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PHYSIOLOGICAL ERRORS

OF

MODERATION.

BY

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1855

THE

PHYSIOLOGICAL ERRORS

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MODERATION.

WILLIAM H. CARRINGTON, M.D., F.R.C.P., F.R.S.

LECTURE IN PHYSIOLOGY IN THE UNIVERSITY OF LONDON, AND IN THE UNIVERSITY OF CAMBRIDGE.

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THE

PHYSIOLOGICAL ERRORS OF MODERATION.

"WAITER," said one of a party of travellers that was stopping, in the old days of stage-coaching, to dine at the half-way hotel, "bring me a glass of brandy-and-water, because it's hot." "Waiter," cried another, "bring me a glass of brandy-and-water, because it's cold." "Waiter," said a third, in the hearing of both, "bring me a glass of brandy-and-water, because I like it."

If this little story had not been so old and well known, one might have almost imagined that it had been invented for the very purpose of typifying the present aspect of the question we are about to discuss; namely, whether the "moderate" use of Alcoholic liquors is *beneficial* or is *injurious* to the human system, or may be considered as a matter of such *indifference* that it may be fairly left to the decision of individual taste. For, just as the first two of our travellers thought it necessary to assign some ground for their self-indulgence, so have the advocates of "Moderation" been driven, by the cogency of the *moral* arguments for "Total Abstinence," to show that their habit is *physiologically good* for them; and in attempting to do this, and to rebut the arguments of the Total Abstiners, the Moderationists have often advanced reasons as inconsistent with each other, as were those given by the gentlemen in question; nay more, they have not unfrequently contradicted themselves. We feel sure, however, that at least nine hundred and ninety-nine out of every thousand of those who take their daily draught of ale, or their glass or two of wine, or their tumbler-full of whisky-toddy, would be found—if, like our third traveller, they were honest enough to confess the truth—to do so "because they *like* it;" and it would be much more to their credit, if they would put the matter on this downright footing. The author of a recent defence of "Moderation,"*

* "The Physiological Errors of Teetotalism," in the "Westminster Review," July, 1855.

indeed, candidly confesses that he was at first "almost persuaded," by the cogency of the physiological arguments on the other side, to become a Teetotaler; although further reflection enabled him (as he thinks) to detect their fallacy. Would he have taken this trouble, if he had not felt an unwillingness to give up his daily indulgence? Was not his *liking* for the practice, the secret of his endeavour to find a rational basis for it? And is not he the type of a vast number, who pertinaciously cling to a favourite habit, because they are *unwilling to be convinced* that it would be much better for them to relinquish it?

As the writer just referred-to has marshalled, with very able generalship, all the arguments that he thinks can be adduced on the side of Moderation, and as his vindication has been lauded as triumphant by those whose cause he espouses, we shall treat him as the scientific champion of his party, and shall contest with him all the more important positions he has taken up,—leaving out of the discussion, for the sake of conciseness, only those minor points which he must abandon if we get possession of his strongholds, even as the Russians evacuated their whole line of defence at Sebastopol, so soon as the Malakhoff was taken. Our task is singularly facilitated by certain admissions which he has made, apparently in ignorance how pointedly they may be made to tell against himself. And we shall be disappointed if we do not prove to the satisfaction of every *unprejudiced* reader, not only that "Moderation" cannot be fairly put on a Physiological basis, but that all sound Physiology inculcates the habit of "Abstinence."

The first question on which we join issue with the Moderationist champion, is that of the nutritive value of Alcohol; which is asserted not to be the *poison* that the Temperance advocates affirm it to be, but to have a legitimate title to rank as an article of *food*, and, as food, to be a source of animal force. Now the Physiologist may, without the least inconsistency, admit Alcohol to be a food in the wide sense of the term, seeing that it is undoubtedly capable of being applied to the maintenance of some of those operations within the body, for which food is required; whilst at the same time he affirms that it has injurious properties, which prevent it from being (under ordinary circumstances) a *wholesome* food, and which even give it a poisonous action on the system, that is fatal when sufficiently intensified. On this question of mere terms, certain writers have expended a great deal of ink, very unprofitably; since the discussion, so far from being really advanced thereby, is made to turn upon *words*, rather than upon *facts*. It has been urged by some, whom we must call the ultra-Teetotalers, that since Alcohol is a *poison*, it cannot, under *any* circumstances or in *any* doses, be beneficial to the human system; the fact being altogether lost sight of, that all our most powerful *medicines* are active poisons, and derive their potency

from those very alterations in the vital processes, which, when carried too far, become fatal. On the other hand, it is affirmed, no less incorrectly, by those who find reason to regard Alcohol as *food*, that, if its claim to this designation can be established, it cannot be regarded as in any sense a poison; and that, used like any other food "in moderation," it is a fitting sustenance to the body, with which no one has any fair ground to quarrel.

The Westminster Reviewer has charged Dr Carpenter with inconsistency, because he has in one place ranked Alcohol with the oleaginous and saccharine constituents of food, as a combusive material, whilst he has elsewhere maintained that it is *essentially* a poison. Yet the Reviewer himself, whilst asserting that Alcohol is *essentially* a food, and that it cannot therefore be a poison, admits (p. 113) that "if Alcohol were *continually* present in the circulating current, the effect would be fatal." Now we should like to know first, what article of *food* there is, whose continual presence in the blood would be fatal; and second, what better definition of a *poison* can be given, than that which the Westminster Reviewer has thus (in a remarkable fit of candour) admitted to be true of his favourite food.

It would be well if the old proverb, "What is one man's meat is another man's poison," were kept more constantly in mind; since, where it is impossible to frame rigorous definitions in which all will agree, it is far better to abstain from quibbling about *words*, and to lay the burthen of the case upon *facts* alone. Define these two classes how we may, there are not a few substances which might claim admission into either. Thus, while most persons enjoy crabs, lobsters, and oysters, in their proper season, as wholesome delicacies, there are some who can never eat of them, even in very small quantity, without a serious attack of indigestion, followed by an eruption of nettle-rash; the appearance of which indicates that their presence has not merely occasioned a disturbance in the alimentary canal, but that it has imparted some poisonous contamination to the blood. Not only the nutritious mushroom, but even the fragrant strawberry, eminently wholesome and refreshing as the latter is to mankind in general, produces the like effect on particular individuals. And men there have been, who could not even eat mutton without a similar disorder.—Again, the food which is most wholesome and sustaining in one climate, may be so unsuited to another, as to become, if habitually used there, the source of serious disease. If any man were foolish enough to try the Arctic regimen of six or eight pounds of fat meat daily, in Calcutta or on the Guinea coast, he would ere long pay the penalty in dangerous visceral congestions or liver-disease, even if he did not earlier fall a victim to fever or acute inflammation; whilst the attempt to sustain life, at a temperature of 50° below zero, on the diet most suited to

tropical regions, would be attended with a very rapid reduction of vital power.

The real question at issue, then, is, whether Alcohol, in any of its forms, is a *wholesome article of habitual diet*—that is, whether it does *good* to the body without doing *harm*; whether the good so outweighs the harm, that *advantage* is gained on the whole by its use; or whether *the reverse* is the fact. The advocates of “Moderation” cannot have any fair objection to discuss the question in this form. It excludes all profitless disputes about terms and definitions, and leaves it to the Physiologist to discuss simply the question of fact—what is good, and what is harm.

Now the main argument on which the upholders of “Moderation” rely, as proving the title of Alcohol to be regarded as *useful food*, is its capacity to sustain the *Heat* of the body, by that combusive process to which the function of Respiration is subservient. In this process, as they correctly state, five times the quantity of food is consumed daily, that is required for the maintenance of the tissues; and hence the *respiratory* fuel is just as much entitled to be regarded as food, as is the *plastic* or organizable material which is employed in repairing the “waste” of the body itself. We fully accept this statement; but in judging of what is *the* fuel most appropriate to our use, we prefer to take *Nature* as our guide; more especially as her indications have acquired, from recent discoveries, a singular definiteness and precision. For just as the researches of the Dutch chemist Mulder, ten or fifteen years ago, showed that all the “proximate principles” which afford *plastic* food, possess precisely the same composition, whether derived from the Animal or from the Vegetable kingdom, (thus removing all the mystery which previously attached to the fact, that the blood and the tissues of herbivorous animals are made up of exactly the same materials as those of carnivorous,) so have the recent researches of a distinguished French Physiologist, M. Bernard, proved that the *respiratory pabulum* by whose combustion the animal heat is sustained, is the same in the carnivorous, as it is in the herbivorous animal, being a peculiar *fat* and a peculiar *sugar*, the preparation of which is one of the most important functions of the Liver.

What proof can be more satisfactory, that the combusive materials intended by Nature for the supply of animal heat, are *sugar* and *fat*? The former (its chemical composition being water *plus* carbon) is the less powerful of the two as a heat-producing fuel; the latter (containing but a small proportion of oxygen, and being almost entirely composed of hydro-carbon) is far more efficient as a generator of warmth. It is stated by Liebig, that the heating power of fat is to that of starch or sugar as about $2\frac{1}{2}$

to 1 ; so that 100 parts of fat would answer the same purpose in maintaining the heat of the body, as 240 parts of starch or 249 of sugar. We find, accordingly, not only that the aliment most copiously provided for Man (who is almost the only species of animal that can support itself in the extremes of climate) is most suited in each case to his wants, but that his appetite spontaneously leads him to these sources of supply. The Hudson's Bay trader, like the native Esquimaux, has recourse to masses of fat, supplied by the animals on which he feeds, such as a European would loathe ; and turns from the wheaten loaf, as by itself not sufficiently sustaining, to the maize-bread which contains a large proportion of oleaginous matter. The Hindoo, in common with most races naturally inhabiting tropical climates, makes farinaceous substances the staple of his diet ; and the European resident in India, though unwilling to give up the rich dishes to which he has been accustomed at home, finds his greatest safety in the most sparing use of them.

Now what, considered merely in its Chemical relations, is the heating power of Alcohol ? According to the estimate of Liebig, "proof" spirit containing 50 per cent. of absolute alcohol (which is the strength of ordinary brandy, rum, gin, or whisky) is even *a weaker fuel than starch or sugar* ; for 266 parts by weight are required to generate the same amount of heat as 240 of starch or 249 of sugar would serve to produce, whilst it is *inferior to fat in the proportion of 1 to 2 $\frac{2}{3}$* ; since the burning of 266 parts of spirit will only generate as much heat as that of 100 parts of oil.

The case, then, stands thus :—The ordinary food of Man contains either *Sugar*, or starchy substances capable of being converted into sugar. That this sugar is the *most natural* fuel for the heat-producing process in temperate climates, is shown by the special arrangement made for its preparation within the body, out of other materials, when the food does not contain it. In substituting Alcohol—a product of the *artificial decomposition* of sugar, which cannot be converted back to sugar, either out of the living body, or by any chemical process whatever—we introduce a substance *foreign* to the system, which is never generated within it, which (as will be shown hereafter) it *repudiates* by its most expressive actions, and which, even in the form of raw spirit (and no one would think of drinking it stronger), is *absolutely inferior* to sugar as a heat-producing material. It may be very true, as Liebig reports, that the teetotal members of the Peace Congress at Frankfort ate an unusual quantity of farinaceous puddings ; and that the servants in families in which the allowance of beer has been commuted for wages, consume so much more bread as to make the masters pay twice over. But it does not hence follow that Alcohol replaces pudding or bread, and may be advantageously used as their substitute. For it is well known that *bad air* pro-

duces exactly the same lowering of the appetite; and no one would rank *this* as food. But even if it be admitted that Alcohol can take the place of farinaceous food, *what is got*, even Chemically, by the substitution? This the Moderationists do not attempt to explain. We shall by and by show that *much is lost*, Physiologically, by the disturbance of other functions; and that the effect of Alcoholic drinks is essentially the same as that of bad air.

But further, the food which Nature provides for Man in climates where the demand for the production of heat within his body is the greatest, and where sugar is too weak a fuel, contains a large proportion of *Fat*, whose heat-producing power is $2\frac{1}{2}$ times greater. Now, what is here gained by the substitution of Alcohol? Let even the Chemist answer:—The *gain of a loss*, in the proportion of 266 to 100. As Physiologists, who look at the effects of the use of Alcohol as a fuel on the system generally, we shall have other disadvantages to point out presently.

Now, what has *experience*—the grand test of all theory—to say on this matter? Take that strongest of all possible cases, the experience of Europeans who pass winter after winter in Arctic climates, where the thermometer ranges from 40° to 60° *below zero*, without any of that hereditary aptitude or constitutional fitness to sustain cold, which the native Esquimaux or Greenlander might be supposed to possess. If Alcohol be the advantageous fuel for the Human body which its advocates assert it to be, how is it that a very large and extended experience has shown, that it cannot be compared in *sustaining* power with an adequate supply of oleaginous food?

Even the Westminster Reviewer admits the cogency of the evidence adduced from unquestionable sources, “that Alcohol is not in the long run so good a producer of heat as food is.” Of this evidence, we may give the following samples. Sir John Richardson, the companion of Franklin in his earliest Arctic expedition, wrote to Dr Carpenter as follows, a short time before he started (in 1848) on the search for his old comrade:—

“I am quite satisfied that spirituous liquors, though they give a temporary stimulus, diminish the power of resisting cold. Plenty of food, and sound digestion, are the best sources of heat; and a Canadian, with seven or eight pounds of good beef or venison in his stomach, will resist the greatest degree of natural cold, in the open air, and thinly clad, if there be not a strong wind. We found on our northern journey, that *tea was much more refreshing than wine or spirits*, which we soon ceased to care for, while the craving for the tea increased. Liebig, I believe, considers that spirits are necessary to northern nations, to diminish the waste of the solids of the body, and that tea is less useful; but *my experience leads me to a contrary conclusion*. The Hudson’s Bay Company have for many years entirely excluded spirits from the fur

countries to the north, over which they have exclusive control, to the great improvement of the health and morals of their Canadian servants, and of the Indian tribes." On Sir J. R.'s return from his second expedition, which was conducted (by his desire) entirely on the abstinent system, he assured Dr Carpenter that the whole party had sustained the full severity of an Arctic winter, in a manner in which he was confident (from his former experience) that they could not have borne it, if even a moderate allowance of spirits had been consumed.—Dr Kane, who has just returned from the American searching expedition, after experiencing a cold of 70° below zero,—the lowest ever observed,—speaks no less decidedly of the advantage of the abstinent system. Dr C. has also received most explicit testimony to the same effect from Dr King, who was the medical officer to Sir G. Back's overland journey in search of Sir John Ross; and from Mr Donnet, the surgeon to Captain Austin's expedition in search of Sir John Franklin. Captain Kennedy, who commanded the expedition fitted out by Lady Franklin herself, attributes the health of his crew to "the strictly teetotal principle on which the expedition was carried out." And Mr R. A. Goodsir, who went as surgeon to a whaling ship engaged in the same search, after speaking of tea and coffee as "the whaling sailor's greatest luxury and comfort," continues—"he has no objection to his grog; but I think he has, long ere this, found out that strong hot tea or coffee, particularly the former, is by far the best beverage he can take in these climates."—Among the 700 or more American ships engaged in the whale-fishery, the Abstinence principle has been almost universally adopted, from a general conviction of its practical superiority.—The following statement was made to Dr Carpenter, not many years since, by a witness who certainly could not be considered as having any personal predilection for the Abstinence system. He was an intelligent man, of above seventy years of age, who had spent more than fifty winters as a fowler (a pursuit which, as is well known, is more successful in proportion to the severity of the weather, a larger number of birds being driven to the south, the more intense the cold of winter). This man had frequently been out for a fortnight at a time, without lying down, save in his boat, and scarcely ever obtaining warmth from a fire; and, notwithstanding this severe exposure, he was remarkably hale and vigorous for his years. Being himself the proprietor of a public-house, he could not be supposed to have any indisposition to the use of fermented liquors, in which he indulged in moderation; but his very explicit testimony was, that although the use of ale or brandy might seem beneficial in causing the cold to be less felt at first, so that when out for a day or two he did not think it necessary to abstain, the case was quite reversed when the duration of the exposure was prolonged, the cold being then more severely felt the larger the propor-

tion of fermented liquors taken. And he further stated, that all the fowlers who had been accustomed to employ brandy with any freedom, when out on prolonged expeditions, had died early.

We assert, then,—and challenge the Moderationists to prove the contrary,—that Alcoholic liquors are proved both by Science and Experience, to be *decidedly inferior* to the materials furnished by ordinary food for the sustenance of the heat of the body; and we base our assertion on the following *facts*, which are established beyond controversy:—1st, That the fuel provided by Nature, being invariably generated for this purpose in the body of Man and animals, whatever the nature of the food may be, consists of *sugar* and *fat*; the first of which is the weaker, the latter the stronger fuel;—2nd, That the Alcoholic fuel which the Moderationists would substitute, is *inferior*, even chemically, to sugar, and *very greatly inferior* to fat;—3rd, That the greater the demand for the production of heat in the body of Man, the greater is the demand of his appetite for an abundance of *fat* in his food; and that if this be adequately supplied, the most intense cold may be borne without any reduction of the heat of the body;—and 4th, That in proportion to the demand for *sustained* calorific power, occasioned by the intensity of the cold and the prolongation of exposure to it, does the *inferiority of alcoholic drinks* as heat-producing materials come to be felt more and more decidedly, and their positive *disservice* to be experienced.

But, it is affirmed,* “Food, of whatever kind, is *ultimately* translated into *Force*; whether it pass through the intermediate stage of tissue, or through that of fuel for the respiratory process, its final stage is motive power. Force is the end and aim of Food. The exertion of Force wastes the material fabric; with every thought we think, with every muscle we move, a particle of our fabric is consumed,” “or,” the Reviewer goes on to say, “a particle of our fuel is burned.” This last assertion he slides in very quietly, as if it followed naturally upon the preceding; but it is utterly opposed, as we shall show, to the best-approved truths of Physiology.

The Reviewer seems to have some strange confusion in his head, between a Human body and a Steam-engine. It is quite true that the heat applied to the conversion of water into elastic vapour, is thereby translated into mechanical force; and the steam-engine is a machine constructed to effect this translation in the most advantageous manner. But there is no boiling of water or of any other liquid in the living body; neither does its mechanism bear the remotest resemblance to that of a steam-engine. Again, in a steam-engine, every increase of heat applied, developes an

* Westminster Review, p. 103.

increased mechanical force; but in the living body, an increase of temperature above its normal standard, is well known to produce a positively-weakening effect; and we have, in the Perspiratory apparatus, as careful a provision for keeping *down* the temperature to that standard, as we have in the Respiratory apparatus for keeping it *up*. What Heat really does in the Animal body, is to sustain the *nutritive activity*; being *translated* into that *organizing force*, which is exerted in converting organizable or plastic material (p. 6) into living tissue.

Now it is by the precisely-converse process, that *Animal Force* is generated. What says Professor Liebig, whose views on this subject have been, we believe, universally accepted amongst well-informed Physiologists?—"All experience proves that there is in the organism *only one* source of Mechanical power; and this is the conversion of *living tissue* into lifeless amorphous compounds." The same is true of Nerve-force also, which no mechanism can imitate. It is only, then, by supplying *plastic material* for the production of the Nervo-muscular tissues, whose conversion back to the state of dead matter is the immediate source of animal force, and by supplying fuel to keep the heat of the body up to the standard best fitted for its organization, that Food can be translated into Force. Heat cannot be directly translated, in the living body, into Animal Force, any more than non-azotized food can be made into the tissues, whose disintegration is the only source of that force. Alcohol has been shown to be a *less* advantageous fuel than starch, sugar, or fat; and even were it *more*, it could not generate animal force; for heating the body does not make it grow muscular, however plentiful may be the supply of plastic food.

So far Science teaches: what does Experience show? Let an animal be fed with any amount, and on any kind, of combustive material, but let plastic food be withheld, and he will gradually lose force and pine away. He will live longer than if he got no food at all, only because his heat will be sustained; for an animal which is completely starved, dies (as M. Chossât's experiments proved) not of exhaustion but of cold; its temperature falling to that of the atmosphere around, so soon as the store of combustive material which its body may contain shall have been expended.

What, on the other hand, does all experience show to be the conditions best adapted for developing the *highest amount* of bodily force? The answer is, as every "trainer" knows, 1st, vigorous exercise; which, whilst occasioning a destruction of nervo-muscular tissue, promotes an increased determination of blood towards that apparatus, and healthfully excites its nutritive activity; 2nd, a sufficient, but not excessive, supply of plastic food; 3rd, intervals of repose, sufficient to enable this food to be appropriated to the reparation of the tissues; and, 4th, an active state of the exere-

tory operations, by which the "waste" of the tissues may be carried off. Generally speaking, the increased activity of the respiration which is promoted by exercise, is of itself sufficient for this last purpose; but many "trainers" think it well to give an occasional dose of purgative medicine, the operation of which is obviously depurative.—Now what is the value of Alcoholic liquors under such circumstances? If, as the Moderationists affirm, they impart *force*, surely the man who is in training for a boat-race, a running-match, or a pugilistic encounter, should find his account in a very free use of them. So far is this from being the case, that many of the most experienced "trainers" *strictly prohibit* them to those who place themselves under their direction; and those who do allow them, require them to be taken in such *small quantity* and in such a *dilute form*, that the only result which can be fairly attributed to them, is, that by stimulating the digestive process to unusual activity, they enable more food to be prepared for assimilation in a given time, so as to meet the *extraordinary* demand.

But, it may be urged, the condition of "training" is an exceptional one; familiar every-day experience conclusively proves that Alcohol *does* impart force. The weary pedestrian finds his failing strength renewed by a draught of ale; to the medical man, fatigued with long and anxious night-watching, a glass or two of wine seems to exert a wonderfully restorative power; the sailor, who is called upon to make an intense effort to escape from some impending danger, can do, under the stimulus of a dram, what he would otherwise fail to effect. We grant the facts; but we affirm that, in all these cases, Alcohol does not *give* force, but only, by exciting the nervous system to unwonted activity, enables it to call forth more muscular power than it could otherwise evoke; and *that power is generated at the expense of an increased "waste" of nervo-muscular tissue*. The proof of this is twofold: first, the extreme depression and sense of fatigue which are experienced after any such efforts; and, second, the impossibility of keeping up the extra-exertion for any length of time, whatever be the amount of Alcohol introduced into the system. On this latter point, all the testimony yet published, in regard to the comparative results of the "abstinent" and the "moderate" systems, when severe *muscular exertion* has to be maintained for any length of time, is in favour of the former; and the cogency of this proof, as of that which relates to the power of sustaining cold, is admitted by the Westminster Reviewer. Of this evidence, we shall cite the following case as a sample, since it is perhaps one of the most unexceptionable ever published, as giving the comparative experience of the *very same body of men under the two systems of Moderation and Total Abstinence*. The witness was beyond the suspicion of prejudice, and the statement

was made to Dr Carpenter, some years before he had himself given his adhesion to the Total Abstinence creed:—A gentleman with whom Dr C. was then intimate, and who, though moderate in his own habits, was by no means a disciple of the Total Abstinence system, informed him that he had once had the command of a merchant vessel from New South Wales to England, which had sprung so bad a leak soon after passing the Cape of Good Hope, as to require the continued labour, not merely of the crew but of the officers and passengers, to keep her afloat by the use of the pumps during the remainder of her voyage, a period of nearly three months. At first, the men were greatly fatigued at the termination of their “spell” at the pumps; and after drinking their allowance of grog would “turn in” without taking a proper supply of nourishment. The consequence was, that their vigour was decidedly diminishing, and their feeling of fatigue of course increasing, as our physiological knowledge would lead us to expect. By the commander’s direction, coffee and cocoa were substituted for the grog; a hot “mess” of these beverages being provided, with the biscuit and meat, at the conclusion of every watch. The consequence was, that the men felt inclined for a good meal of the latter, their vigour returned, their fatigue diminished, and after twelve weeks of incessant and severe labour (with no interval longer than four hours) the ship was brought into port with all on board of her in as good condition as they had ever been in their lives.

In regard to the sustenance of that *mental* power, whose exercise depends upon the maintenance of the nervous system in good working order, a large body of evidence exists to the same effect. But as the general principle is the same in this case as in the preceding, we shall content ourselves with the following testimony given by Sir B. Brodie (in his *Psychological Inquiries*, p. 141) as the result of his long-continued and extensive observation:—

“Alcohol removes the uneasy feeling, and the inability of exertion, which the want of sleep occasions. But *such relief is only temporary. Stimulants do not create nervous power; they merely enable you, as it were, to use up that which is left, and then they leave you more in need of rest than you were before.*”

In the very cases, then, in which, if useful at all (according to the doctrines of the Moderationists), Alcohol should be pre-eminently useful, not only does its valuelessness become apparent, but its injurious results are most strongly brought out. The Arctic traveller, even when insufficiently supplied with food,—according to the dear-bought experience of Sir John Richardson (than whom what witness could be more trustworthy?)—suffers more severely from constant exposure to intense cold, if he have recourse to Alcoholic potations, than if he place his reliance upon hot tea or coffee. And the man who is going through the most

laborious exertion, finds that, if that exertion, instead of being a mere temporary effort, has to be sustained for any length of time, the use of Alcoholic liquors, so far from yielding an augmentation of force, most seriously impairs his vigour. We limit ourselves to these two cases, because they afford the best possible means of bringing the Total Abstinence and the Moderation doctrines to the test of experience, and because even the Westminster Reviewer has been forced by the weight of evidence to concede the fundamental facts on which we base our deductions. What sort of victory can he claim for "Moderation," when it is accompanied with such a concession as the following? "Dr Carpenter is more cogent when he points out, that *Alcohol is not in the long run so good a producer of Heat and Power as Food. The sections of his work in which he examines the comparative merits of food and alcohol, in enabling men to sustain the extreme of cold or the demands of labour, are so rich in facts, and so important in conclusions, that it is with regret that we see them hampered by teetotal prejudices and vitiated by teetotal logic.*" Why, Dr Carpenter's argument is nothing more or less than this:—that if, when there is *most* demand for animal heat, and *most* demand for muscular power, Alcohol is found to be worse than useless, it cannot be either the advantageous fuel, or the producer of force, that its advocates assert it to be; and, therefore, when there is but a *moderate* demand for heat, and a *moderate* demand for muscular power, its "Moderate" use cannot be justified on either of these grounds. Where is either the unsound "teetotal logic," or the "teetotal prejudice," in this conclusion?

Having thus shown that *no real advantage* can be gained, in the long run, either as regards Calorific power or Nervo-muscular force, by the "moderate" use of Alcoholic liquors (we are speaking, of course, as regards persons *in ordinary health*, whose digestive and assimilative powers are adequate, *when they get fair play*, to prepare as much nutriment as their bodies need), we now come to the other side of the question, and grapple with the two assertions of the Westminster Reviewer, that Alcohol, being a food, cannot be a poison, and that the Teetotalers have no right to argue from the admitted effects of *excess*, against its "moderate" use.

The Moderationists seem to think that it is peculiar to Teetotalers to rank Alcohol as a poison; being apparently quite in ignorance that every reputable authority on Toxicology considers it to be such. Orfila and Devergie, Christison and Taylor, whose treatises on Poisons are appealed-to as standard authorities in every court of justice in the civilized world, are all of one mind with us on this point; the Westminster Reviewer, as the champion of the Moderationists, puts *them* in the wrong,—his line of

argument being, that *anything*, even the most wholesome article of our ordinary diet, is a poison, if made too free with. Thus he has the hardihood to assert that "mutton-chops taken in excess kill with the certainty of arsenic." We should like to be referred to any recorded case of this kind. Doubtless, a man *might* so gorge himself as to be unable to breathe, from the mere mechanical oppression; and many a one has been suffocated by the obstruction produced by a single morsel of food "going the wrong way." But the Reviewer would not, we presume, any more than ourselves, call this *poisoning*. Let us recommend him to try the following experiment:—Keep three dogs without food for a couple of days; then fill the stomach of one of them with the *most concentrated essence of mutton-chops*; introduce into that of another a tea-spoonful of *strong prussic acid*; and inject into the stomach of the third a couple of ounces of *rectified Alcohol*. What will be the result? The first dog will show no signs of poisoning, but, on the contrary, will exhibit every indication of relief from hunger and exhaustion. The second will drop down dead. What of the third? He, too, will drop down dead; the fatal influence of Alcohol, under such circumstances, being not less sudden and vehement, than that of a substance which ranks among the most powerful poisons.

The arguments adduced by the Reviewer prove rather too much. There is an old proverb, "What is sauce for the goose is sauce for the gander;" and it would be very easy to prove, on his own showing, that if Alcohol be not a poison, arsenic is not a poison,* opium is not a poison, prussic acid is not a poison; in fact, that *there is no such thing as a poison at all*. Is not this a *reductio ad absurdum* of his whole system of reasoning?

Our Reviewer makes it an objection to the doctrine that Alcohol is a poison, that there have been individuals who drank a quart of brandy daily, and yet lived to a great age. Such *isolated* cases really go for nothing in a matter of this kind; so variously, as is well known to Toxicologists, do even the poisons whose action is most constant, act upon different individuals. Thus we know two sisters, upon whom the smallest dose of *opium*, or of any of its preparations, acts as a violent *irritant*; whilst cases are on record (among them that of the Duc de Praslin, who poisoned himself while in prison for the murder of his duchess), in which *arsenic*, instead of producing the accustomed symptoms of irritation, has acted as a *narcotic*. We were acquainted with a gentleman (recently dead) upon whom *green tea* had so *calmative* and *soporific* an effect, that, from the time of his going to college until his demise five and forty years afterwards, he was in the habit of

* The Reviewer himself, indeed, may be shown, by the direct application of his own logic, to assert that *arsenic is a food*.

taking it whenever he felt worried and uncomfortable, and, if wakeful at night, would rise to make himself a cup to send him to sleep. No sane man questions that opium is a poison, or affirms it to be a food; yet the system may be so habituated to its effects (as it may become to those of other narcotics), that doses which would prove immediately fatal to those unaccustomed to them, are taken as necessities of life by such as have brought themselves into dependence upon these substances, and may be affirmed to be a part of their daily diet. And so it is with regard to Alcohol; for every one has heard of individuals who have gone through a long life in constant habits of excess, without any apparent injury from them: yet we presume that no one—not even the Westminster Reviewer—would be fool-hardy enough to assert that the *mass of man-and-woman-kind* could take an entire bottle of spirits, or two or three bottles of brandied wine, or six or eight quarts of strong ale, every day of their lives, without the probability of a serious curtailment of their term of existence. Indeed, even *he* allows that such cases are exceptional, and that, if the argument is based on them, they prove too much.

The great fallacy which the Westminster Reviewer and the "Moderationists" generally, profess to have found in the arguments of Dr Carpenter and the Teetotalers, lies in the statement of the latter, that what is bad in excess, is bad, though in a less degree, in moderation; and they appeal to various examples, by which they affirm that a contrary conclusion may be justified. But there is not one of these cases, whose analogy could not be shown to be superficial only, and to fail entirely when more closely examined. *We* appeal, however, to *the facts of this particular case*; and we maintain that the action of the excessive or of the moderate use of Alcohol upon the healthy body, is a question of *degree* alone, its immediate effect being essentially the same in the one case as in the other.

We affirm that as habitual "excess" is admitted to pervert the *Nutritive Functions* in a considerable degree, habitual "moderation" perverts them in a slighter degree; and we shall prove this in regard to the two great operations of *blood-making* and *blood-purifying*.

Dr Böcker has recently ascertained, by comparative analyses of the Blood of the same subjects on the Abstinence regimen and the Moderate-beer-drinking regimen, that the coagulum in the latter case contained more fibrin, with a larger proportion of colourless to red corpuscles. Now, whatever may be the precise idea entertained as to the function of these components of the blood, all Physiologists and Pathologists would now agree in regarding such an alteration as one of *deterioration*, tending either to inflammation, or to imperfect nutrition.

The most important of all the means by which the blood is *kept pure*, is universally admitted by Physiologists to be the act of *Respiration*; and we affirm that the regular performance of this act is interfered-with by the introduction of any amount of Alcohol into the current of the circulation. For it is the peculiar attribute of Alcohol (and this is admitted by the Westminster Reviewer himself) to *help itself first to the oxygen of the blood*, and thus to take it from its normal work. Now what will be the effect of this interference? Dr Carpenter has thus demonstrated it in his "*Physiology of Temperance and Total Abstinence*:"—

"The peculiar vital activity of the Nervous and Muscular systems, which manifests itself in sensation, motion, etc., is entirely dependent upon chemical changes in those tissues, which can only be sustained by a constant supply of oxygen through the blood; and in proportion to the degree of activity which they are called upon to put forth, are the quantity of oxygen that is required for consumption, and the amount of the components of those tissues that are reduced to the state of dead or effete matter. This matter is received back into the current of circulating blood, that it may be conveyed to the excretory organs, by which it may be removed from the system; that part of it which cannot be turned to any account whatever, is at once separated by the kidneys; but by far the larger portion of it is gradually applied to the maintenance of the temperature of the body, by being subjected to the combustive process, the products of which are discharged through the lungs. Now, if any cause should obstruct the perfect performance of this process of oxidation, the effete matter, instead of being removed from the blood in a fully-oxidized condition nearly as fast as it enters it, is only partially got rid of; and it thus tends to accumulate in the circulating current, or is discharged in some lower form of oxidation,—just as when a lamp or a furnace *smokes* from being supplied with oxygen in an insufficient degree to effect perfect combustion. And among other evidences of this fact, which the experience of every one will enable him to recognise, is the offensive odour which proceeds from the persons of those who have been for some time pent-up in ill-ventilated apartments, and which helps, with the accumulated carbonic acid of the respiration, to contaminate the whole atmosphere. Thus, then, we may liken the living body to a Manufactory, wherein various operations are going on, which involve the production of matters too noxious to be kept in it; for the consumption of these a furnace is provided, which, when in full operation, burns them off as fast as they are produced, and thus gives their components back to the atmosphere in the least injurious form; and the heat which is thus generated, serves to warm the manufactory. But if the access of air to the furnace be limited by partially cutting off the draught, or more of the offensive fuel be brought to it than it can thoroughly consume,

then the offensive matter is either got rid of by an imperfect combustion, the products of which have not lost their noxious character, or it accumulates within the building, to the great discomfort and injury of all exposed to its effluvia.

"Now it is one of the properties of Alcohol, that it so readily undergoes combustion, when exposed under the requisite conditions to the contact of oxygen, as to prevent the oxygenation of other substances whose affinity for oxygen is less. Of this we have a familiar example, in its well-known power of preserving bodies which have a tendency to putrefaction; for that process, which cannot take place without oxygen, is prevented by the prior appropriation of that element to the combustion of the alcohol in which such substances may be immersed. So if—to revert to our previous comparison—whilst our furnace-fire is effectually doing its duty in consuming all the noxious products of our manufactory, some alcohol be poured on the flame, *this* will immediately blaze up, undergoing as rapid a combustion as the limited supply of oxygen will allow, and thus checking for a time the combustion of the offensive fuel, which the fire was previously serving to consume. Hence it will in effect produce exactly the same result, in regard to these substances, as that which would be occasioned by cutting off the draught of air; for they must remain almost or completely unconsumed, so long as the alcohol remains to set up the first claim on the limited supply of oxygen." *

The Moderationist champion admits that this argument would be a very cogent one, but for two considerations which he affirms that Dr Carpenter has left out of view; namely, that the combustion of Alcohol saves that of *force*-producing tissue; and that, as the supply of oxygen is unlimited, no harm can come of the substitution of Alcohol for other combustible material. Now, of the first objection we have already disposed: Alcohol *cannot*, and *does not*, take the place of living tissue as a producer of force. We could not wish a better example than the second, of the Reviewer's ignorance of the fundamental truths of Physiology. Truly the supply of oxygen in the Air is unlimited; but the supply of oxygen in the *Blood* is limited. The quantity taken in through the lungs is as strictly regulated (other conditions being the same) by the degree in which the external temperature is below that of the body, as the draught of Dr Arnott's stove is restricted by its regulating thermometer. It is not increased by *any* demand which may be set up by the presence of "waste" matter, however noxious, in the circulating current; but only by a depression of external temperature, which gives occasion to the production of more animal heat. And it is correspondingly diminished, with every degree that the external temperature rises. This is how it comes to pass, that, as the

* Physiology of Temperance, §§ 7, 8.

general experience of foundry-men, glass-blowers, and other men working in very hot places fully proves, if they drink of Alcoholic liquors *while they are at their work*, they soon pay the penalty in a loss of muscular energy; their supply of oxygen, already curtailed by the high temperature, being further reduced by the amount taken away by the Alcohol for its own combustion. The following case is recorded by Dr Carpenter, as having fallen within his own experience, and as having made a strong impression on his mind, long before he took upon himself the advocacy of Total Abstinence principles:—"When visiting Messrs Boulton and Watt's celebrated factory at the Soho, Birmingham, some years since, we were much struck by the Herculean aspect of a particular workman, who was engaged in forging the steel dies (using in coining) into the massive blocks of iron in which they are imbedded. This, we were informed, was the most laborious occupation in the whole factory, requiring a most powerful arm to wield the heavy hammer, whose blows were necessary to insure the union of the two metals; and involving also constant exposure to a very high temperature. The day was sultry and oppressive; and the additional heat of the forge was, to our feelings, almost unbearable. But we stood awhile, watching this gigantic workman, the girth of whose chest seemed twice that of any ordinary subject, whilst, naked to the waistband, and with the perspiration streaming down his head and body, he dealt the rapid and skilful blows of his ponderous hammer upon the heated mass. At the first pause, we asked him (for mere curiosity, for Teetotalism was then scarcely talked of) what liquor he drank; and he replied by pointing to a whole row of *ginger-beer* bottles behind him, the contents of one of which he imbibed every ten or fifteen minutes. He stated, upon further questioning, that he found it quite impossible to drink Alcoholic liquors whilst at his work; their effect being to *diminish his strength* to such a degree as to render him unfit for it."*

Thus again it is, that muscular exertion is borne with so much more difficulty in hot climates, and that, when severe, it predisposes in so much greater a degree to fever, cholera, &c.; the increased "waste" of the system not being burned-off with half the rapidity that it is in cold climates, on account of the limited supply of oxygen, not in the air, but in the blood; while the accumulation of this "waste" in the blood is now generally admitted (since Dr Carpenter first directed attention to it, as the one fact common to the operation of all the recognized "Predisposing Causes of Epidemics") to be the condition that most favours the development of the fever-poison in the body. Even under ordinary exposure to the influence of a warm climate, the advan-

* Physiology of Temperance, § 136.

tage of the Total Abstinence system over Moderation is most unmistakeably evidenced by the experience of our Indian Army; as the Government return of the mortality of the three classes of Teetotalers, Temperate or Moderate men, and Intemperate, authoritatively proves; this being 11·1 per 1,000 for the first, 23·1 per 1,000 for the second, and 44·5 for the third. Let it be noted that whilst the mortality of the Intemperate was *nearly double* that of the Temperate, that of the Temperate or Moderate men was *more than double* that of the Total Abstainers.

The contrast becomes even more striking, when to the *constant* effects of the high temperature, is added the *temporary* influence of muscular exertion, especially when performed under circumstances which peculiarly predispose to disease. The following statement, made on the authority of an officer in the regiment to which it relates, affords unquestionable proof of the value of Abstinence, in a condition of all others most trying to the capacity of enduring fatigue, and the power of resisting causes of disease:—

“ In the early part of the year 1847, the 84th Regiment marched by wings from Madras to Secunderabad, a distance of between four and five hundred miles. They were forty-seven days on the road, and during this time the men were, practically speaking, Teetotalers. Previous to leaving Madras, subscriptions were made among the men, and a coffee establishment was organized. Every morning, when the tents were struck, a pint of hot coffee and a biscuit were ready for each man, instead of the daily morning dram, which soldiers on the march in India almost invariably take. Half way on the day's march the regiment halted, and another pint of coffee was ready for any man who wished it. The regimental canteen was opened only at ten and twelve o'clock for a short time, but the men did not frequent it, and the daily consumption of arrack for one wing was only two gallons and a few drams per diem, instead of twenty-seven gallons, which was the daily Government allowance. The commanding officer employed the most judicious precautions to prevent the men from obtaining arrack in the villages on the route, and his exertions were effectively seconded by the zealous co-operation of the other officers, and by the admirable conduct of the majority of the men, who were fully persuaded of the noxious influence of ardent spirits during exercise in the sun. The results of this water system were shortly these:—during the whole march the regiment had not a single prisoner for drunkenness; although the road is proverbial for cholera and dysentery, and passes through several unhealthy and marshy districts, the men were free from sickness to an extent *absolutely unprecedented* in our marches in India; they had no cholera and no fever, and lost only two men from dysentery, both of whom were old chronic cases taken out of hospital at Madras. With these exceptions, there was scarcely a serious

case during the whole march. The officers were surprised to find that the men marched infinitely better, with less fatigue and with fewer stragglers than they had ever before known, and it was noticed by every one that the men were unusually cheerful and contented."*

Now that this remarkable result was not due to any peculiar healthfulness of the season, or other modifying circumstance, is shown by the fact, that the wing of the 63d Regiment, which performed the same march, at the same time, though in the opposite direction, lost several men out of a strength of 400; and that it had so many sick, that, when it met the 84th on its march, it was obliged to borrow the spare "dhoolies" (or sick palanquins) belonging to the latter.

Thus every drop of Alcoholic liquor taken in India, save when judiciously administered as medicine, tends to shorten life; and the difference between India and Britain, in regard both to temperature and to causes of disease, is merely one of degree. Alcohol is burned-off from the blood less slowly here than in India; but whilst it is *in the blood*, and so long as it is *in course of removal from it*, its influence in preventing the elimination of the "waste" of the system is not the less sure. The poisons of Cholera, Fever, and other "zymotic" diseases, are more potent and more diffused in India than in Britain; but that *we* are not exempt from them, the mortality tables, which indicate that half the entire number of deaths in this country occur from diseases of this class, too surely tell.

It is clear, then, that *so long as Alcohol is circulating in the blood, it is interfering with that Respiratory process*, the perfect working of which is, perhaps, more essential than that of any other function to the welfare of the living body. And the very rapidity of the elimination of Alcohol from the body by the combusive operation, to which the Moderationist champion appeals as a proof that it cannot do any great harm, is not only, in the eye of the Physiologist, a proof that it is a substance *foreign* to the body (this immediate rejection, so opposite to the care taken to retain all really *nutritious* substances, showing that it has no business there), but is the source of one part of its mischievous influence. For, as the Alcohol, whilst it remains in the blood, impairs the composition of the vital fluid, and thereby produces a deterioration in the nutritive actions generally, so, by the energy with which its elimination is effected, the blood is partially robbed of its oxygen, and the essential part of the Respiratory function—the oxygenation of the effete matters of the blood—is imperfectly performed. We talk about purifying the atmosphere by Sanitary

* Physiology of Temperance, § 177.

Reforms; but so long as we habitually take Alcohol into our blood, so long do we prevent our bodies from being cleansed and sweetened by the process which an All-wise Creator has provided for that express purpose.

But, says the Moderationist, if this were true, the Blood of drunkards ought to be habitually venous, and to be loaded with the ashes of used-up tissue. *So it is*, in that most essential feature, the large predominance of unconsumed hydro-carbon, though not always as to colour;—this last being a comparatively non-essential character, which (as every *real* physiologist knows) bears no constant relation to the quantity of oxygen in the blood. What says Rokitansky,—the universally-recognized chief of modern Pathologists,—upon this very point? He tells us that the blood of drunkards is characterized by its dusky colour and viscidness, and by the marked increase of its fatty contents; and that fat takes the place of healthy tissue in every part of the body, in the muscles, nerves, skin, mucous membranes, and even in the bones. The description given by Dr Huss, in his "*Alcoholismus Chronicus*," is exactly to the same effect. The eminent French analytical chemist, Lecanu, found as much as 117 parts of fat in 1,000 parts of a drunkard's blood, the *highest* estimate of the quantity in health being $8\frac{1}{2}$ parts, and the *ordinary* amount not being more than 2 or 3 parts; so that it reached *fourteen times* the *highest* quantity found in health, and *forty times* the *ordinary* quantity. This, be it observed, is not an *addition* to the organic components of the Blood; but is a *substitution* of a material which is good for little in the body but to be burned off, for those ingredients which are good for making tissue. And the body at large suffers, in like degree, from the like substitution, which is known as *fatty degeneration*.

It is because of this proved tendency of Alcoholic drinks, in *whatever measure they are introduced* into the circulating system, to render the Blood venous, by obstructing the removal of its hydro-carbon, that we hold it to be a legitimate inference, that the habitual *moderate* use of Alcohol *must* tend to favour that "fatty degeneration" of the tissues, to which the body spontaneously becomes more and more liable as age advances, and which may be induced at any period of life (as modern pathology has unquestionably shown) by habitual *excess*.

Next let us appeal to the facts which exhibit the injurious influence of the Moderation system on the sustentation of *Muscular Force*. To some of these facts, indicating the decided superiority of the Abstinence regimen under fair comparative trials, we have already referred. We are in possession of the results of several other trials, made (some of them at our request, others at their own suggestion) by young and middle-aged pedestrians,

during prolonged walking tours; and the results are unanimous in favour of the Abstinence system; particular stress being laid on the fact, that there is a feeling of much greater *freshness* and *vigour* on rising in the morning, when *no* Alcoholic liquor has been taken over-night, than when even a moderate allowance has been made use of.—The writer, being desirous of making the experiment for himself (which, being under no pledge, he felt that he might legitimately do), determined, during a short walking-tour which he made in Switzerland a couple of summers ago, to compare his power of endurance when he took only aqueous beverages, with that which he found himself to possess when he made use of the light wine of the country, according to the recommendation of the “Moderationists.” His longest walk, which was executed on his second day (without the advantage, therefore, of previous training), was over the pass of the Wengern Alp, 6,000 feet high, from Lauterbrünnen to Grindenwald, and afterwards from Grindenwald to the lake of Thun, a distance of nearly 14 miles in addition. As it was necessary to accomplish the whole before 4 P.M., he set out early, crossed the pass (which is commonly considered a good seven hours’ walk) in five hours, took at Grindenwald a mutton chop and a whole quart bottle of effervescing lemonade (which the enormous loss he had sustained by perspiration made him feel to be not “a drop too much”), and then started at the rate of four miles an hour on the remainder of his journey, which he completed very easily within the requisite time, and without more fatigue than a night’s rest sufficed to remove, a little foot-soreness alone remaining. On some subsequent days, when he walked a much shorter distance, and took a moderate quantity of wine, he found his sense of fatigue much greater; and he particularly noticed that, if he took wine at supper-time, even in a very limited quantity, he did not rise in the morning with the same feeling of freshness, as he did when he had taken either tea or *limonade gazeuse*.

Now this may be considered as a mere case of individual peculiarity, and as therefore good for nothing in an inquiry which concerns general facts; but it tallies, on the one hand, with a very large amount of *like* experience; and it is also in precise accordance with what we maintain to be sound Physiological theory. For the general sense of fatigue and of incapacity for exertion (which every one can distinguish from that arising from the mere weariness of a particular set of muscles) may fairly be attributed to the presence of effete matter in the blood, as the result of the disintegration of nervo-muscular tissue; just as the peculiar sense of distress arising from imperfect or suspended respiration, is attributable to the insufficient oxygenation of that fluid. When this effete matter has been got rid of, either by active cutaneous excretion (as in the Russian bath), or by the

slower eliminating action of the lungs and kidneys, the sense of fatigue passes off; and that this is the true account of it, appears from the very familiar fact, that if people sleep in ill-ventilated rooms, or with curtains drawn closely around their beds, they wake in the morning unrefreshed, and complain of not having "slept off their fatigue." Now here, one would think, would be a case in which, if Alcohol *could* either serve as food or supply force, it ought to be specially useful. A great consumption of tissue has taken place, a great exhaustion of force has been experienced; will alcohol repair either? So far is this from being the case, that, as a large comparative experience has now shown, the use of Alcoholic liquors at night, after a day of peculiar exertion, *has exactly the same effect as an ill-ventilated apartment, or a bed with closely-drawn curtains.* The alcoholized subject rises comparatively unrefreshed, because his blood has been robbed of so much of its oxygen, that what remains has not sufficed for the elimination of the effete matter; while the water-drinker feels as if he had thrown off every burden, and is ready for the work of the day on which he is entering.

We will cite another case, which has been recently communicated to us by one of the many honest sympathizers (especially numerous among the Medical profession) who say, "We agree with you perfectly in theory, although we do not practise Total Abstinence, because we don't like it." There exists, on the river Thames, near Woolwich (if we recollect aright) a school formed by the "Marine Society," in which boys who are in training as sailors are practised on board ship in the various exercises they will afterwards be called on to perform. These boys were formerly allowed a cup of beer (*small*, we believe, both as to quantity and quality), with their dinners. But it having been continually noticed that they were indisposed to climbing the shrouds, lying along the yards, or performing other active exercises, for some time after dinner, the Managers of the school thought it worth while to try the experiment of substituting water for beer at that meal. The good effect, we are assured, was immediately obvious; the boys, from that time, showing no more indisposition to activity at the post-prandial period of the day, than at any other.

The difference becomes still more striking, when the work has to be done under exposure to a high temperature. We are assured that during the extreme pressure created by the war, in the Arsenal at Woolwich, the superior endurance of the Teetotalers has become most apparent, especially in the hottest departments of the work, such as the casting of shells; for *they* have been able to make two or three days of over-time, whilst the Moderationists have not made one.

We have lately received a similar account of the experience of

the workmen sent out from this country to erect hospitals in and near Constantinople. Not one of the Teetotalers, we are assured, has suffered from serious illness, and all have done their work with facility; the Moderate men have had more sickness, and have been less efficient as workmen; of the Intemperate, a large proportion have fallen a sacrifice to indulgence in their baneful habit.

Now what is the experience of the Turks themselves, as to the sustenance of muscular exertion upon the abstinence system? Mr Fairbairn, the eminent machine-maker, who, as the head of a firm which numbers its workmen by thousands, must be a good judge of human strength, tells us: "I observed on a late journey to Constantinople, that the boatmen or rowers to the caiques, who are perhaps the first rowers in the world, drink nothing but water; and they drink that profusely during the hot months of the summer. The boatmen and water-carriers of Constantinople are decidedly, in my opinion, the finest men in Europe as regards their physical development, and they are all water-drinkers; they may take a little sherbet, but in other respects are what we should call in this country teetotalers." Mr Fairbairn enforces the same system in his own works, as the best means of getting his work done. "I strictly prohibit on my works the use of beer or fermented liquors of any sort, or of tobacco. I enforce the prohibition of fermented liquors so strongly, that if I found any man transgressing the rule in that respect, I would instantly discharge him without allowing him time to put on his coat. In those foundries in which there is drinking throughout the works all day long, it is observed of the men employed as workmen that they do not work so well; their perceptions are clouded, and they are stupified and heavy. I have provided water for the use of the men in every department of the works. In summer-time the men engaged in the strongest work, such as the strikers to the heavy forges, drink water very copiously. In general the men who drink water are really more active and do more work, and are more healthy, than the workmen who drink fermented liquors."

In the last place, we have to consider the influence of "Moderation" on the regular play of the functions of the *Nervous System*, and especially (the nerve-force that excites Muscular action being obviously under the same conditions with it), on that which ministers to *Mental activity*. Here it is that our Moderationist adversary obviously thinks that he has us most completely "on the hip." But he has altogether disregarded the proofs repeatedly adduced by those who have carefully analysed the effects of Alcoholic stimulants, that, whatever the temporary increase of energy may be, that increase is *not* in the activity of the *whole*

mind, or in that of the best part of it; but consists in an augmented energy of the *Automatic* part of our mental nature, while the *Volitional* control over the current of thought, which is the source of our self-directing power, is proportionably weakened. Let any one watch the gradual transition from the state of "moderate" excitement to that of drunkenness; and he will see that the influence of the Alcoholic intoxication is not different in *kind* throughout, but only in *degree*. The genial flow of spirits, the brilliant flashing of wit, the rich outpourings of humour, the vivid creations of imagination, which seem the best products of that social enjoyment to which wine is commonly believed to contribute, pass, by a *continuous transition*, into tipsy jollity and incoherent foolishness. The volitional power is *gradually* diminished; the automatic activity becomes *gradually* more and more irregular; and at last *all* self-control is lost, all cohesion of ideas ceases. Now if, as often happens, the part of man's mental nature, which is first stimulated, should chance to be the selfish and brutal, we have sulky moroseness instead of cheerful glee, irritability and quarrelsomeness instead of good-fellowship. Are these cases so very uncommon, that they should be regarded as exceptional? Let any one examine the *Etiology* of the minor crimes of violence, especially outrages on women, and he will find that by far the majority of them are committed in a state that is not by any means one of drunkenness, but consists in that weakening of the power of self-control and that excitement of the automatic activity of the mind, which, in so far as *any* effect is produced by Alcohol, it is its characteristic property to exert, be the dose large or small.

And that such is the true state of the case, is remarkably evidenced by the very great diminution which has taken place in the punishments called for in our Navy, since the reduction of the spirit allowance, a few years ago, on the recommendation of the Admiralty Committee, which made particular inquiry upon this very point,—the *excitement* given by the stimulus to acts of violence and insubordination, though nothing like drunkenness may be produced. The following case, given in evidence before that Committee by Captain Drew, is a very apt illustration of what, as even a limited range of observation teaches, is a very common condition among men whose lower passions are readily excited, while their self-control is weakened, by the Alcoholic stimulus:—

"I had a marine who was a very bad character, and he was constantly complained against for quarrelling and fighting, and disobedience to the orders of his sergeant. At length I began with flogging him; I gave him two dozen lashes, and told him that I would increase his punishment every time I had a complaint against him. In less than a month I had another complaint

against him, and I gave him three dozen. Within another month, I had a complaint again, and it appeared to me that the man's reason was affected, as he was constantly excited. I therefore applied to the surgeon of the ship, and asked him to examine him, and see whether he was not a fit subject for invaliding. He was examined, and the surgeon reported that he was as fine and healthy a young man as there was in the ship. I then did not think myself justified in flogging him again, but took upon myself to do an illegal act with a good intention; and when we came into harbour (in the West Indies), I hired a cell in the gaol, and kept him there three days upon bread and water. When the man came out of gaol, I told him whenever I had a complaint against him, as sure as we came into harbour I would send him again to gaol. He said, 'Do you mean to say that I am to be sent to gaol every time we come into harbour?' I said, 'No, only in case of my having a complaint against you.' He said, 'Thank you, Sir.' I said, 'Now, I will start afresh with you. I will forget everything that has happened, if you choose to alter your conduct.' He said he was very much obliged to me; and he came to me the next day, and asked me if I would stop his allowance of grog, and let him be paid for it. I did so, and never had another complaint against the man while I was in the ship."*

We may again call Sir B. Brodie as a witness on this point—

"There is many a person in whom a muddled intellect and a peevish temper may be traced to a too great indulgence of the appetite—to eating more than the stomach can digest, to drinking a bottle or even half a pint of wine daily, and leading otherwise a lazy and luxurious life, but who would be found to have no contemptible powers of mind, and cheerful spirits, if restricted to a more abstemious diet, and drinking nothing more stimulating than toast and water."†

Of all men in the world, we had least expected to be able to cite Sydney Smith in favour of Total Abstinence; yet his recently-published letters contain abundant evidence of his conviction of its advantages, especially, as regards the *healthy activity of the mind*. Take the following, addressed to Lady Holland, December, 1828:—

"Many thanks for your kind anxiety respecting my health. I not only was never better, but never half so well; indeed, I find I have been very ill all my life, without knowing it. Let me state some of the goods arising from abstaining from all fermented liquors. First, sweet sleep; having never known what sweet sleep was, I sleep like a baby or a ploughboy. If I wake, no needless terrors, no black visions of life, but pleasing hopes and pleasing recollections: Holland House, past and to come! If I

* Report of the Admiralty Committee.

† Psychological Inquiries.

dream, it is not of lions and tigers, but of Easter dues and tithes. Secondly, I can take longer walks, and make greater exertions, without fatigue. My understanding is improved, and I comprehend Political Economy. I see better without wine and spectacles than when I used both. Only one evil ensues from it: I am in such extravagant spirits that I must lose blood, or look out for some one who will bore and depress me. Pray leave off wine:—the stomach quite at rest; no heart-burn, no pain, no distension.”*

Now, that this was not one of those jocose effusions, with which this great humorist and good man was wont to amuse his friends, but was as honest an expression of his real convictions as anything he ever wrote, we have the assurance of those who knew him and his habits most intimately. From the time when those convictions were forced upon him, we are informed that he habitually practised the abstinent system, except when induced to break through it by the temptations of society; and it would have probably been well for him, if he had commenced that system earlier, and kept to it more uniformly.

We have not here touched upon the case of those who do not find themselves able to digest the quantity of food which is wholesome and necessary for them, without the assistance of Alcoholic liquors; because this, not being a healthy condition, has no bearing upon the question whether Abstinence or Moderation is best for the mass of mankind, whose stomachs *are* capable of digesting as much nutriment as they really require. Every Physiologist must admit, that the Creator has made the action of the Stomach of a healthy man to depend upon no other conditions, than those which are required for the welfare of the system at large. Wholesome food and drink, containing the elements of the tissues and fluids of the body, without mixture with deleterious substances, pure fresh air, moderate bodily and mental labour, alternating with sufficient intervals of repose,—these are the essential conditions of health; and we find not only individuals, but whole nations, in the enjoyment of thoroughly good digestion, and preserving the “tone of the stomach” to the end of a long life, without the assistance of bitter beer or any other stomachic. It is notorious, however, that any departure from these conditions tends to injure the digestive power. Unwholesome food or drink, or excess in what is wholesome, habitual confinement in ill-ventilated apartments, over-exertion of mind or body, or (what is not less injurious) inadequate exercise of either, insufficient or too much protracted sleep; these and various other departures from the rules of health, have a direct tendency to impair the digestive

* Memoirs of Sydney Smith.

power; and it is by artificially provoking the languid stomach to increased exertion, that a temporary benefit is derived from alcoholic liquors in such cases, which is so commonly mistaken for real support. The case is exactly parallel to the effect of similar "assistance" upon the muscular system, when already overcome with fatigue: a feeling of temporary refreshment and reanimation is induced; the flagging powers are revived; and the exertion is continued and completed with far more ease than it could have been without the comforting draught. But what says the preacher, or pedestrian, or hard-worked artizan, next morning? The fatigue *then* experienced is far greater than if he had given-in when Nature warned him; and a longer period of repose is necessary to recover from it.

Now, if bitter beer, or any other favourite Alcoholic liquor habitually taken in "moderation," has any influence at all upon the functional activity of the stomach, that influence must be either to *increase*, to *diminish*, or to *pervert* that which is natural to it. From the language used by the advocates of these liquors, it may be presumed that they would choose the former of these alternatives; and it will then be for them to reply to the question,—What good can arise from habitually exciting an organ, that is already in a state of healthful activity? It would be just as rational for a man who already sleeps soundly through the whole night, to take an habitual narcotic for the purpose of improving his repose; or for a man who finds no difficulty in maintaining the erect posture by the natural action of the muscles of his back, to construct an artificial support for the purpose of relieving them of the strain which they are adapted to bear. Every one knows that, in either of these cases, the organ thus *assisted* will gradually lose its own independent vigour, and will come at last to *require* the artificial support, without which it could at first have discharged its full share of duty. And experience shows, in like manner, that those who have long been habituated to the "moderate" use of Alcoholic beverages with their meals, are seldom able to discontinue them without a temporary loss of appetite and of digestive power; unless, indeed, their place be supplied by the more wholesome excitement of fresh air and exercise.

The Moderationist champion, however, while admitting that "under perfectly healthy conditions, with hereditary strength of organism, with abundance of excellent food, and with stomachs equipped for efficient exercise, *Alcohol is certainly of no use*," asserts that, to find a "civilized stomach" capable of doing its work, is a rare occurrence. We, on the contrary, from a pretty extensive acquaintance with habitual water-drinkers in various ranks of society, can assure him that it is much commoner than he supposes; that we have never found the power deficient in children, save such as

were obviously suffering from constitutional debility; that we have known the discontinuance of the beer-allowance in many schools to be followed by a marked improvement in the health and vigour (both physical and mental) of the pupils; and that it is hence our deliberate conviction that, if the habit of dependence upon stimulants *be never formed*, and the stomach only get *fair play*, it will do its work quite as efficiently, more naturally, and therefore more enduringly, without recourse to their deceptive assistance. It is rather curious that the writer who appeals to the *want of digestive power* among civilized stomachs as a reason for the moderate use of Alcoholic liquors, should in another place, when it suits his purpose to do so, make special mention of the increased appetites of Teetotalers (p. 7). And it cannot but astonish the Physiologist to find this writer contending (p. 123), that because the substance of the organism is constantly undergoing change, a stimulant will produce upon the *new* tissues the same effect as upon the old, the fact being, as is demonstrated by all experience in the use of opium, tobacco, &c., that the body *grows to* the habit; that the first effect of their disuse is to produce a most distressing depression, and that to keep up the same effects through a long period of time, an occasional increase in the dose is required.

Every important argument advanced by the Westminster Reviewer in behalf of the "Moderation" system, and against the Total Abstinence regimen, has now, we believe, been met and discussed. We have shown that if Alcohol *be* a Food, it is not a wholesome food; and that, if it *be not* a Poison, it is so marvelously like one in its effects, that the distinction is without a difference. The Westminster Reviewer himself admits, that, if constantly present in the blood, its effects would be fatal; and he argues, as cogently as we could do, that these effects are only averted by the rapidity with which it is got rid of by the excretory processes;—a fact which of itself settles the whole question of its suitability as an ingredient of the vital fluid. Our adversary also admits it to be demonstrably true, that the action of Alcohol on the animal body in health produces a disturbance in the regular current of vital action (p. 98); and we think we have shown that any such disturbance must almost certainly be for the worse.

Of course the "Moderationists" may bring down their standard of moderation, until it becomes so low, that the quantity of Alcohol introduced into the body is almost powerless either for harm or good. The "moderation" of this century would have been considered very close upon total abstinence in the last; and we cannot venture to say what further reduction may take place. It would be as absurd in us to quibble about the effect of a few drops of Alcohol, as it is in the "Moderationists" to attack Tee-

totalers for drinking ginger-beer. The question is about the effects of such doses of Alcohol as produce *some* appreciable action on the economy; is that action wholesome or injurious?—We willingly leave the issue to our readers; particularly begging them to weigh well the admissions of the champion in whose advocacy the Moderationists have so much exulted; since in these admissions, there are really conceded all the essential bases of our arguments.

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