Fraser, of Edinburgh, in 1901 laid down that (1) alcohol is very easily oxidized; (2) after ingestion of alcohol, the output of carbonic acid and the intake of oxygen are increased; (3) only an insignificant amount of alcohol is to be discovered in any of the excretions. Such facts as these show that alcohol is absolutely burned up in the body, and must therefore necessarily generate force and energy; it is, indeed, more readily burned up than either carbohydrates or fat.

The chief experimental grounds on which we may base the opinion that alcohol is really a food are afforded by the researches of Atwater and Benedict, published in 1902. These observers first established a diet for themselves such as would maintain their weight, and the heat they evolved, at a constant level; the experimenters were enclosed for several days in a respiratory calorimeter, the total amount of energy produced by the food consumed

being measured in the form of heat. Then a certain quantity of alcohol (namely, the value of a litre of wine in twenty-four hours) was substituted for an equivalent, or isodynamic, quantity of sugar or starchy material, and the calories (that is, work done or energy produced) again measured. Lastly, a return was made for three or four days to the original diet, without alcohol, and the same observations repeated as a check or control. It was established that the quantities of heat produced were identical (almost to a thousandth part) both when alcohol was taken, and when an isodynamic quantity of sugar or starch was consumed. Subsequently, by means of a motor cycle combined with an ergometer in the calorimeter, the mechanical work of the body was measured and found to yield the same amount of heat, both when alcohol was taken and when it was not. The potential energy of alcohol was transformed into kinetic energy in the body as completely as that of any ordinary nutrient material; except for the energy of the external muscular work, the whole of the food energy, including that of the alcohol, left the body as heat, and must necessarily therefore have been transformed into heat within the body. Only 1.9 per cent. of the alcohol ingested was eliminated by the lungs, skin, and kidneys. The radiation of heat from the body was found to be but very slightly greater with than without alcohol; that is, the gain resulting from the oxidation of the alcohol was not counterbalanced by loss owing to increased radiation from the body surface, as has been taught by some authorities.

This view of the behaviour of alcohol and its metabolism in the body was taken by Professor Cushny, of University College, London, at the meeting of the British Association, Physiological Section, last year (1907). He said: "There can be but one opinion in the minds of those who have studied the subject. Over 95 per cent. of the alcohol ingested undergoes combustion in the tissues, and is utilized by them as a source of energy. As regards its fate in the body, in fact, alcohol is strictly comparable to sugar, which is also an alcohol, though of a more complex nature."[1] Dr. Cushny does not, however, advise that alcohol should be adopted as a substitute for carbohydrates or hydrocarbons in the diet. The healthy stomach needs no stomachic, and the tendency towards the habit of alcohol consumption must be guarded against.

II.

It has already been said that as an article of food alcohol cannot be considered necessary, or even advisable, merely from a dietetic point of view. There are some special conditions that need to be considered in regard to its use, especially from a service standpoint; these are (1) extremes of heat and cold; (2) excessive labour, bodily or mental; and (3) the peculiar fatigues and exposures incident to war.

1. As to great cold, opinion is unanimous amongst the well informed: all alcohol is more or less hurtful; spirits are the worst, but even light wine or beer is not to be recommended. The experience of arctic voyagers and of alpine guides is singularly concordant as to this. Sir John Ross wrote:[2] "The most irresistible proof of the value of abstinence was when we abandoned our ship, and were obliged to leave behind us *all* our wine and spirits. It was remarkable to observe how much stronger and more able the men were to do their work when they had nothing but water to drink." Dr. John Rae maintained that "the greater the cold, the more injurious is the use of alcohol."

As to great heat, the evidence is equally conclusive; the strongest liquors are the most hurtful, greatly predisposing to heat stroke and diseases of the liver. In former years, in India, a very great deal too much alcoholic liquor was consumed. Every soldier had a right to purchase at the canteen 2 drams of spirits, generally rum or arrack, supplied by the Commissariat Department; 2 drams were equal to 8 fl. oz.; many men drew only 1 dram of spirits, that is, 4 oz., and took out the other dram in the shape of a quart of beer. The amount of disease ascribed to intemperance was described by Dr. J. Maclellan (1863) as "something appalling"; one-tenth of all the admissions to hospital for sickness in Bombay were on account of delirium tremens or drunkenness; the numbers admitted for these causes were greater than for any other disease, except fever; and as to deaths, "alcohol destroyed more than either fever, hepatitis or diarrhoea, and nearly as many as cholera."*

2. Exertion of the body is better borne without than with alcohol; this has been proved most conclusively. As a restorative after fatigue, and as a spur to special exertion for a short time, a small quantity of alcohol may be useful, but reaction is sure to follow. A German observer, Schneider, has recently (1907) examined 1,200 mountain climbers, and found that, according to their testimony, as long as continuous efforts and difficulties are to be expected no alcohol should be taken. Only for a special effort of mind or body (as for overcoming a final obstacle) may a dose be admissible. In descending, when all difficulties have been overcome, many mountaineers find a small dose of brandy a restorative.

In mental work it is very doubtful if alcohol is of any service, except in cases of great exhaustion from want of food, when alcohol does revive mental power, probably by increasing the blood supply to the brain.

3. In the exposures and fatigues of war, it has been demonstrated that alcohol is quite unnecessary to enable troops to support them effectively and cheerfully; nor are

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* As a contrast to this the last Army Medical Report may be quoted: The admissions for alcoholism during 1906 in the army in India amounted to 170, or 2.4 per 1,000 of strength; the deaths were 6 in number or 0.09 per 1,000 strength.

they endured any better when alcohol is consumed, but on the contrary, worse. The experiences of the British forces in Egypt in 1800, when a body of troops under Sir David Baird marched across the desert from the Red Sea to the Nile (Kosseir to Keneh); of the Red River expedition in Canada in 1870; of the Ashanti campaign in 1874; and of the Nile expedition in 1885—the three latter under Lord Wolseley—all prove that very great exertion and exposure to extremes of temperature can be better borne without alcohol than with it, and that arduous campaigns can be carried on without the use of alcoholic drinks of any kind. The campaigns quoted include instances of extreme heat (Egypt, 1800 and 1885), extreme cold (Red River), and a most malarious climate (Ashanti, 1874). The bodily exertions undergone by the troops in the Red River and Nile expeditions were undoubtedly extreme. There are circumstances in which a small spirit ration may be of benefit—as towards the end of a long march, when it is an urgent matter to reach camp before dark. The issue of a very small alcohol ration may then enable troops to do in a short time what would otherwise take longer. But the dose must be small, and must be administered very near the termination of the work to be done; otherwise reaction will certainly set in, and no benefit will result.

III.

From the preceding summary there appears to be no doubt whatever that alcohol is unnecessary in any form, or in any quantity, under any circumstances that may occur in military affairs. These observations apply only to the use of alcohol by the ordinary healthy man; the question of its employment in the treatment of the sick is another matter altogether, with which we are not at present concerned.

It may now be considered whether the use of alcoholic beverages by healthy men, which we have seen to be unnecessary, is, under ordinary circumstances, harmful or harmless, and, especially as regards military conditions, whether it is to be encouraged, prohibited, let alone, or regulated.

The most extended series of observations or statistics referring to the comparative healthiness of abstainers and non-abstainers that I am acquainted with is that of the United Kingdom Temperance and General Provident Institution for the sixty years 1841 to 1901. Mr. R. M. Moore, the actuary of this society, read a paper before the Institute of Actuaries in November, 1903, in which he made a detailed statement of the actual death-rate of the Temperance (by which is meant the Total Abstinence) Section of the society as compared with the deaths that had occurred in the Non-abstaining Section.

Taking the experience of mortality—that is, the number of deaths that were found actually to occur in the different quinquennial age periods—as 100 for the Non-abstaining

Section, it was found that, for abstainers, the deaths actually occurring only amounted to the following proportions:

Age Periods.		Relative Mortality of Abstainers.	Age Periods.		Relative Mortality of Abstainers.
20—24	...	69.9	40—44	...	57.2
25—29	...	70.1	45—49	...	58.5
30—34	...	56.5	50—54	...	62.4
35—39	...	54.8	55—59	...	70.6

Not until the quinquennium 75–79 did the actual mortality among abstainers reach that of non-abstainers; it was then 110; the additional deaths that would have taken place between 25 and 75 are postponed, to appear *after* 75 years of age. It is not to be supposed that the non-abstainers were persons who consumed an inordinate quantity of alcohol, and therefore formed an unhealthy body of persons. They were, in fact, just the reverse—temperate and steady living.

These figures were at first much criticized, but they have withstood the criticism. There is no reason whatever to suppose that the non-abstainers were persons who took alcohol to excess, and were therefore unfair and unsatisfactory lives with which to make the comparison. The probabilities are just the reverse. It does therefore seem that the consumption of alcohol, even in moderate quantities (as would be the case with the assurers in this society), tends to diminish the expectation of life, as compared with that expectation which has been found to hold good for total abstainers. The figures are as yet hardly sufficient to make the bad effects of small amounts of alcohol, as compared with total abstinence, so obvious as to convince every one, but they at any rate deserve, and indeed demand, attention.

Meantime, as regards military life in ordinary times of peace, the absolute prohibition of alcoholic drinks altogether is not a practicable procedure. What is to be aimed at, and what may be effected, is a regulation of their consumption, and an encouragement of those men who desire to do without them altogether, or who at any rate wish to partake of them in very moderate amount.

With regard to the ordinary soldier not an abstainer, in the British army, the canteen is provided where, within stated hours, he may obtain his beer, provided he behaves himself properly, and is not under the influence of liquor. The general opinion is that this method of supplying alcoholic drink—granting that it is to be supplied at all—is the best that is practicable; the places are strictly regulated, and completely under control, both as regards the purity and quality of the liquor supplied, and the details of their management.

In the United States army the canteens, which were first officially recognized in 1889, were abolished in 1903 at the instance of the Women's Christian Temperance Association; some effects of this abolition are noted in the *American Journal of the United Service Institution* for 1907 (p. 423):

1. During the ten years previous to 1889 (when canteens were first recognized) the desertions were 116 per 1,000. During the period from 1889 until 1903 (when they were abolished) desertions were 46.2 per 1,000. Since the abolition, desertions have risen to 74.3 per 1,000.

2. Fines imposed by courts-martial have increased 125.2 per cent. since the abolition.

3. Sums deposited by soldiers in savings banks have diminished.

4. Alcoholism and venereal disease have increased, the latter to a very remarkable extent.

5. The number of places where intoxicants are sold within one mile of military posts has greatly increased.

The American *Army and Navy Journal*, November, 1907, in an article deprecating the misguided legislation that prevents the soldier from buying beer and light wine in a canteen within barracks, states that the admission-rate for alcoholism in the United States army for 1906 reached the appalling figure of 30.58 per 1,000. The admission ratio for alcoholism in the British army at home that year was 1.1 per 1,000; for the preceding ten years, it had averaged 2.1 per 1,000. None of the Continental armies show an admission ratio as high as 0.5 per 1,000 for this affection.

The Association of American Military Surgeons, at their meeting in 1905, after categorically stating that the abolition of canteens had caused an increased use of bad liquor, leading to an increase in venereal and other diseases; that a great increase had taken place in the number of saloons and brothels contiguous to barracks; and that no benefit whatever had resulted from the abolition measure, resolved unanimously to request the Secretary for War to bring about the re-establishment of the canteen system.

I am not aware that any one proposes, or intends to propose, abolition of the canteen system in the British army; if there be any such intention, it would be well for everyone concerned to know what has been the result of canteen closure in the army of the United States.

In the French army the sale of spirits in barracks has been forbidden since May, 1900, though wine and beer may be obtained. In consequence, the brandy shops *(débits d'eau de vie)* in the near neighbourhood of barracks have enormously increased; the soldiers spend their time in these places rather than in the regimental canteen. The admissions to hospitals for alcoholism in the French army, however, only amounted to about 0.1 per 1,000 strength during the period 1890-1903; having diminished since 1873-1888, when the rate was 0.33 per 1,000.

Two alterations have within quite recent years been brought about in the British army, which, though not tending towards total abstinence, are in my opinion calculated to lead to moderation in beer-drinking. The first is, the provision of beer and of mineral waters, to be consumed at the time of the men's dinners. According to the ordinary custom, when the canteen opens at noon, most

men (not abstainers) who are not on duty, or at any rate a great many of them, make their way there and spend their time before dinner in drinking; if this is not actually to excess, it is at any rate very generally more than is good for their stomachs. But until recently they were unable to get any beverage of any kind (except perhaps water) with their midday meal; so that some liquid to quench thirst was almost necessary beforehand. Now, however, it is the custom in many regiments for beer (up to 1 pint) and mineral waters to be taken round when the men are at dinner in their dining rooms, and consequently the before-dinner drinking in the canteen is in many cases lessened. This is better for the men's digestions, and for their pockets and general bodily health. It is many years since I urged that this should be done in India. I was always told that it was impracticable, owing to the difficulty in keeping the accounts. This, however, has in many regiments been overcome, with much addition to the comfort and, as I believe, health of the soldier; it is the canteen that suffers.

The other recent measure that has been introduced is the provision of beer in recreation rooms, as well as in the canteen. The objection has been made to this innovation that it puts temptation in a man's way; whereas formerly he had to take the trouble to go to the canteen to get drink. It appears to me to cut both ways. The moderate man who only wishes for one pint of beer, or even one glass, can now satisfy this moderate appetite without being exposed to the temptation of the canteen, and being there led on to drink more than he intends, or desires. My own opinion is that this new fashion will tend to lessen consumption of alcoholic liquor on the whole, and will therefore be beneficial.

Holding, as I do, the opinion, or rather the conviction, that consumption of alcoholic liquor is not in itself either (1) absolutely wrong morally, or (2) absolutely harmful physically, I consider that it is more important and desirable to moderate the quantity consumed, and to take away opportunities for excess than to enforce total abstinence. Moreover, in practice, regulation and restriction can be carried out; total prohibition cannot.

My view is that temptations to excess should be removed. This, I think, can be better attained by allowing a moderate consumption at meal times, and in recreation rooms, and by discouraging in every practicable way the terrible soaking in the canteen that has hitherto been, in so many instances, the only relaxation or recreation the private soldier cared to indulge in. Along with this encouragement to temperance and discouragement of excess there should also be every encouragement to total abstainers, among whom are to be numbered some of the finest soldiers of the British army.

The Royal Army Temperance Association now numbers 20,869 members in the United Kingdom and colonies, more than 18,000 of whom are total abstainers. In India there are more than 28,000 members. Altogether, therefore,

the temperance men in the British army number nearly 50,000. As to the enthusiasm of this body of men there can be no doubt. It is, in my opinion, by encouragement given to this movement of total abstinence, and of temperance or moderation in the use of alcoholic beverages, rather than by harsh measures, such as the abolition of canteens in the United States army, that the most steady and enduring progress towards increased health and efficiency of body and mind will be attained. Lord Roberts has said that there are so many difficulties and temptations connected with the provision and management of liquor for soldiers, that he would like to see every man in the army a total abstainer. This, however, he admits, is not possible. Moreover, the man who has sufficient control over himself to take what is allowable and no more is, in his opinion, a finer character than he who takes the pledge because he cannot trust himself to touch stimulants without taking more than is good for him. The strengthening of mental and moral fibre and the building up of character are of even greater importance than the preservation of bodily health and fitness. Drunkenness is a terrible evil. Excessive drinking, far short of drunkenness, is harmful in every way. It is possible, though I do not think it has yet been actually proved, that even moderate alcoholic drinking is harmful to health; but when a great statesman and divine said, "I would rather see England free than sober," he well knew that freedom of the mind, the capacity to govern oneself. self-control—not the absence or removal of all temptation—is the real, the highest form of temperance; and that in regard to alcohol, more than anything else, is this self control as difficult as it is necessary.

My belief is that great progress in the direction of moderation and true temperance is taking place; this is evident from the large number of men that now belong to the Royal Army Temperance Association. As regards India, Lord Kitchener, speaking at Simla in July, 1907, said that, in 1901, Sir Power Palmer, the then Commander-in-Chief, had stated that the average consumption of beer by non-abstaining soldiers was just under two quarts per man per day; while at that date (1907) the amount was about two pints per day per man. In 1901 the number of courts-martial for offences that might be attributed to drunkenness or excessive drinking was 545; in 1906 the number was 257; this was in an army of 72,000 men.

With facts such as these before us we may be encouraged in the belief that the consumption of alcohol in our army is steadily diminishing, to the benefit of the individual soldier, and to the increased efficiency of the army as a whole.

REFERENCES.

[1] *Science Progress*, April, 1908. [2] *Voyage to the Arctic Regions*, 1829-33