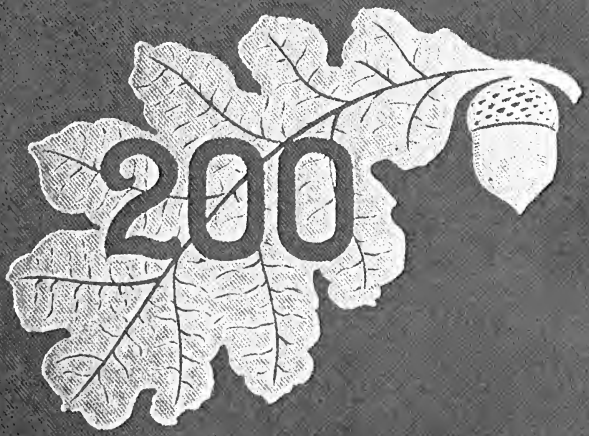
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THE POSSIBILITY OF LIVING

200 YEARS

COMPILED

FROM

THE BEST AUTHORITIES

BY

F. C. HAVENS

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Dedicated

to

Ambitious Youth

and

Thoughtful Age

CONTENTS.

TO THE READER.

This work represents the labor of many odd hours in a life devoted to business pursuits. No claim is made that the discoveries and suggestions relative to diet are new or original. Much reading and observation in regard to this subject showed the possibility of condensing the salient features of the works of leading authors on the subject of longevity—a subject of more importance to humanity than any and all others.

There is no royal road to health or long life, but neither is there any need for people to grope their way blindly along, and make both a matter of mere chance, as the vast majority of the human race are now doing. Such writers as De Lacy Evans, and other scientific investigators, point out a path to perfect health, and prove age to be a controllable disease.

Illness and decrepitude are shown to be unnecessary evils, caused almost invariably by the lack of

the knowledge of the plain and simple rules which are compiled and condensed in this little volume. The punishments inflicted by nature are usually as just as they are sure. Where people sin willfully sympathy is wasted. A quotation will be found herein from Sir Wm. Thompson, in which he points out an easy road to sickness and a rapid method of growing old — an illustration of the absurdity of suffering the greatest misery for an indefinite period, as the result of two hours of imaginary happiness.

Modern scientific discoveries in relation to diet indicate a higher and more rational mode of living; and yet it is surprising to note how much of this was foreshadowed three hundred years ago by Cornaro, who had no guide but his stomach and his common sense. But these are not infallible guides, because foods which are easily digested, and water which is most palatable and apparently most pure, may contain substances of an injurious nature.

The ideas embodied here are wholly in the line of progress, and are such as may and should be thoroughly understood by all. If put only into partial application, the results will be beneficial; if conscientiously carried out, all may be accomplished

that is claimed for them. It is only a question of how much self-denial the reader is capable of, in order to break away from injurious habits of eating and drinking, and to form new ones upon a correct basis. After a personal experience, he doubtless will share with the writer in a sincere regret that the knowledge of what constitutes proper diet was not long ago put into such form as to be easily accessible to all who love life sufficiently to wish to prolong it two hundred years.

THE POSSIBILITY OF LIVING

200 YEARS.

ADDISON.

[From the *Spectator*, 1712]

There is a story in the *Arabian Nights Tales* of a king who had long languished under an ill habit of body, and had taken abundance of remedies to no purpose. At length, says the fable, a physician cured him by the following method: He took a hollow ball of wood, and filled it with several drugs, after which he closed it up so artificially that nothing appeared. He likewise took a mall, and, after having hollowed the handle, and that part which strikes the ball, he inclosed in them several drugs, after the same manner as in the ball itself. He then ordered the sultan, who was his patient, to exercise himself early in the morning with these rightly prepared instruments, till such time as he should sweat; when, as the story goes, the virtue of the medicaments perspiring through the wood had so good an influence on the sultan's constitution, that they cured him of an indisposition which all the compositions he had taken inwardly had not been able to remove. This eastern allegory is finely

contrived to show us how beneficial bodily labor is to health, and that exercise is the most effectual physic. I have described, in my hundred and fifteenth paper, from the general structure and mechanism of a human body, how absolutely necessary exercise is for its preservation; I shall, in this place, suggest another great preservative of health, which, in many cases, produces the same effects as exercise, and may, in some measure, supply its place, where opportunities of exercise are wanting. The preservative I am speaking of is temperance, which has those particular advantages above all other means of health, that it may be practiced by all ranks and conditions, at any season, or in any place. It is a kind of regimen into which every man may put himself without interruption to business, expense of money, or loss of time. If exercise throws off all superfluities, temperance prevents them; if exercise clears the vessels, temperance neither satiates nor overstrains them; if exercise raises proper ferments in the humors and promotes the circulation of the blood, temperance gives nature her full play, and enables her to exert herself in all her force and vigor; if exercise dissipates a growing distemper, temperance starves it.

Physic, for the most part, is nothing else but the substitute of exercise or temperance. Medicines are, indeed, absolutely necessary in acute distempers, that cannot wait the slow operations of these two great instruments of health; but, were men to live in a habitual course of exercise and temperance, there would be but little occasion for them. Accordingly, we find that those parts of

the world are most healthy where they subsist by the chase, and that men lived longest when their lives were employed in hunting, and when they had little food besides what they caught. Blistering, cupping, and bleeding, are seldom of use but to the idle and intemperate. All those inward applications, which are so much in practice among us, are, for the most part, nothing else but expedients to make luxury consistent with health. The apothecary is perpetually employed in countermining the cook and the vintner. It is said of Diogenes, that, meeting a young man who was going to a feast, he took him up in the street and carried him home to his friends, as one who was running into imminent danger, had he not prevented him. What would that philosopher have said had he been present at the gluttony of a modern meal? Would not he have thought the master of a family mad, and have begged his servants to tie down his hands, had he seen him devour fowl, fish, and flesh, swallow oil and vinegar, wines, and spices, throw down salads of twenty different herbs, sauces of a hundred ingredients, confections, and fruits of numberless sweets and flavors? What unnatural motions and counterferments must such a medley of intemperance have produced in the body. For my part, when I behold a fashionable table set out in all its magnificence, I fancy I see gouts and dropsies, fevers and lethargies, with other innumerable distempers, lying in ambuscade among the dishes.

Nature delights in the most plain and simple diet. Every animal but man keeps to one dish. Herbs are the food of this species, fish of that, and flesh of a third.

Man falls upon every thing that comes in his way; not the smallest fruit or excrescence of the earth, scarce a berry or a mushroom, can escape him.

It is impossible to lay down any determinate rule for temperance, because what is luxury in one may be temperance in another; but there are few that have lived any time in the world who are not judges of their own constitutions, so far as to know what kinds and what proportions of food do best agree with them. Were I to consider my readers as my patients, and to prescribe such a kind of temperance as is accommodated to all persons, and such as is particularly suitable to our climate and way of living, I would copy the following rules of a very eminent physician: "Make your whole repast out of one dish. If you indulge in a second, avoid drinking any thing strong till you have finished your meal; at the same time, abstain from all sauces, or, at least, such as are not the most plain and simple." A man could not be well guilty of gluttony if he stuck to these few obvious and easy rules. In the first case, there would be no variety of tastes to solicit his palate, and occasion excess; nor, in the second, any artificial provocatives to relieve satiety and create a false appetite. Were I to prescribe a rule for drinking, it should be formed upon a saying quoted by Sir William Temple: "The first glass for myself, the second for my friends, the third for good humor, and the fourth for mine enemies." But, because it is impossible for one who lives in the world to diet himself always in so philosophical a manner, I think every man should have his

days of abstinence, according as his constitution will permit. These are great reliefs to nature, as they qualify her for struggling with hunger and thirst whenever any distemper or duty of life may put her upon such difficulties; and, at the same time, give her an opportunity of extricating herself from her oppressions, and recovering the several tones and springs of her distended vessels; besides that, abstinence, well-timed, often kills a sickness in embryo, and destroys the first seeds of an indisposition. It is observed by two or three ancient authors that Socrates, notwithstanding he lived in Athens during that great plague which has made so much noise through all ages, and has been celebrated, at different times, by such eminent hands—I say, notwithstanding he lived in the time of this devouring pestilence, he never caught the least infection, which those writers unanimously ascribe to that uninterrupted temperance which he always observed.

And here I cannot but mention an observation which I have often made, upon reading the lives of the philosophers, and comparing them with any series of kings or great men of the same number. If we consider these ancient sages, a great part of whose philosophy consisted in a temperate and abstemious course of life, one would think the life of a philosopher and the life of a man were of two different dates. For we find that the generality of these wise men were nearer a hundred than sixty years of age at the time of their respective deaths. But the most remarkable instance of the efficacy of temperance toward the procuring long life is what we meet with in a

little book published by LEWIS CORNARO, the Venetian which I rather mention, because it is of undoubted credit, as the late Venetian ambassador, who was of the same family, attested more than once in conversation when he resided in England. Cornaro, who was the author of the little treatise I am mentioning, was of an infirm constitution, till about forty, when, by obstinately persisting in an exact course of temperance, he recovered a perfect state of health; insomuch that, at fourscore, he published his book, which has been translated into English, under the title of *Sure and Certain Methods of Attaining a Long and Healthy Life.* He lived to give a third or fourth edition of it; and, after having passed his hundredth year, died without pain or agony, and like one who falls asleep. The treatise I mention has been taken notice of by several eminent authors, and is written with such a spirit of cheerfulness, religion, and good sense as are the natural concomitants of temperance and sobriety. The mixture of the *old man* in this work is rather a recommendation than a discredit to it.

AN ABRIDGMENT

OF THE

SEVERAL TREATISES

By LEWIS CORNARO.

It is universally agreed that custom, with time, becomes a second nature, forcing men to use that, whether good or bad, to which they have been habituated; nay, we see habit, in many instances, gain an ascendency over reason. This is so undeniably true, that virtuous men, by conversing with the wicked, very often fall into the same vicious course of life, and the contrary is equally true.

To come, then, to that abuse of which I have proposed to speak, namely, *intemperance*, I say that it is a great pity it should have prevailed so much as entirely to banish sobriety. Though all are agreed that intemperance is the offspring of gluttony, and sober living of abstemiousness, the former, nevertheless, is considered as a virtue and mark of distinction, and the latter as dishonorable, and the badge of avarice. Such mistaken notions are entirely owing to the power of custom, established by our senses and irregular appetites; these have blinded and besotted men to such a degree that, leaving the paths of virtue, they have followed those of vice, which are apt to lead them imperceptibly to an old age, burdened with strange and mortal infirmities, so as to render them quite decrepit before forty, contrary to the effects of sobriety,

which, before it was banished by this destructive intemperance, used to keep men sound and hearty at a great age.

How many friends of mine, men of the finest understanding and most amiable disposition, have I seen carried off by this plague in the flower of their youth! who, were they now living, would be ornaments to the public, and whose company I should enjoy with as much pleasure as I am now deprived of it with concern.

In order, therefore, to put a stop to so great an evil, I have resolved, by this short discourse, to demonstrate that intemperance is an abuse which may be easily removed, and that the good old sober living may be substituted in its stead; and this I undertake the more readily, as many young men of the best understanding, knowing that it is a vice, have requested it of me, moved thereto by seeing their fathers drop off in the flower of their youth, while I remain so sound and hearty, at a great age. They expressed a desire to reach the same term, nature not forbidding us to wish for longevity, and old age, being in fact that time of life in which prudence can be best exercised, and the fruits of all the other virtues enjoyed with the least opposition, the senses being then so subdued that man gives himself up entirely to reason. They beseeched me to let them know the method pursued by me to attain it; and then, finding them intent on so laudable a pursuit, I resolved to treat of that method, in order to be of service, not only to them, but to all those who may be willing to peruse this discourse. I shall, therefore, give my reasons for renouncing intem-

perance, and betaking myself to a sober course of life; declare freely the method pursued by me for that purpose; and then set forth the effects of so good a habit upon me; whence it may be clearly gathered how easy it is to remove the abuse of intemperance. I shall conclude by showing how many conveniences and blessings are the consequences of a sober life.

I say, then, that the heavy train of infirmities, which had not only invaded, but even made great inroads in my constitution, were my motives for renouncing intemperance, to which I had been greatly addicted; so that, in consequence of it, and the badness of my constitution, my stomach being exceedingly cold and moist, I had fallen into different kinds of disorders, such as pains in the stomach, the colic, and the gout, attended, by what was still worse, an almost continual slow fever, a stomach generally out of order, and a perpetual thirst. From these natural and acquired disorders the best delivery I had to hope was death, to put an end to the pains and miseries of life; a period as remote, in the regular course of nature, as I had forwarded it by my irregular manner of living. Finding myself, therefore, in such unhappy circumstances between my thirty-fifth and fortieth years, every thing that could be thought of having been tried to no purpose to relieve me, the physicians gave me to understand that there was but one method left to get the better of my complaints, provided I would resolve to use it, and patiently persevere in it. This was a *sober* and *regular* life, which they told me would still be of the greatest power and efficacy; as powerful and efficacious

as the other, which was contrary to it in every thing; I mean an intemperate and irregular one; and that of this power and efficacy I might convince myself, since, as by my disorders I was become infirm, though not reduced so low that a regular life, the reverse in its effects of an irregular one, might not still entirely recover me. On the other hand, it in fact appears, such a regular life, whilst observed, preserves men of a bad constitution and far gone in years, and for a long space of time, just as a contrary course has the power to destroy those of the best constitution in their prime; for this evident reason, that different modes of life should be attended by different effects; art following, even herein, the steps of nature, with equal power to correct natural vices and imperfections. This is obvious in husbandry and the like. They added that if I did not immediately have recourse to that medicine I could receive no benefit from it in a few months, and that in a few more I must resign myself to death.

These solid and ingenuous arguments made such an impression on me that, mortified as I was, besides, by the thoughts of dying in the prime of life, though perpetually tormented by various diseases, I immediately concluded that the foregoing contrary effects could not but be produced by regularity and irregularity; and therefore, full of hopes, resolved, in order to avoid at once both death and disease, to betake myself to a regular course of life. Having, upon this, inquired of them what rules I should follow, they told me that I must not use any food, solid or liquid, but such as, being generally pre-

scribed to sick persons, is for that reason called diet, and both very sparingly. These directions, to say the truth, they had before given me; but it was at a time of life when, impatient at such restraint, and finding myself satiated, as it were, with such food, I could not put up with it, and therefore ate freely of every thing I liked best; and likewise, feeling myself in a manner parched up by the heat of my disease, made no scruple of drinking, and in large quantities, the wines that best pleased my palate. This, indeed, like all other patients, I kept a secret from my physicians. But when I had once resolved to live soberly, and according to the dictates of right and reason, in consequence of my discovering that it was no difficult matter—nay, that it was my duty as a man so to do—I entered with so much resolution upon this course of life that nothing since has been able to divert me from it. The consequence was that in a few days I began to perceive that such a course agreed with me very well; and, by pursuing it, in less than a year I found myself (some persons, perhaps, will not believe it) entirely freed from all my complaints.

Having thus recovered my health, I began seriously to consider the power of temperance, and say to myself that if this virtue had efficacy enough to subdue such grievous disorders as mine, it must have still greater to preserve me in health, to help my bad constitution, and comfort my very weak stomach. I therefore applied myself diligently to discover what kinds of food suited me best. But, first, I resolved to try whether those which pleased my palate agreed or disagreed with my stomach, in order

to judge for myself of the truth of that proverb, which I once held for true, and is universally held as such in the highest degree, insomuch that epicures, who give loose to their appetites, lay it down as a fundamental maxim. The proverb is, that whatever pleases the palate must agree with the stomach, and nourish the body; or that which is palatable must be equally wholesome and nourishing. The issue was that I found it to be false; for, though rough and very cold wines, as likewise melons, and especially salad, pork, tarts, garden-stuff, pastry, and the like, were very pleasing to my palate, they disagreed with my stomach. Having thus convinced myself that the proverb in question was false, I disregarded it as such; and, taught by experience, I gave over the use of such meats and wines, and likewise of ice; chose wines suited to my stomach, drinking but the quantity I knew I could digest. I did the same with meats, as well in regard to quantity as to quality, accustoming myself to contrive matters so as never to cloy my stomach with eating or drinking, but constantly rise from table with a disposition to eat and drink still more. In this I conformed to the proverb which says that a man, to consult with his health, must check his appetite. Having, in this manner and for these reasons, conquered intemperance and irregularity, I betook myself entirely to a temperate and regular life; this first affected in me that alteration which I have already mentioned; that is, in less than a year it rid me of all those disorders which had taken so deep a root in me; nay, as I have already observed, made such a progress as to be in a manner incurable. It had like-

wise this other good effect, that I no longer experienced those annual fits of sickness with which I used to be afflicted, when I followed a different, that is, a sensual, course of life; for then I used to be attacked every year with a strange kind of fever, which sometimes brought me to death's door. From this plague, then, I also freed myself, and became exceedingly healthy, as I have continued from that time forward to this day, and for no other reason than that I never trespassed against regularity, which, by its infinite efficacy, has been the cause that the meat I constantly ate, and the wine I constantly drank, being such as agreed with my constitution, and taken in proper quantities, imparted all their virtues to my body, and then left it without difficulty, and without engendering in it any bad humors.

In consequence, therefore, of my taking such methods, I have always enjoyed the best of health. It is true, indeed, that besides the two foregoing most important rules relative to eating and drinking, which I have ever been very scrupulous to observe, that is, not to take of any thing but as much as my stomach could easily digest, and to use those things only which agreed with me, I have carefully avoided heat, cold, and extraordinary fatigue, interruption of my usual hours of rest, excessive venery, making any stay in bad air, and exposing myself to the wind and sun; for these, also, are too often the causes of great disorders. But then, fortunately, there is no great difficulty in avoiding them, the love of life and health having more sway over men of understanding than any satisfaction they could find in

doing what must be extremely hurtful to their constitutions. I likewise did all that lay in my power to avoid those evils which we do not find so easy to remove; these are, melancholy, hatred, and other violent passions, which appear to have the greatest influence over our bodies. However, I have not been able to guard so well against either one or the other kind of those disorders, as not to suffer myself now and then to be hurried away by many, not to say all, of them; but I reaped one great benefit from my weakness, that of knowing by experience, that these passions have, in the main, no great influence over bodies governed by the two foregoing rules of eating and drinking, and therefore can do them but very little harm; so that it may with great truth be affirmed, that whoever observes these two capital rules, is liable to very little inconvenience from any other excess. This, Galen, who was an eminent physician, observed before me. He affirms, that, so long as he followed these two rules, relative to eating and drinking, he suffered but little from other disorders, so little, that they never gave him above a day's uneasiness. That what he says is true, I am a living witness, and so are many others who know me and have seen how often I have been exposed to heats and colds, and such other disagreeable changes of weather; and have likewise seen me (owing to various misfortunes which have more than once befallen me) greatly disturbed in mind. For they can not only say of me that such disturbance of mind has done me very little harm, but they can aver of many others, who did not lead a sober and regular life, that it proved very prejudicial to them,

amongst whom was a brother of my own, and others of my family, who, trusting to the goodness of their constitution, did not follow my way of living. The consequence hereof was of the greatest disservice to them, the perturbations of mind having thereby acquired an extraordinary influence over their bodies. Such, in a word, was their grief and dejection at seeing me involved in expensive lawsuits, commenced against me by great and powerful men, that, fearing I should be cast, they were seized with that melancholy humor with which intemperate bodies always abound; and these humors took such effect upon them, and increased to such a degree, as to carry them off before their time; whereas, I suffered nothing on the occasion, as I had in me no superfluous humors of that kind.

But I must go a step farther, and say that evils which immediately affect bodies can do very little mischief, or cause very little pain, if a regular life nas been led; and, that this is true, I have myself experienced at the age of seventy. I happened, as is often the case, to be in a coach, which, going at a pretty smart rate, was overset, and, in that condition, drawn a considerable way by the horses before means could be found to stop them; whence I received so many shocks and bruises that I was taken out with my head and all the rest of my body terribly battered, and a dislocated leg and arm. When I was brought home, the family immediately sent for the physicians, who, on their arrival, seeing me in so bad a plight, concluded that within three days I should die, nevertheless, they would try what good two things would do me;

one was to bleed me, the other, to purge me; and thereby prevent my humours altering, as they every moment expected, to such a degree as to ferment greatly, and bring on a high fever. But I, on the contrary, who knew that the sober life I had led for many years past, had so well united, harmonized, and disposed my humors, as not to leave it in their power to ferment to such a degree, refused to be either bled or purged. I just caused my leg and arm to be set, and suffered myself to be rubbed with some oils, which they said were proper on the occasion. Thus, without using any kind of remedy, I recovered, as I thought I should, without feeling the least alteration in myself, or any other bad effects from the accident; a thing which appeared no less miraculous in the eyes of the physicians. Hence we are to infer, that whoever leads a sober and regular life, and commits no excess in his diet, can suffer but very little from disorders of any kind, or external accidents. On the contrary, I conclude, especially from the late trial I have had, that excesses in eating and drinking are fatal. Of this I convinced myself four years ago, when, by the advice of my physicians, the instigation of my friends, and the importunity of my own family, I consented to such an excess, which, as it will appear hereafter, was attended with far worse consequences than could naturally be expected. This consisted in increasing the quantity of food I generally made use of; which increase alone brought on me a most cruel fit of sickness. And, as it is a case so much in point to the subject in hand,

and the knowledge of it may be useful to some of my readers, I shall take the trouble to relate it.

I say, then, that my dearest friends and relations, actuated by the warm and laudable affection and regard they had for me, seeing how little I ate, represented to me, in conjunction with my physicians, that the sustenance I took could not be sufficient to support one so far advanced in years, when it was become necessary not only to preserve nature, but also to increase its vigor. That, as this could not be done without food, it was absolutely incumbent upon me to eat a little more plentifully. I, on the other hand, produced my reasons for not complying with their desires. These were, that nature is content with little, and that with this little I had preserved myself so many years; and that, to me, the habit of it was become a second nature; besides, it was more agreeable to reason, that, as I advanced in years, and lost my strength, I should rather lessen than increase the quantity of my food. Further, that it was but natural to think that the powers of the stomach grew weaker from day to day; on which account I could see no reason to make such an addition. To corroborate my arguments, I alleged those two natural and very true proverbs; one, that he who has a mind to eat a great deal must eat but little; which is said for no other reason than this, that eating little makes a man live very long, and, living very long, he must eat a great deal. The other proverb was, that what we leave after making a hearty meal does us more good than what we have eaten. But neither these proverbs, nor any other arguments I could

think of, were able to prevent their teasing me more than ever. Wherefore, not to appear obstinate, or affecting to know more than the physicians themselves, but, above all, to please my family, who very earnestly desired it, from a persuasion that such an addition to my usual allowance must preserve the tone of my stomach, I consented to increase the quantity of food, but by two ounces only. So that, as before, what with bread, meat, the yolk of an egg, and soup, I ate as much as weighed in all twelve ounces, neither more nor less, I now increased it to fourteen; and, as before I drank but fourteen ounces of wine, I now increased it to sixteen. This increase and irregularity had, in eight days' time, such an effect upon me that, from being cheerful and brisk, I began to be peevish and melancholy, so that nothing could please me, and was constantly of so strange a temper that I neither knew what to say to others, nor what to do with myself. On the twelfth day I was attacked with a most violent pain in my side, which held me twenty-two hours, and was succeeded by a terrible fever, which continued thirty-five days and as many nights, without giving me a moment's respite, though, to say the truth, it began to abate gradually on the sixteenth; but, notwithstanding such abatement, I could not, during the whole time, sleep half a quarter of an hour together, insomuch that every one looked upon me as a dead man; but, God be praised, I recovered merely by my former regular course of life, though then in my seventy-eighth year, and in the coldest season of a very cold year, and reduced to a mere skeleton; and I am positive that it was the great regularity I

observed for so many years, and that only, which rescued me from the jaws of death. In all that time I never knew what sickness was, unless I may call by that name some slight indispositions of the continuance of a day or two; the regular life I had led, as I have already taken notice, for so many years not having permitted any superfluous or bad humors to breed in me; or, if they did, to prevent them acquiring such strength and malignity as they generally acquire in the superannuated bodies of those who live without rule. And, as there was not any old malignity in my humors (which is the thing that kills people), but only that which my new irregularity had occasioned, this fit of sickness, though exceedingly violent, had not strength enough to destroy me. This it was, and nothing else, that saved my life; whence may be gathered how great is the power and efficacy of regularity; and how great likewise is that of irregularity, which, in a few days, could bring on me so terrible a fit of sickness, just as regularity had preserved me in health for so many years.

By attending duly to what I have said a man becomes his own physician, and, indeed, the best he could have, since no man can be a perfect physician to any one but himself; the reason of which is, that any man may, by repeated trials, acquire a perfect knowledge of his own constitution, and the most hidden qualities of his body, and what wine and food agree with his stomach. Now, it is so far from being an easy matter to know these things perfectly of another, that we cannot, without much trouble, discover them in ourselves, since a great deal of time and repeated trials are requisite for that purpose.

These trials are (if I may so express it) more than necessary, as there is a greater variety in the natures and stomachs of different men than in their persons. Who could believe that old wine—wine that had passed its first year—should disagree with my stomach, and new wine agree with it; and that pepper, which is looked upon as a warm spice, should not have a warm effect upon me, insomuch that I find myself more warmed and comforted by cinnamon? Where is the physician that could have informed me of these two latent qualities, since I myself, even by a long course of observation, could scarce discover them? From all these reasons it follows that it is impossible to be a perfect physician to another. Since, therefore, a man cannot have a better physician than himself, nor any physic better than a regular life, a regular life he ought to embrace.

I do not, however, mean that, for the knowledge and cure of such disorders as often befall those who do not live regularly, there is no occasion for a physician, and that his assistance ought to be slighted. For if we are apt to receive such great comfort from friends, who come to visit us in our illness, though they do no more than testify their concern for us, and bid us be of good cheer, how much more regard ought we to have for the physician, who is a friend that comes to see us in order to relieve us, and promise us a cure? But for the bare purpose of keeping ourselves in health, I am of opinion that we should consider as a physician this regular life, which, as we have seen, is our natural and proper physic, since it preserves men, even those of a bad constitution, in health;

makes them live sound and hearty to the age of one hundred and upwards. However, to confess the truth, men, for the most part, are very sensual and intemperate, and love to satisfy their appetites, and to commit every excess; therefore, seeing that they cannot avoid being greatly injured by such excess as often as they are guilty of it, they, by way of apologizing for their conduct, say that it is better to live ten years less, and enjoy themselves, not considering of what importance are ten years more of life, especially a healthy life, and at a maturer age, when men become sensible of their progress in knowledge and virtue, which cannot attain to any degree of perfection before this period of life.

Thus, I have assigned my reasons for abandoning intemperance, and betaking myself entirely to a sober life, with the method I pursued in doing so, the consequences resulting from it, and, finally, the advantages and blessings which a sober life confers upon those who embrace it. Some sensual, inconsiderate persons affirm that a long life is no blessing, and that the state of a man who has passed his seventy-fifth year cannot really be called life, but death; but this is a mistake, as I shall fully prove; and it is my sincere wish that all men would endeavor to attain my age, in order that they also may enjoy that period of life which of all others is the most desirable.

I will therefore give an account of my recreations. I mount my horse without any assistance or advantage of situation; I climb up hill from bottom to top, afoot, and with the greatest ease and unconcern; then how gay

pleasant, and good-humored I am; how free from every perturbation of mind, and every disagreeable thought, in lieu of which joy and peace have so firmly fixed their residence in my bosom as never to depart from it. Many persons know in what manner I pass my time, so as not to find life a burden, seeing I can contrive to spend every hour of it with the greatest delight and pleasure, having frequent opportunities of conversing with many honorable gentlemen; men valuable for their good sense and manners, their acquaintance with letters, and every other good quality. Then, when I cannot enjoy their conversation, I betake myself to the reading of some good book. When I have read as much as I like, I write, endeavoring in this, as in every thing else, to be of service to others, to the utmost of my power.

These things I do with the greatest ease to myself, at their proper seasons, in a house of my own, which, being situate in the most beautiful quarter of Padua, is in itself really convenient and handsome, such, in a word, as it is no longer the fashion to build; for, in one part of it, I can shelter myself from extreme heat, and, in the other, from extreme cold; having contrived the apartments according to the rules of architecture, which teach us what is to be observed in practice. Besides this house, I have my several gardens, supplied with purling streams, in which I always find something to do that amuses me.

Whence it appears that the life I lead is cheerful, and not gloomy as some persons pretend who know no better, to whom, in order that it may appear what value I set on every other kind of life, I must declare that I would not

exchange my manner of living, or my grey hairs, with any of those young men, even of the best constitution, who give way to their appetites.

Besides all these blessings, I mention another which I enjoy, and so great a blessing that I am ever amazed at it, since it is altogether beside the usual course of nature. This blessing is, that I should pass fifty in spite of a most powerful and mortal enemy I carry about me, and which I can by no means conquer, because it is natural, or an occult quality implanted in my body by nature; and this is, that every year, from the beginning of July to the end of August, I cannot drink any wine, of whatever kind or country; for, besides being these two months quite disgustful to my palate, it disagrees with my stomach. Thus, losing my milk (for wine is indeed the milk of old age), and having nothing to drink, for no change of preparation of waters can have the virtue of wine, nor, of course, do me any good; having nothing, I say, to drink, and my stomach being thereby disordered, I can eat but very little, and this spare diet, with the want of wine, reduces me by the middle of August, extremely low; nor is the capon broth, or any other remedy, of service to me; so that I am ready, through mere weakness, to sink into the grave. Hence I must infer that were not the new wine (for I always take care to have some ready by the beginning of September), to come in so soon, I should be a dead man. But what is still more surprising is that this new wine should have power sufficient to restore me, in two or three days, to that degree of health and strength of which the old wine had robbed me.

[FROM A LATER TREATISE.]

The man who is naturally of a bad constitution may, by dint of reason and a sober life, live to a great age and in good health, as I have done, who had naturally the worst, so that it was impossible I should live above forty years; whereas I now find myself sound and hearty at the age of eighty-six; and, were it not for the long and violent fits of illness which I experienced in my youth, to such a degree that the physicians gave me over, and which robbed me of my radical moisture, a loss absolutely irreparable, I might expect to attain the above-mentioned term of one hundred. It is enough for me that I have lived forty-six years beyond the term I had a right to expect; and that during this long respite all my senses have continued perfect; and even my teeth, my voice, my memory, and my heart. But what is still more, my brain is more itself now than ever it was; nor do any of these powers abate as I advance in years; and this because, as I grow older, I lessen the quantity of my solid food.

This retrenchment is necessary; nor can it be avoided, since it is impossible for a man to live forever; and, as he draws near his end, he is reduced so low as to be no longer able to take any nourishment, unless it be to swallow, and that with difficulty, the yolk of an egg in the four-and-twenty hours, and thus end by mere dissolution, without any pain or sickness, as I expect will be my case. This is a blessing of great importance, yet may be expected by all those who shall lead a sober life, of what-

ever degree or condition, whether high or middling or low; for we are all of the same species, and composed of the same four elements. And since a long and healthy life ought to be greatly coveted by every man, I conclude that every man is bound in duty to exert himself to attain longevity, and that he cannot promise himself such a blessing without temperance and sobriety.

Some allege that many, without leading such a life, have lived to a hundred, and that in constant health, though they ate a great deal, and used indiscriminately every kind of viands and wine, and therefore flatter themselves that they shall be equally fortunate. But in this they are guilty of two mistakes; the first is, that it is not one in a hundred thousand that ever attains that happiness; the other mistake is, that such, in the end, most assuredly contract some illness, which carries them off; nor can they ever be sure of ending their days otherwise, so that the safest way to attain a long and healthy life is, at least after forty, to embrace sobriety. This is no such difficult affair, since history informs us of so many who, in former times, lived with the greatest temperance; and I know that the present age furnishes us with many such instances, reckoning myself one of the number; we are all human beings and endowed with reason, consequently we are masters of all our actions.

This sobriety is reduced to two things, quality and quantity. The first, namely, quality, consists in nothing but not eating food, or drinking wines, prejudicial to the stomach. The second, which is quantity, consists in not eating or drinking more than the stomach can easily

digest; which quantity and quality every man should be a perfect judge of, by the time he is forty, or fifty, or sixty; and whoever observes these two rules may be said to live a regular and sober life. This is of so much virtue and efficacy, that the humors of such a man's body become most homogeneous, harmonious, and perfect; and, when thus improved, are no longer liable to be corrupted or disturbed by any other disorders whatsoever, such as suffering excessive heat or cold, too much fatigue, want of natural rest, and the like, unless in the last degree of excess. Wherefore, since the humors of persons who observe these two rules relative to eating and drinking, cannot possibly be corrupted, and engender acute diseases, the sources of an untimely death, every man is bound to comply with them; for whoever acts otherwise, living a disorderly instead of a regular life, is constantly exposed to disease and mortality, as well in consequence of such disorders as of others without number, each of which is capable of producing the same destructive effect.

It is indeed true, that even he who observes the two rules relating to diet, the observance of which constitutes a sober life, may, by committing any one of the other irregularities, find himself the worse for it a day or two; but not so as to breed a fever. He may likewise be affected by the revolutions of the heavens; but neither the heavens nor those irregularities are capable of corrupting the humors of a temperate person; and it is but reasonable and natural it should be so, as the two irregularities of diet are interior, and the others exterior.

But as there are some persons, stricken in years, who

are, notwithstanding, very sensual, and allege that neither the quantity nor the quality of their diet makes any impression upon them, and therefore eat a great deal of every thing, without distinction, and indulge themselves equally in point of drinking, because they are insensible in what part of their bodies their stomachs are situate; such, no doubt, are beyond measure sensual, and slaves to gluttony. To these I answer that what they say is impossible in the nature of things, because it is impossible that every man who comes into the world should not bring with him a hot, a cold, or a temperate constitution; and that hot foods should agree with hot constitutions, cold with cold ones, and things that are not of a temperate nature with temperate ones, is likewise impossible in nature. After all, these epicures must allow that they are now and then out of order, and that they cure themselves by taking evacuating medicines, and observing a strict diet. Whence it appears that their being out of order is owing to their eating too much, and of things disagreeing with their stomach.

Some say that it is necessary they should eat and drink a great deal to keep up their natural heat, which is constantly diminishing as they advance in years; and that it is therefore their duty to eat heartily, and of such things as please their palate, be they hot, cold, or temperate; and that were they to lead a sober life it would be a short one. To this I answer, that our kind mother, Nature, in order that old men may still live to a greater age, has contrived matters so that they should be able to subsist on little, as I do; for large quantities of food

cannot be digested by old and feeble stomachs. Nor should such persons be afraid of shortening their days by eating too little, since, when they happen to be indisposed, they recover by eating a mere trifle; for it is a trifle they eat when confined to a regimen, by observing which they get rid of their disorder. Now, if, by reducing themselves to a very small quantity of food, they recover from the jaws of death, how can they doubt but that, with an increase of diet, still consistent, however, with sobriety, they will be able to support nature when in perfect health?

Others say that it is better for a man to suffer every year three or four returns of his usual disorders, such as the gout, sciatica, and the like, than be tormented the whole year by not indulging his appetite, and eating every thing his palate likes best, since, by a good regimen alone, he is sure to get the better of such attacks. To this I answer, that, our natural heat growing less and less as we advance in years, no regimen can retain virtue sufficient to conquer the malignity with which disorders of repletion are ever attended; so that he must die at last of these periodical disorders, because they abridge life in the same proportion as health prolongs it.

Others pretend that it is much better to lose ten years than not indulge one's appetite. To this I answer that longevity ought to be highly valued by men of parts; as to others, it is no great matter if it is not duly prized by them, since they are a disgrace to mankind, so that their death is rather of service to the public. But it is a great misfortune that men of bright parts should be cut off in that manner.

There are others who, though their stomachs become weaker and weaker as they advance in years, cannot, however, be brought to retrench the quantity of their food; nay, they rather increase it. And because they find themselves unable to digest the great quantity of food with which they must load their stomachs, by eating twice in the four and twenty hours, they make a resolution to eat but once, that the long interval between one meal and the other may enable them to eat, at one sitting, as much as they used to do in two; thus they eat till their stomachs, overburdened with much food, pall and sicken, and change the superfluous food into bad humors, which kill a man before his time. I never met with a *very* aged person who led that manner of life. All these old men I have been speaking of would live long, if, as they advanced in years, they lessened the quantity of their food, and ate oftener, but little at a time; for old stomachs cannot digest large quantities of food; old men changing in that respect to children, who eat several times in the four and twenty hours.

Others say that a sober life may indeed keep a man in health, but that it cannot prolong life. To this I answer, that experience proves the contrary, and that I myself am a living instance of it. It cannot, however, be said that sobriety is apt to shorten one's days as sickness does; for that the latter abbreviates life is not to be doubted. Notwithstanding, a man had better be always jocund and hearty than be obliged to submit now and then to sickness, in order to keep up the radical moisture. Hence it may be fairly concluded that holy sobriety is the true parent of health and longevity.

EXTRACT FROM A LETTER

WRITTEN BY

A NUN OF PADUA,

THE GRANDDAUGHTER OF CORNARO.

Cornaro was a man of understanding, merit, and courage. He loved glory, and was naturally liberal; nevertheless, without profuseness. His youth was infirm, being very passionate and hasty; but, when he perceived what damages the vices of his temper caused him, he resolved to correct them, and had command enough of himself to conquer his passion, and those extravagant humors to which he was subject. After this glorious victory he became so moderate, mild, and affable, that he gained the esteem and friendship of all those who knew him.

He was extraordinarily sober, observed the rules which he mentions in his writings, and dieted himself always with so much wisdom and precaution, that, finding his natural heat decaying by degrees in his old age, he also diminished his diet by degrees, so far as to stint himself to the yolk of an egg for a meal, and sometimes, a little before his death, it served him for two meals.

By this means he preserved his health, and was also vigorous, to the age of a hundred years; his mind did

not decay, he never had need of spectacles, neither lost he his hearing.

And that which is no less true than difficult to believe, is, that he preserved his voice so clear and harmonious, that, at the end of his life, he sang with as much strength and delight as he did at the age of twenty-five years.

He had foreseen that he should live long without any infirmity, and was not deceived in it. When he felt that his last hour drew near, he disposed himself to leave this life with the piety of a Christian and the courage of a philosopher. He made his will, and set all his affairs in order; after which he received the last sacraments, and expected death patiently in an elbow-chair. In short, it may be said that, being in good health, feeling no manner of pain, having also his mind and eye brisk, a little fainting fit took him, which was instead of an agony, and made him fetch his last breath. He died at Padua April 26, 1566, and was buried May 8, following.

His wife died some years afterwards. Her life was long, and her old age as happy as that of her spouse, only her latter days were not altogether like his. Some time before her death she was seized with a lingering, which brought her to her grave. She gave up her soul one night in her bed, without any convulsive motions and with so perfect a tranquility that she left this life without being perceived.

A SOCIETY DINNER

By SIR HENRY THOMPSON.

Only a few years ago excellence in quality and good taste in cuisine were often sacrificed in the endeavor to make a profuse display. Hence abundance without reason, and combinations without judgment, were found co-existing with complete indifference to comforts in the matters of draughts, ventilation, temperature, and consumption of time. Who among the diners-out of middle age has not encountered many a time an entertainment with some such programme as the following—one of an order which, it is to be feared, is not even yet quite extinct?

"Eighteen or twenty guests enter a room adapted at most to a dinner of twelve. It is lighted with gas; the chief available space being occupied by the table, surrounding which is a narrow lane barely sufficing for the circulation of the servants. Directly — perhaps after oysters—appear turtle soups thick and clear. A consomme is to be had on demand, but so unexpected a choice astonishes the servitor, who brings it after some delay, and cold; with it punch. Following arrive the fish—salmon and turbot, one or both, smothered in thick lobster sauce; sherry. Four entrees promenade the circuit in single file, whereof the first was always oyster patties, after which came mutton or lamb cutlets, a vol-au-vent, etc., hock and champagne. Three-quarters of

an hour at least, perhaps an hour, having now elapsed, the saddle or haunch of mutton arrives, of which gentlemen who have patiently waited get satisfactory slices and currant jelly, with cold vegetables or a heavy, flabby salad. Then come boiled fowl and tongue, or a turkey with solid force meat, a slice of ham, and so on, up to game, followed by hot, substantial pudding; three or four other sweets, including an iced pudding; wines in variety more or less appropriate, to be followed by a pate de foie gras, more salad, biscuits, and cheese. Again two ices and liqueurs. Then an array of decanters, and the first appearance of red wine; a prodigious dessert of all things in and out of season, and particularly those which are out of season, as being the more costly. General circulation of waiters, handing each dish in turn to everybody, under a running fire of negatives, a ceremonial of fifteen minutes' duration, to say the least. Circulation of decanters, general rustle of silks, disappearance of the ladies, and first change of seat precisely two and a half hours after taking it. It may be hoped that a charming companion on either side has beguiled and shortened a time which otherwise must have been tedious. Now general closing up of men to host, and reassembling of decanters; age, quality, and vintage of wine discussed during consumption thereof. At last coffee, which is neither black nor hot. Joining the ladies; music by the daughters of the house; service of gunpowder tea, fatal to the coming night's rest if taken in a moment of forgetfulness; and carriages announced."

THE ART OF LIVING

By WILLIAM KINNEAR.

[*From the North American Review, June*, 1893.]

Very few people, it is safe to say, desire old age. Men and women harassed by trouble, or overpowered by sorrow, surrounded by disgrace, or tortured by pain, may long for death, but not for a hundred or two hundred years of human life. Old age is of two kinds. One, the calm passing of many years; the other, brought about by excesses either mental or physical. The latter is not within the province of this brief essay. Without good health and faculties, trained by sobriety and temperance in all things, both of mind and body, long life would be an intolerable tedium. To die would indeed be great gain in such a case. The possibility of living two hundred years in average good health seems to many a wild sort of scientific dream. So did crossing the Atlantic by steamships; so did conveying intelligence by electricity; so did all the many startling inventions of these latter days. Every week we read of people who have lived to be a hundred or a hundred and ten years old. Let us not be surprised at any thing.

We cannot defy death. But we may, by searching, find certain secrets of nature and apply them to the renewal of the organs whose decay is constantly going on

in the body. Anatomical experiment and investigation show that the chief characteristics of old age are deposits of earthy matter of a gelatinous and fibrinous character in the human system. Carbonate and phosphate of lime, mixed with other salts of a calcareous nature, have been found to furnish the greater part of these earthy deposits. As observation shows, man begins in a gelatinous condition; he ends in an osseous, or bony, one—soft in infancy, hard in old age. By gradual change in the long space of years the ossification comes on; but, after middle life is passed, a more marked development of the ossific character takes place. Of course these earthy deposits, which affect all the physical organs, naturally interfere with their functions. Partial ossification of the heart produces the imperfect circulation of the blood which affects the aged. When the arteries are clogged with calcareous matter there is interference with the circulation upon which nutrition depends. Without nutrition there is no repair of the body. Hence in his work "The Physiology of Common Life," G. H. Lewes states that "If the repair were always identical with the waste life would only then be terminated by accident, *never by old age*." Both Bichat and Baillie considered that the greater number of people past sixty suffer more or less from arterial ossification, which brings about obstructions in the proper and healthy circulation of the blood.

None of these things interferes with nutrition and circulation in early years. The reparation of the physical system, as every one ought to know, depends on this

fine balance. In fact, the whole change is merely a slow, steady accumulation of calcareous deposits in the system. The physical organs cannot preserve the balance between waste and nutrition. This is what we call old age. Nutrition in the earlier years of life is perfectly performed. Repairs are at once promptly attended to by the young blood. To repair the waste of the body, so that the exquisite equipoise called perfect health may be maintained, and the decay and blockage which advances with age may be kept at bay, is to prolong our years. If this secret be known, why not hundreds of years of life? Keep the means of repair of the system always in good working order, and you live, according to nature, in the highest, finest sense. Then, what are the means of checking these osseous and cartilaginous enemies of life?

The oxygen of the atmosphere is a most destructive element in many respects. Researches of a recent scientific character have shown that the origin of one of the sources of old age, namely, fibrinous and gelatinous matter, can be traced to the destructive action of atmospheric oxygen. Now, the relative proportions of oxygen and nitrogen in the air we constantly breathe are 22 of the former to 78 of the latter. Oxygen is the more active, aggressive element of the two, though of much smaller bulk. For every other element except fluorine, oxygen has an affinity, thus forming oxides. In the chemical changes constantly taking place in our bodies oxygen plays the most important part by all odds. By

oxidation, which is a constant waste or rust of life, the physical system is hourly destroyed, and then again built up by the reparation of the food we live upon. Albumen and fibrine exist in the blood, and are resolved into their component elements, carbon, hydrogen, nitrogen, oxygen, sulphur, and phosphorus. By oxidation, the albumen is converted into fibrine, which nourishes the organs of our bodies. But in repairing their waste an excess of this substance accumulates in the blood vessels, causing their induration, and thus gradually lessening their caliber. Gelatine is an oxide of fibrine, as fibrine is an oxide of albumen. Oxidation causes these substances in part to be decomposed, and afterwards eliminated through the kidneys. A constant struggle is daily going on in our bodies when in the most perfect health between accumulation and elimination. And these accumulations, becoming greater in old age than the power of elimination, produce the effects we term feeling one's age.

In order to extend and prolong life, how shall they be counteracted? Let us see. Seventy per cent of the human body is water—nearly three-fourths. Not a single tissue is there in which water is not found as an ingredient. Certain salts are held in solution by this water, portions of which—notwithstanding the large quantity eliminated by the secretions — become more or less deposits in the body. When these become excessive and resist expulsion they then cause the stiffness and dryness of old age. Entire blockage of the functions of the body is then a mere matter of time, and the refuse matter

deposited by the blood, in its constant passage through the system, stops the delicate and exquisite machinery which we call life. This is death. It has been proved by analysis that human blood contains compounds of lime, magnesia, and iron. In the blood itself are thus contained the earth salts. In early life they are thrown off. Age has not power to do it.

Hence, as blood is produced by assimilation of the food we eat, to this food we must look for the earthy accumulations which in time block up the system and bring on old age. It is thus seen that in the necessary elements of nutrition lurk the enemies of life, for food contains salts of a calcareous character. Does it then follow that man, by careful selection of his daily food, may prolong his life? In a measure, yes. Bathing, pure air to live and sleep in, exercise, and other means of preserving health, must be attended to, of course; but what we put into our mouths to make our blood is the important matter either in retaining health or prolonging life. Almost every thing we eat contains more or less of these elements for destroying life by means of calcareous salts deposited by the all-nourishing blood. Careful selection, however, may enable us to avoid the worst of them.

Paradoxical as it may sound, certain foods which we put into our mouths to preserve our lives help at the same time to hurry us to the inevitable gate of the cemetery. Earth salts abound in the cereals, and bread itself, though seemingly the most innocent of edibles, greatly assists in the deposition of calcareous matter in our

bodies. Nitrogeneous food abounds in this element. Hence, a diet made up of fruit principally is best for people advancing in years, for the reason that, being deficient in nitrogen, the ossific deposits so much to be dreaded are more likely to be suspended. Moderate eaters have in all cases a much better chance of long life than those addicted to excesses of the table. Blockages of the functions of the stomach are more usual to those who eat more than the stomach can utilize than to light eaters.

Mr. De Lacy Evans, who made many careful researches in these regions of science, comes to the conclusion that fruits, fish, and poultry, and young mutton and veal contain less of the earthy salts than other articles of food, and are, therefore, best for people entering the vale of years. Beef and old mutton usually are overcharged with salts and should be avoided. If one desires to prolong life, therefore, it seems that moderate eating and a diet containing a minimum amount of earthy particles is most suitable to retard old age by preserving the system from functional blockages. Excessive action of atmospheric oxygen must be counteracted. Ossific matter deposited in the body must be dissolved as far as practicable. To produce the desired effect distilled water and diluted phosphoric acid are perhaps the most efficacious and the least harmless. Their combined chemical action retards old age.

The powerful solvent properties of distilled water are well known. As carbonate of lime exists in nearly all

drinking water the careful distillation eliminates this harmful element. As a beverage distilled water is rapidly absorbed into the blood; it keeps soluble those salts already in the blood and facilitates their excretion, thus preventing their undue deposit. The daily use of distilled water is, after middle life, one of the most important means of preventing secretions and the derangement of health. As to diluted phosphoric acid, it is one of the most powerful influences known to science for shielding the human system from the inconveniences of old age. Daily use of it mixed with distilled water helps to retard the approach of senility. By its affinity for oxygen the fibrinous and gelatinous deposits previously alluded to are checked, and their expulsion from the system hastened. Waste of the tissues is believed to be preventable also by the use of hypophosphites.

Hence, to sum up: The most rational modes of keeping physical decay or deterioration at bay, and thus retarding the approach of old age, are avoiding all foods rich in the earth salts, using much fruit, especially juicy, uncooked apples, and by taking *daily* two or three tumblerfuls of distilled water with about ten or fifteen drops of diluted phosphoric acid in each glassful.

As some objector may say, "I would not take all this minute and daily trouble to live 200 years—better a short life and a merry one." I will only answer, Take your choice.

EXTRACTS FROM THE ESSAYS OF

S. ROWBOTHAM.

We have seen that a process of consolidation begins at the earliest period of existence, and continues without interruption until the body is changed from a comparatively fluid, elastic, and energetic state, to a solid, earthy, rigid, inactive condition, which terminates in death — that infancy, childhood, youth, manhood, old age, and decrepitude are but so many different conditions of the body or stages of the process of consolidation or ossification—that the only difference in the body between old age and youth is the greater density, toughness, and rigidity, and the greater proportion of calcareous earthy matter which enters into its composition. The question now arises, What is the source of the calcareous earthy matter which thus accumulates in the system? It seems to be regarded as an axiom that all the solids of the body are continually built up and renewed from the blood. If so, every thing which these solids contain is derived from the blood; the solids contain phosphates and carbonate of lime, which are therefore derived from the blood, in which, as already shown, these earthy substances are invariably found to a greater or less extent. The blood is renewed from the chyle; which is always found upon analysis to contain the same

earthy substances as the blood and the solids. The chyle is renewed from chyme, and ultimately from the food and drink. The food and drink, then, which nourish the system, must, at the same time, be the primary source of the calcareous earthy matter which enters into the composition of the chyme, the chyle, and the blood; and which is ultimately deposited in all the tissues, membranes, vessels, and solids of the body—producing old age, decrepitude, and natural death.

Common table salt, which is used in the preparation of almost every kind of food, and along with many of our meals, contains a fearfully large amount of calcareous earthy matter; and is productive of very great mischief to the animal economy.

Many elaborate articles have been written, and some by very learned philosophers, to account for the declared absolute necessity for the use of salt in carrying on the general functions of the body. But this supposed necessity for the use of salt is merely an opinion derived from some of the many theories held in the present day to account for the different phenomena connected with organization and life. There is no foundation in fact for such an opinion. Whole tribes and nations of powerful, active persons are known to have subsisted without even the knowledge of salt. The author of these remarks and several of his friends have lived without salt more than two years without any injurious consequences, but, on the contrary, with considerable advantage. There cannot be a doubt that if persons who have been in the

habit of consuming salt freely should suddenly abandon its use, much evil might arise, just as it might by any other change of habits; but if the change is made by degrees, and the old articles of diet gradually removed by the substitution of new ones, such changes may be wrought in the body without injury as would appear at first sight incredible.

Bread (from wheaten flour), when considered in reference to the amount of nutritious matter it contains, may with justice be called the staff of life; but in regard to the amount of earthy matter, we may with equal justice pronounce it the "staff of death."

Spring water contains an amount of earthy ingredients which is fearful to contemplate. It certainly differs very much in different districts and at various depths; but it has been calculated that water of an average quality contains so much carbonate and other compounds of lime that a person drinking an average quantity each day will, in forty years, have taken as much into the body as would form a pillar of solid chalk or marble as large as a good-sized man. So great is the amount of lime in spring water that the quantity taken daily would alone be sufficient to choke up the system, so as to bring on decrepitude and death long before we arrived at twenty years of age were it not for the kidneys and other secreting organs throwing it off in considerable quantities. These organs, however, only discharge a portion of this matter; for instance, supposing ten parts to be taken during a day, eight or nine may be thrown out, and one or two lost somewhere

in the body. This process continuing day after day and year after year, the solid matter at length accumulates, until the activity and flexibility of childhood become lost in the enfeebled rigidity of what is then called, though very erroneously, "old age." A familiar instance of earthy deposition and incrustation from water is observed in a common tea-kettle or steam boiler. Every housewife knows that a vessel which is in constant use will soon become "furred up" or plastered on the bottom and sides with a hard, stony substance. Four and five pounds weight of this matter have been known to collect in twelve months. The reader must not mislead himself by thinking that because so much lime is found in a tea-kettle, the water, after boiling, is therefore free from lime. It is true, boiling water does cause a little carbonate of lime to precipitate, but the bulk of the sediment is left from that portion of the water only which is driven off as steam, or boiled away. This can easily be ascertained by testing the water both before and after boiling. It will be found to contain earthy particles, however long the boiling may continue. Filtering it is also of no use; for this only removes what may be floating or mechanically mixed in the water; whereas the earthy matter here spoken of is held in solution. So that spring water, clear and transparent as it may appear, is nevertheless charged with a considerable amount of solid choking-up matter, and is therefore in any form unfit, or at least is not the best suited for internal use. The only means whereby it can be rendered perfectly pure and fit

for unlimited consumption is distillation. A very simple apparatus might be attached to a kitchen fire so as to be of very little trouble, and yet to gradually distill as much water as would be required for a family. There cannot be a doubt that distilling the water intended for tea, coffee, soup, and other internal purposes, even without any other change in diet, would diminish disease and add many years to our existence.

These facts, and many others which could be advanced, all tend to support and prove the position, that the food and drink alone are the source of the calcareous earthy matter which is gradually deposited in the body, and which by degrees brings on a state of induration, rigidity, and consequent decrepitude, which ends in a total cessation of consciousness or death. We have seen that different kinds of food and drink contain these earthy elements in different proportions, and we cannot avoid the conclusion, that the more we subsist upon such articles as contain the largest amount, the sooner shall we choke up and die; and the more we live upon such substances as are comparatively free, the longer will health, activity, and life continue.

EXTRACTS FROM

DR. DE LACY EVANS

IN "HOW TO PROLONG LIFE."

What is man without health, even if endowed with riches? Take away the latter and their accompanying luxuries—only give him health; this accomplished, the first desire is a return of the riches. But with both a word remains which we hate to utter, a thought we dread to contemplate, a thing which gives sorrow, pain, and grief. That word, that thought, that thing, is *Death*. Even in cases where life appears a burden, how tenaciously do men cling to it! How the spirit recoils from a struggle with Death! How fondly it retains its grasp of life! Man's great desire is for health and long life on earth; to this there are but some few exceptions—the result of incidental impressions. "Man clings to the world as his home, and would fain live here forever."

It has long been the opinion of scientific men that by a suitable life and regularity the blessings of life may be enjoyed in fair health to a "green old age." The purpose of this work is to show that we may for a time curb the causes which are visible in effect as age advances, and thus prolong life; and further, that by other means,

founded upon simple facts, we may accomplish this for a lengthened period.

In "old age" the body differs materially from youth, in action, sensibility, function, and composition. The active, fluid, sensitive, and elastic body of youth gradually gives place to induration, rigidity, and decrepitude, which terminate in "natural death." In nature there are distinct reasons for every change, for development, growth, decomposition, and death. If, with our minds free from theory, and unbiased by hypotheses, we ask nature the cause of these changes, she will surely answer us. Let us ask her the cause of these differences between youth and old age—why the various functions of the body gradually cease; why we become "old" and die. The most marked feature in old age is that a fibrinous, gelatinous, and earthy deposit has taken place in the system; the latter being composed chiefly of phosphate and carbonate of lime, with small quantities of sulphate of lime, magnesia, and traces of other earths.

Among physiologists and medical philosophers generally, the idea prevails that the "ossification" (or the gradual accumulation of earthy salts in the system) which characterizes "natural death" is the *result* of "old age," but investigation shows that such an explanation is unsatisfactory. For, in the first place, if "old age" (which is really the number of years a person has lived) is the cause of the ossification which accompanies it, then, if "like causes produce like effects," *all* of the same age should be found in the same state of ossification; but

investigation proves beyond all doubt that such is not the case. How common it is to see individuals about fifty years old as aged and decrepit as others at seventy or eighty!

We now come to the most important change of all, which fully accounts for the many differences in the brain existing between youth and old age, that is, the changes in the blood vessels supplying it. The arteries in old age become thickened and lessened in caliber from fibrinous, gelatinous, and earthy deposits. This is more easily detected in the larger vessels; but all, even to the most minute subdivisions, undergo the same gradual change. Thus, the supply of blood to the brain becomes less and less; hence the diminution in size of the organ from the prime of life to old age; hence the functions of the brain become gradually impaired; the vigorous brain of middle life gradually giving place to loss of memory, confusion of ideas, inability to follow a long current of thought, notions oblivious of the past, and regardless as to the future, carelessness of momentary impressions, softening of the brain, and that imbecility so characteristic of extreme age.

Copland, Hooper, M. Rayer, M. Cruveilheir, M. Rostan, M. Recamier, and others show that ossification and thickening of the arteries of the brain has not been overlooked, but that it is a fact which has been known for many years; also, that this gradual process of ossification is not due to any inflammatory action. And we shall show that this earthy matter has been deposited from the blood, and increases year by year with old age, thus lessening the

caliber of the larger vessels partially, and in some cases fully, "clogging up" the capillaries, gradually diminishing the supply of blood to the brain, causing its diminution in size in old age, and fully accounting for the gradual loss of the mental capabilities before enumerated.

As age advances, the energies of the *ganglial system* decline; digestion, circulation, and the secretory functions are lessened; the *ganglia* diminish in size, become firmer, and of a deeper hue. In old age the *nerves* become tougher and firmer, the medullary substance diminishes, and their blood-vessels lessen in caliber. The sensibility of the whole cerebro-spinal system decreases, hence diminution of the intellectual powers, lessened activity and strength in the organs of locomotion in advanced age.

* * * * * *

In the foregoing pages we have pointed out the differences existing between youth and old age. In the former the various organs and structures are elastic, yielding, and pliable; the senses are keen, the mind active. In the latter these qualities are usurped by hardness, rigidity, and ossification; the senses are wanting in susceptibility, the mind in memory and capacity.

Further, that these changes are due, firstly, to a gradual accumulation of fibrinous and gelatinous substances; secondly, to a gradual deposition of earthy compounds, chiefly phosphate and carbonate of lime. These, acting in concert, diminish the caliber of the larger arterial vessels, and by degrees partially, and sometimes fully,

obliterate the capillaries. By these depositions every organ and structure in the system is altered in density and function; the fluid, elastic, pliable, and active state of body gives place to a solid, inactive, rigid, ossified, and decrepit condition. The whole system is "choked up"; the curtain falls, the play of life is ended, terminating in so-called "natural death."

The general impression is that this accumulation of fibrinous, gelatinous, and osseous matter is the *result* of old age—the result of time, the remote *effects* of the failure of that mysterious animal principle, life.

We will now inquire into the *source* of these depositions, which gradually accumulate from the first period of existence to old age.

As the *blood* is built up from the *chyle* (which is formed from the chyme by the action of the bile and pancreatic fluid), we should expect to find in the latter the same calcareous matter; *and such is the fact*, that, on analysis, we find the same earthy salts in the chyle as exist in the blood. As the *chyle* is formed from the *chyme* (which is the product of action of the stomach and its secretions on food), we should in it find the same calcareous matter; and such, again, is the *fact*. But as the *chyme* is the product of *digestion*, we expect to find the same calcareous matter in the contents of the stomach; and such also is the *fact*. The contents of the stomach consist of food and drink taken to nourish and support the system, and in that food and drink we ought to find the same calcareous substances; and chemical analysis gives to us the

certain answer, that the food and drink taken to support the system contains, besides the elements of nutrition, *earthy salts*, which are the *cause* of ossification, obstruction, old age, and natural death.

We have now traced these earthy compounds which are found in the system, and which increase as age advances, to the blood, from which they are, by the process of transpiration, gradually deposited. From the blood we trace them to the chyle, from the chyle to the chyme, and from the chyme to the contents of the stomach, and thence to articles of diet. Thus we eat to live, and eat to die.

As we have traced these earthy salts to our food or articles of diet, we naturally inquire whether the different kinds of food and drink which we have for our selection contain the same proportion of ossifying and "old age" producing matter. Here chemical analysis answers in the negative! Some of the most generally used alimentary substances contain a comparatively *large* proportion of earthy compounds, some a *moderate*, and others a very *small* amount.

If we eat vegetable food, plants derive their earthy salts from the earth in which they grow. If animal flesh be our sustenance, they have the same source, through the medium of the animal we eat, which derives its supply from vegetation. Fish in the sea, fowls in the air, animals upon the earth, all derive the earthy salts contained in them originally from the earth, in the food on which they live.

From this it follows, that if we can so regulate our diet

—food and drink—that the amount of earthy matter taken into the system be sufficient only for the growth and nourishment of the bones, without which our powers of strength and motion would be useless (the body being deprived of its mechanical levers), the many organs and structures would not, and could not, harden and ossify; the arteries would not become indurated and lessened in caliber, the capillaries would not become obliterated, the brain would not decrease in size by age, sight would not fail, hearing, taste, and smell would not lose their susceptibility, hair would not turn grey, the skin would not become dry and wrinkled, the body would retain its fluidity, elasticity, and activity, and the brain its mental capabilities. If we can so regulate our diet that these earthy compounds are taken into the system in *smaller* quantities, and therefore take a *longer* period to accumulate—if we can even partially accomplish this—we can prolong life!

We have shown "old age" and "natural death" to be due to *two* causes—*firstly*, to the action of atmospheric *oxygen*, which consumes our bodies, and causes fibrinous and gelatinous accumulations; *secondly*, to a deposition of *earthy* matter (ossification). If, therefore, we can, by artificial means, partially arrest the never-ceasing action of atmospheric oxygen, and at the same time prevent the accumulations of these earthy compounds, or even remove them from the system—that state of body termed "old age" would be deferred, and life would be prolonged for a *lengthened period!*

Liebig says: "Many of the fundamental or leading

ideas of the present time appear, to him who knows not what science has already achieved, as extravagant as the notions of the alchemists."

Who can deny that, with all our knowledge and discoveries, which are daily increasing, man may not again re-discover the secret of long life, which has been lost for so many ages, and which secret may probably be summed up in the following few words:

If a human being subsists upon food which contains a large proportion of lime, a large proportion will enter into the composition of the chyme, the chyle, and the blood; and as from the blood the deposition of lime takes place, the greater the amount of lime that blood contains, the greater will be the amount deposited in the system, the greater the degree of ossification, and the sooner will be produced that rigidity, inactivity, and decrepitude which make him old and bring him to *premature death.*

On the other hand, if the food and drink taken to nourish and support the body are selected from the articles which contain the *least* amount of lime, the least amount will enter into the composition of the chyme, the chyle, and the blood, the less amount will there be to deposit, the less degree of ossification, the less the rigidity, inactivity, and decrepitude, and the *longer the life of the man!*

We can stunt the growth of the lower animals by giving them an excess of earthy matter; we can ossify them, make them permanently old, and shorten their days, by

the same. In human beings we need not look further than the Cretins found in the valleys of the Alps, Pyrenees, and other regions. Although cretinism has two distinct causes, the first and most important is that an excess of *earthy* matter—lime or magnesian lime—is taken into the system in solution in water used for drinking purposes. Hereditary it must be to children born of parents suffering from this disease, if not removed from the cause; but sound, healthy children brought into districts where cretinism exists are, at an early age, equally subject to the disease with children born in them.

Now, these beings are, in their infancy, literally prematurely ossified, the development of the bones is arrested, the height being seldom more than four and a half feet. The bones of the cranium, which in a natural state should expand to allow the brain to grow and develop, at an early age become thickened, hardened, and ossified to such an extent that expansion is impossible; the brain, therefore, cannot develop; it is gradually deprived of its blood supply from below; it is incased and imprisoned by its own shield; its intellectual part cannot develop; the being is subservient to the animal portion; he becomes voracious and lascivious, and in many cases sinks in intelligence below the level of many of the brutes. The age of Cretins is short; few of them reach thirty years, and, as Clayton remarks, "although they die early, they soon present the appearance of age." This miserable state of existence is due, to a great extent, to *premature* ossification.

Distilled water, used as a drink, is absorbed directly into the blood, the solvent properties of which it increases to an extent that will keep salts already existing in the blood in solution, prevent their undue deposition in the various organs and structures, and favor their elimination by the different excreta. If the same be taken in large quantities, or if it be the only liquid taken into the system, either as a drink, or as a medium for the ordinary decoctions of tea, coffee, etc., it will in time tend to remove those earthy compounds which have accumulated in the system, the effects of which usually become more manifest as the age of forty or fifty years is attained. The daily use of distilled water facilitates the removal of deleterious compounds from the body by means of the excreta, and therefore tends to the prolongation of existence. The use of distilled water may be especially recommended after the age of thirty-five or forty years is attained; it will of itself prevent many diseases to which mankind is especially subject after this age; and were it generally used, gravel, stone in the bladder, and other diseases due to the formation of calculi in different parts of the system, would be much more uncommon.

The beneficial effects of fruit as an article of diet, both in health and disease, cannot be overrated. In health the apple, the pear, the grape, the strawberry, the gooseberry, the tomato, the fig, the date, wall-fruits, the melon, and numerous others, present such a field for choice that the most capricious appetite need never be disappointed.

EXPERIENCES OF

DR. WINCKLER (ALANUS).

Degeneration of the arteries is a prime source for diseases and the weakening and shortening of human life. The inner lining of the arteries is enlarged, incrusted, and hardened, the size of the tube is lessened, a smaller quantity of the blood is carried to the tissues; this in its turn results in inadequate nutrition, and this again in weakness and decrepitude.

Under the name of Dr. Alanus a German physician, Dr. Winckler, contributed an account of his experience and investigations to the *New York Medical Record*, from which the following is taken:

"Having lived for a long time as a vegetarian without feeling any better or worse than formerly with mixed food, I made one day the disagreeable discovery that my arteries began to show signs of atheromatous degeneration (chalky degeneration); particularly in the temporal and radial arteries this morbid process was unmistakable. Being still under forty I could not interpret this symptom as a manifestation of old age, and being, furthermore, not addicted to drink, I was utterly unable to explain the matter. I turned it over and over in my mind without finding a solution of the enigma. I, however, found the explanation quite accidentally in a work of that excellent physician, Dr. G. Monin, of Paris. The following

is the verbal translation of the passage in question: 'In order to continue the criticism of vegetarianism we must not ignore the work of the talented Doctor Gubler, on the influence of a vegetable diet on a chalky degeneration of the arteries. Vegetable food, richer in mineral salts than that of animal origin, introduces more mineral salts into the blood. Raymond has observed numerous cases of atheroma (chalky deposit) in a monastery of vegetarian friars, among others that of a prior, a man scarcely thirty-two years old, whose arteries were considerably hardened. The naval surgeon Freille has seen numerous cases of atheromatous degeneration in Bombay and Calcutta, where many people live exclusively on rice. A vegetable diet, therefore, ruins the blood-vessels, and makes one prematurely old, if it is true that man is as old as his arteries.

"Having unfortunately seen these newest results of medical investigation confirmed in my own case, I have, as a matter of course, returned to a mixed diet. I can no longer consider a purely vegetable diet as the normal diet of man, but only as a curative method, which is of the greatest service in various morbid states. Some patients may follow this diet for weeks and months, but it is not adapted for everybody's continued use. It is the same as with the starvation cure, which cures some patients, but it is not fit to be used continually by the healthy. I have become richer by my experience, which has shown me that a single brutal fact can knock down the most beautiful theoretical structure."

M. GUBLER

ON ARTERIAL DEGENERATION.

The following is from an essay on Cretaceous Degeneration of the Arteries, by Monsieur Gubler, Professor of Therapeutics, Paris College of Surgeons, published in the *Annales d'Hygiene*, Paris, 1877 (2d Ser., Vol. 48):

"As age progresses, and under the influence of conditions still imperfectly determined, the inner wall of the arteries, supple and elastic in its normal state, thickens gradually, and becomes indurated in such a manner as to offer, to the exploring finger, similar resistance to that of a bird's feather or the windpipe of a chicken, according as the degeneration is uniform or disposed in circular zones alternately with rings relatively healthy.

"By anatomic examination it is found that the thickening and induration of the vascular membrane is due to the accumulation of a whitey yellow granulous and fatty substance, but essentially of mineral composition, the greater part of which is represented by the carbonates and earthy phosphates.

"This degeneration spares no one and affects all classes, but in a manner very unequally; indeed, the contrast is something astonishing in this respect between the well-to-do and the working classes, between town and country people, the difference being entirely to the

advantage of the first. While among those high in the social scale, supple arteries are to be noted until the approach of confirmed old age, if not even of decrepitude; in the inferior classes, on the contrary, arterial induration often shows a striking precocity. It evidences itself not only in the wane of life, but in maturity and even in youth. In our hospitals, for example, men of 40, 30, and even 20 and under, exhibit the radial arteries already thickened and resistant. In short, while that at about 45 or 50 years confirmed degeneration is the general rule amongst laborers from the country, the deterioration only commences to show itself at about the age of 60 among the higher classes. Whence comes this strange disparity? Is there nothing for it but to ascribe this condition as one more of the baneful effects of alcoholism? No doubt alcohol is a great evil, and it is not easy to put the working classes too much on their guard against its deplorable influence. Still, there is no need to exaggerate, and for my part I am convinced that modern physicians have not always been able to avoid imputing to alcoholism (so fruitful in dangers to health and life) symptoms the real cause of which they were unable to discover.

"I do not pretend absolutely to exonerate alcohol from all share in this atheromatous and calcareous degeneration. I merely believe I can establish that this poisonous agent is neither the sufficient nor the principal cause of the pathological phenomena under consideration.

"As a matter of fact, I have had occasion to see many subjects of premature arterial induration who have em-

phatically affirmed their sobriety. Among these there are those whose sincerity can hardly be questioned, and respecting many of them I obtained information entirely favorable; without counting that the youth of some of them made it impossible that habits of drunkenness, which they wholly repudiated, and of which they manifested no other distinctive symptoms, could have existed.

"On the other hand, wealthy people are not exempt from the vice that is attributed (and justly) to the town working classes. I know many gentlemen who never put water in their wine, who drink plentifully of the best wines, and do not abstain from spirits, yet who remain free from all atheromatous and calcareous degeneration.

"It may be urged, perhaps, that in the higher ranks of society alcoholic drink is taken with the meals, and that, consequently, being mingled with the chymous matter, and slowly absorbed, it is not so liable to reach the hepatic gland or the blood in sufficiently large quantity to work great harm. The habits of the two classes however, from the alcoholic point of view, are not so very dissimilar, and consequently they are not capable of accounting for the profound difference that exists between rich and poor in respect to the precocity and intensity of this deterioration of the arterial system.

"It seemed to me that the nourishment, so different in the cases respectively of each class, poor and rich, country and town, would be able to furnish us with a satisfactory explanation of the facts noted. While the one class live principally on flesh (their favorite vegetables—mushrooms, truffles, asparagus—are themselves

largely provided with the nitrogenous principle), the other class is sustained on vegetable substances, bread, potatoes, cabbages, salads, and the pulse or bean species, forming the basis of their food.

"Now, meat and the albuminous substances contain very little mineral elements; while cereals are well supplied with them. It is the leaves of plants that possess the function of condensing and retaining in their tissues the mineral matter in solution in the ascending sap, and these organs, in decaying, yearly restore to the soil the earthy salts the plants have received. Such is the physiologic reason for the enormous proportion of earthy matter which the consumption of green portions of plants (and consequently of the pulses) introduces into the human economy, and into that of the herbivorous animals.

"This aliment is principally composed of phosphates and earthy carbonates, which, easily soluble in the liquid acids of the organism, and even in the blood, by virtue of an excess of carbonic gas, are no longer so, either in the alkaline secretions or in the serum of the blood, devoid as the latter is of carbonic acid. These saline or chalky matters, then, accumulating and being precipitated in the liquid secretions of various organs, tend, among other prejudicial conditions, to the formation of calcareous incrustations throughout the system. This tendency has a two-fold action, not only causing the fossilization of the arteries involved, but, by introducing alkaline salts to organic acids, it serves to further alkalize the fluids of the body and so favor the precipitation of earthy matters.

"The correctness of these views may be easily verified. If, as I think, the cretaceous incrustations of the arteries have their origin in the earthy matters supplied in a vegetarian *régime*, concurrently with drinking waters charged with earthy salts, they will be more frequent, more premature, and more serious in chalky districts; rarer, and even absent, in siliceous districts. Well, Dr. Leblanc tells me that he has been struck by the prevalence of this morbid state among the peasants of l'Orléans. On the other hand, in a region absolutely devoid of lime, and where the fowls can scarcely make shell for their eggs, one of my friends, who is not a doctor (although he can feel the pulses of his work-people), but who is well read in science, has not remarked any hardening of the arteries except in case of those well advanced in years. My friend, Dr. Vibert, who occupies a good medical position at Puy, informs me that in this granitic and volcanic region atheromatous degeneration is rare.

"In short, if I am right, atheromatous and calcareous degeneration affects particularly the sects pledged to pulse-eating, whose recruits come from the better class, as well as the religious orders vowed to the monasticism and to the vegetable nourishment. Such was the case in a convent of Trappists recently visited by Dr. Raymond. My friend, who had acquaintances in the place, was able to assure himself that among some ten monks still young, and especially in the case of the prior, who was only thirty-two years old, the radial arteries were already markedly indurated."

FRUIT AS FOOD.

DR. EMMET DENSMORE.

[*From London Horticultural Times, July 23, 1892.*]

Horticulturists, it seems to me, are doubly interested in the subject of fruit as food. If it can be shown that the substitution of fruit for bread, cereals, and vegetables results in an increase of health, it is, of course, a matter of great interest to every one; and to the horticulturist and fruit dealer this problem becomes important in a business sense.

Scientists and physicians are in substantial agreement as to the different elements of food needed by the human organism, and also as to the relative amounts of same. It has been deduced from experiments made on soldiers and with inmates of public institutions that for an average adult performing healthful, but not excessive, labor, about twenty-one or twenty-two ounces of dried food in the twenty-four hours are requisite to keep up weight and strength. Of this, nearly seventeen ounces must be carbonaceous or heat-giving, about four ounces nitrogenous, or that which is intended for the support of muscular action, and less than an ounce of the phosphatic to support the brain or nervous system, and a small percentage of salts for the bony structure.

If bread be analyzed, after its water has been evaporated, it is found that nearly seventy per cent is composed

of starch; and the purpose that this subserves in the system is to keep up the heat of the body. It is well known to physiologists that while it remains in the condition of starch it is nonabsorbable and nonassimilable by the system; it only becomes food when it is converted by the digestive process first into dextrine and then into glucose. If fruit be analyzed, it will be found that a large portion is carbonaceous, like the starch in bread, and is used in sustaining the heat of the body. In the dried figs of commerce there is about sixty-eight per cent of glucose, which is nearly the amount of starch contained in wheat flour, and nearly twice as much of glucose is contained in a pound of such figs as bread contains of starch, since bread is about half water. Dates and bananas are similarly rich in this carbonaceous element. Fruits growing in more northern regions are usually much more watery, and possess a much smaller proportion of the heat-giving nourishment; but many readers will be surprised to learn that substantially all the fruits usually grown in more northern latitudes are still—when allowance is made for the great preponderance of water—quite rich in heat-giving food.

It will be noticed that when eating bread one must be furnished with some fluid for drink; whereas, when grapes, apples, etc., are used instead of bread, nature provides a distilled water, manifestly more wholesome than any other drink which the human being can take.

Grapes, strawberries, blackberries and raspberries are rich in sugar, and all these fruits may be plentifully and cheaply produced, and, by preserving, may be kept sub-

stantially the year round. The fruitarian has only to add a small quantity of figs, dates, or bananas — and some one of these fruits is always obtainable at a low price—to obtain all the nourishing elements contained in bread, and to have, in addition, a food much more easily digested, rich in aperient and health-giving acids, and filled with the most wholesome drink known.

Men are prone to think in grooves, and to follow custom without thought or challenge; and when one, for the first time, hears of the proposition to substitute fruit for bread, it seems very absurd, simply because we are unused to it. But when it is examined scientifically and experimentally, it will be found to be, not only not absurd, but to have every possible reason to recommend it. The use of bread and of starch foods tends to constipation. To overcome this, hygienists have in recent years recommended the use of coarse or unbolted meal bread, which inflames the stomach and bowels, and, because of this inflammation, induces a free action. During the last few years a reaction against this custom has set in. Hygienists are ascertaining that this daily inflammation of the stomach and intestines is very detrimental to health; and in the "Dietetic Value of Bread," a recent book by John Goodfellow, lecturer on physiology and hygiene at the (London) Bow and Bromley Institute, the following noteworthy remarks occur (page 199):

"Ordinary (*i. e.* coarse) wholemeal bread contains more actual waste matter than white bread; is not so thoroughly digested as white bread; its ingestion in considerable quantities leads to an increase of waste in other

foods; and it may cause diarrhœa and irritate the villous coat of the intestines."

As soon as we depend upon ordinary bread for our heat-giving food, there is at once a strong tendency to constipation. Fruit, on the other hand, while furnishing a food rich in heat-giving elements, also contains an acid which is aperient in its action, and the ingestion of fruit as a considerable portion of our dietary guarantees free and natural action of the bowels. When we add to this strong argument in favor of fruit the incontestable physiological fact that the heat-giving nourishment which it contains is prepared by nature in the form of glucose, and requires no digestion on the part of the system, but is ready for absorption and assimilation as soon as it is swallowed, whereas bread, cereals, and all starchy vegetables must undergo a protracted and vital force wasting digestion before their nourishment is converted into this same glucose, we perceive an overwhelming demonstration of the superiority of fruit over cereals as the staff of life.

Nearly all the elements of food contained in fruits and nuts, together with those found in milk, eggs, fish, flesh, and fowl, are digested in the main stomach; whereas bread, cereals, and vegetables, although remaining in the stomach and undergoing its churnings while the nitrogenous portions of the food are being digested, are passed on to the intestines before digestion can take place.

The doctrine that fruits are a wholesome and desirable article of diet is not new, and it is also a popular idea with mixed feeders. But, practically, it will be found,

both with the vegetarians and those on the usual diet, that wherever persons depend on bread and cereals for their heat-giving nourishment, there is no room for fruits, and generally fruit is not eaten. In proof of this assertion one has but to note the food usually taken at vegetarian restaurants, or at hotels where the usual diet is dispensed. Fruit is simply an unused ornament, much celebrated in talk, decidedly ignored in practice. When the truth is brought home to people that fruit is man's natural food, and all bread and cereals are not only more difficult to digest, but that they necessarily displace nature's food of health, a strong reason will be seen for substituting fruits for bread, cereals, and vegetables. For other portions of the food no alteration is recommended at the outset. Vegetarians, and those opposed to the use of flesh in their dietary, can add nuts or milk, eggs, and cheese, to their fruit; and those accustomed to fish, flesh, and fowl can continue their usual portions of those foods. The substitution of fruits for bread and vegetables will be found upon experiment to produce the happiest results.

FROM "HOW NATURE CURES" BY

DR. EMMET DENSMORE

Intimately connected with the subject of food is the question what is best to drink. Those persons who are able to live on a fruit and nut diet do not need any drink; if an abundance of fruit as prepared by nature is to be had, all the water needed by the system is contained in such fruit. If recourse be had to dried fruits, and if these fruits be restored to nearly their natural condition by the liberal addition of distilled water, there is still no need of drink. But persons who are unable to properly digest and assimilate nuts, and who are obliged to get a considerable portion of their sustenance from flesh or animal foods, will need to drink water. This is best done when the stomach is empty—half an hour or an hour before each meal. A half pint or a pint of water taken at such times not only furnishes the system with needed fluids, but serves to wash out the stomach, to stimulate the action of the bowels, and to overcome constipation. It is of the greatest importance that this water be pure. Nearly all water obtained from springs, wells, and running streams contains more or less of organic impurities and mineral matter. The most reliable method of getting pure water is to distill it. A still capable of evaporating several gallons daily, and

which can be operated by the heat of an oil lamp, or a gas flame, can be obtained at small expense.

When sufficient water has been taken preceding a meal, no drink at the time of eating is required or desirable. The quite universal habit of washing down the food with tea, coffee, beer, wine, and the like, not only interferes with proper mastication, but induces or contributes to the habit of overeating. Moreover, any person who will discontinue the use of such drinks for a year or longer will be convinced not only that they are of no value, but that they work positive harm.

The stimulating and exhilarating effects of tea and coffee, and in a less degree of cocoa or chocolate, are caused by a substance called theine in tea, caffeine in coffee, and bromine in cocoa or chocolate and the kola nut, so popular in Africa and along the shores of the Mediterranean. These have all a similar alkaloid base. Theine, caffeine, bromine, and koline are different names for one substance. The amount of this alkaloid contained in each of the articles is, according to Chambers' Encyclopedia, as follows:

100 parts of tea contain 3 parts of theine.

100 parts of coffee contain 1.75 parts of caffeine.

100 parts of kola nut contain 2.13 of koline.

Chocolate or cocoa contains a smaller percentage of the stimulating and poisonous alkaloid; but like all kindred drinks, it would not long be used if it had none. It will be found by any earnest student who will make an exhaustive study of this subject that opium, alcohol, tobacco, tea, and coffee are intimately related in their effect

upon the human system. A small dose of opium acts as an agreeable stimulant, followed by a desire to sleep; a small portion of brandy has a precisely similar effect. Tobacco is more distinctly a narcotic; but when its use is indulged in moderately, it lends a pleasant stimulus to the brain and nervous system, followed by a desire to sleep. Tea and coffee are at first distinctly stimulating, inducing a pleasing condition of the brain and nervous system, and if the quantity be not excessive, the stimulus is followed by a distinctly sedative and narcotic effect.

In the matter of opium, the safety of the intelligent portion of the race is due to an almost universal and well-defined apprehension of the dangers of the opium habit. To the millions of victims of the opium habit in the East this practice no doubt seemed as harmless as the use of tobacco, tea, and coffee appears to those who indulge in these stimulants in modern life. But in Western civilization it is well known that the habit of opium-taking is equivalent to self-destruction, and invariably leads to the most appalling misery, suffering, and death. Herein lies our safety.

Fortunately, the effects of the excessive use of alcohol are such that few, if any, intelligent persons can remain oblivious to its dangers. Tea and coffee and tobacco do not inebriate, and do not speedily, as does alcohol, transform a human being into a wreck. A moderate use of alcoholic stimulants, such as is indulged in by Continental people in the daily use of natural wine with meals, does not necessarily lead to inebriety, and we find thousands of intelligent people contending for the great value of

such moderate use of alcohol. So, too, the medical profession, and the lay world as well, are divided as to the effect of tobacco upon the human system, many contending that this narcotic is distinctly healthful and valuable.

The student who has become aware of the undeviating and necessarily injurious and destructive effect of tobacco upon the human system, and who searches for an explanation of why it is that there can be such a difference of opinion regarding this matter, will find the solution in the fact that the destructive effect of tobacco, as also of the moderate use of alcohol in wine and light beer, is not immediately seen. Years are required to undermine and break down the nervous system; and when the disaster has been reached there is not an immediate connection between the cause and the result, as there is in the case of the drunkard between his condition and alcohol, and in the case of the opium-eater between his condition and opium. It will be a surprise to many to be made aware of the serious effects which these poisons in such common use have upon the system when taken in large doses. The following quotation is taken from Taylor's "Principles and Practice of Medical Jurisprudence," page 321:

"The effects which tobacco produces in large doses, when taken by persons unaccustomed to its use in the form of powder, infusion, or excessive smoking, are faintness, nausea, vomiting, giddiness, delirium, loss of power of the limbs, general relaxation of the muscular system, trembling, complete prostration of strength, coldness of the surface, with cold, clammy perspiration, convulsive movements, paralysis, and death. In some cases there

is purging with violent pain in the abdomen; in others there is rather a sense of sinking or depression in the region of the heart, creating a feeling of impending dissolution. With the above-mentioned symptoms there is a dilatation of the pupils, dimness of the sight, a small, weak, and scarcely perceptible pulse, and difficulty of breathing."

The writer of an article on tea in Chambers' Encyclopedia, an enthusiastic admirer of what he names "the exhilarating, satisfying, or narcotic action of tea," elsewhere in the same article says:

"If double the above quantity of theine (or of the tea containing it) be taken, there is a general excitement of the circulation, the heart beating more strongly, and the pulse becoming more rapid; tremblings also come on, and there is a constant desire to relieve the bladder. At the same time the imagination is excited, the mind begins to wander, visions appear, and a peculiar kind of intoxication comes on; the symptoms finally terminate, *after a prolonged vigil*, in a sleep arising from exhaustion."

The italicism is ours; we think it well to note the unintentional admission that insomnia is one of the products of the tea habit. It is well known that tea-tasters become subject to headache and giddiness, and not infrequently are subject to attacks of paralysis.

It must be borne in mind that all these poisons—opium, alcohol, tobacco, tea, and coffee—can be taken in moderation for years with no necessarily convincing demonstration to the victim that his or her nervous system is being undermined and destroyed. At the same time, persons

who indulge in tea, coffee, and tobacco, should remember that a moderate use of opium and alcohol may easily and frequently does appear as innocent as the ordinary use of tea, coffee, and tobacco. It ought also to be subject for earnest thought that while tea, coffee, and tobacco, as ordinarily indulged in, do not at once effect the destruction of the nervous system, nevertheless, when taken in large doses the effect may be death, as shown by the above quotation concerning tobacco, or profound nervous prostration in the case of the large dose of tea.

It is worthy of note, also, that all these substances have a disagreeable taste and effect upon the human system when indulged in for the first time. It may be tea, coffee, tobacco, alcohol, or opium, an adult human being who has never taken anything of the sort will be repelled and disgusted at the first effects. The writer on tobacco in Chambers' Encyclopedia says:

"It is unnecessary to enter into particulars regarding the symptoms of slight tobacco poisoning, because they are all well known to the great majority of the male population. Fortunately, the effects produced by tobacco are very transitory, as the poison finds a ready exit from the body. The system after being subjected for a few times to the poison of tobacco smoke becomes accustomed to its influence, the distressing symptoms no longer occur, and a condition of 'tolerance' is established."

"Fortunately," with regard to the readiness with which the tobacco poison finds an exit from the body, is an expression that may well be challenged. It seems to us

rather that it is fortunate that the evils of opium eating are so tremendous that he who runs may read; and that the destructive effects of inebriety are so great that in all the world there cannot be found a single defender of the habit; it is unfortunate, in our view, that the manifestly poisonous effects of tobacco, when the habit is first commenced, are so transitory, for the reason that the system is gradually undermined while the victim is not aware of the source of the difficulty. The same writer as quoted above, and to whom it seemed "fortunate" that the tobacco poison finds a ready exit from the body, says:

"It (tobacco) may, however, produce various functional disturbances; (*a*) on the stomach; (*b*) on the heart, producing debility and irregular action; (*c*) on the organs of the senses, as dilatation of the pupil, confusion of vision, subjective sounds, etc.; (*d*) on the brain, suspending the waste of that organ, and oppressing it if it be duly nourished, soothing it if it be exhausted; (*e*) on the the nerves, leading to over-secretion of the glands which they control; (*f*) on the mucous membrane of the mouth, causing what has been described as the 'smokers' sore-throat,' a disease consisting of an irritation of the mucous membrane at the back of the throat, redness there, dryness, a tendency to cough, and an enlarged, sore condition of the tonsils rendering every act of swallowing painful and difficult. It may exist without detection for a long time, but if a damp, cold, foggy state of the weather comes on, the throat becomes troublesome and painful, enlargement of the tonsils is detected, and the symptoms become much aggravated by any attempt

to smoke. This condition is more readily induced by the use of cigars than of pipes. It is quite incurable as long as the patient continues to smoke, but soon disappears when the use of tobacco is entirely suspended. In association with this condition of the throat, the gums are usually abnormally pale and firm. (*g*) On the bronchial surface of the lungs, sustaining any irritation that may be present, and increasing the cough. . . . . If as is usually allowed, tobacco (in minute doses) possesses, like arsenic, opium, tea, coffee, etc., the power of arresting the oxidation of the living tissues, and thus checking their disintegration, it follows that the habit of smoking must be most deleterious to the young, causing in them impairment of growth, premature manhood, and physical degradation."

The reader's attention is called to the singular fact that an authority who praises the use of tea and coffee, and who is wholly in doubt as to whether smoking is injurious to health, should group tobacco, tea, and coffee together with arsenic and opium.

As before remarked, it is just in this apparent harmlessness of the moderate use of tea, coffee, tobacco and alcohol that lies their greatest danger. The inveterate tobacco-user, in reading these quotations, the meaning of which is so plain, may resolutely shut his eyes to the inevitable conclusion that common sense must arrive at, namely, that a substance that insidiously induces the "smokers' sore throat," together with the other pathological conditions named, must necessarily be in its very nature injurious to the health of a human being; and an

inveterate tea-drinker, who is unable to conceive of how he or she could find life worth the living without the daily indulgence in his or her favorite beverage, may also shut his or her eyes to the plain deductions concerning the matter of tea, that must of necessity be injurious in very small quantities when larger doses induce increased heart-beat, "general excitement of the circulation, disposition of the mind to wander, excitement of the imagination, and a peculiar kind of intoxication; the symptoms finally terminating, after a prolonged vigil, in a sleep arising from exhaustion." Arsenic or opium taken in moderately large doses cause death. When the habit of taking these poisons is adopted gradually, large quantities may be taken without giving any immediate sign of their injurious nature. An unbiased student who will reflect upon the many facts concerning these correlated poisons soon becomes convinced that they are alike to be avoided as highly dangerous, in that a moderate use of them does not at once give conclusive demonstration of their injurious nature, and that a prolonged indulgence in them finally ends in greatly damaging the nervous system.

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What is the originating cause of the use of, and the desire for, stimulants? Unquestionably it is lack of health. There are many men and women in the prime and vigor of life who use no stimulants whatever, either in their food or drink; and who do not feel from one year's end to another a sense of weariness or a need for any artificial aid. Let such an individual go for twenty-

four or forty-eight hours without rest or sleep, and attempt to continue laboring for some hours more, and a distinct need for a stimulant will be felt. After he has exhausted his organism by the twenty-four or forty-eight hours' continuous work, if there be a necessity for only a limited number of additional hours a cup of coffee, a glass of wine, or a small portion of brandy would undoubtedly enable him to perform the additional task with greater ease than without it; and not unlikely enable him in some instances to do in a given brief length of time more than he could do elsewise. The result of such stimulus is easily perceived. Anyone who works forty-eight or even twenty-four hours without rest or sleep inflicts great damage upon the nervous system; and the additional labor that he is able to perform by virtue of the stimulus of the tea or coffee or alcohol is a further damage, not only because of the increased amount of work, but because of the inevitable reaction from the stimulus to the nervous system, and the weakness that is sure to follow such reaction.

The philosophic student has but to survey the field of civilization to perceive that a majority of men and women are performing an excessive amount of labor, and are taking inadequate sleep and rest. It is thus easy to understand why it is that the human race, in all ages and nations, has reached out for some form of stimulant.

As before said, gratifying the craving for stimulation with tea, coffee, or alcohol serves but to further deprave the system and further cause it to require stimulation.

It is for this reason that all these poisons and habits mutually play into each other's hands. Anyone who eschews tea or coffee, as well as alcoholic drinks, and who has studied this question, is well aware that the use of tea and coffee paves the way for the use of tobacco, at any rate in the male, and that anyone using tea, coffee, or tobacco is much more apt to acquire the alcoholic habit than one who does not use these stimulants.

A perception of these principles affords the *rationale* and explanation not only of the causes of intemperance, but of the proper methods to be used for its prevention and cure. Whatever habits or practices tend to undermine the nervous system must be discontinued. Excessive work must be refrained from, and foods requiring an unnatural and undue strain upon the nervous system for their digestion must be avoided. The conditions to be sought for are freedom from overwork; the use of a nourishing and easily digested food; and the avoidance of all stimulants—tea, coffee, tobacco, alcohol.

If the contention be admitted as correct—that a much larger proportion of heat-forming food is needed by the system than all others; that the predominating nourishment in cereals and vegetables is in the form of starch; and that this starch cannot be digested and assimilated by the system except by excessive strain, and an inevitable waste of nervous power; and if the sweet fruits contain a predominant quantity of this heat-giving nourishment in a condition all ready to be assimilated by the system without digestion and without nervous

strain, it must be plain that the universal habit of cereal-eating is a prime cause of nervous prostration, and an ever-acting factor tending to the contraction of the alcoholic habit.

Followers of vegetarianism have claimed, and justly, that their system is favorable to temperance, and to the cure of the alcoholic habit. Since, in the adoption of vegetarianism, there is the chance of taking an even larger proportion of starch foods than was used before, the reader will naturally inquire how this system can be said to be favorable to temperance in face of the fact of the larger use of starch foods. It may be that one making a change from the ordinary diet of civilization to the vegetarian diet is not at all certain to use an increased amount of bread and cereals. The accustomed dishes that appeal to their palate are wanting. They have not as many tempting sauces to induce the taking of more food than is required for the needs of the system, and these two forces are frequently operative on a new convert to vegetarianism, causing him to use even a less amount of starch foods at the outset than was used before its adoption. But this is not by any means the only factor which enters into the problem. To become a vegetarian is to become a student of hygiene; to become impressed with the importance of obedience to hygienic law,—with the importance of simplicity in diet and living,—with a perception of the prostrating and dangerous effect of stimulants, and especially of tobacco and alcohol, and with the importance of regularity in the times of eating, and moderation in quantities. These

hygienic studies and practices usually tend toward a life of temperance. Vegetarians are not, however, generally aware of the physiologic effects of tea and coffee, and often continue their use. They are obliged to get their needed nitrogen either from bread or pulses, or from eggs, milk, and cheese. It has been proven by scientific experiments in analyzing the excreta that the nitrogenous portions of bread and pulses are much more difficult to digest, and are much more apt to be passed through the system without digestion, than the nitrogen found in fish or flesh. Experiments have also shown that eggs, milk, and cheese are more difficult to digest than flesh foods, and hence a convert to vegetarianism is handicapped by being obliged to expend a greater amount of nervous force to obtain his needed nitrogen than while he was living upon a mixed diet.

The natural food system combines all the advantages of vegetarianism and escapes its evils. It pleads for a much greater simplicity in diet, and teaches that tea, coffee, and tobacco play into each other's hands and prepare the way for King Alcohol. Its followers are able to get their heat-giving food with almost no digestive effort, and consequently no strain upon the nervous system; and are able to obtain the nitrogenous portion of their nourishment also with a less expenditure of digestive force. Viewed from whatever standpoint, it will be seen that these plain teachings of physiology stand together to form an impregnable bulwark of temperance for all who will adopt them; and that the substitution of the sweet fruits for bread, cereals, and starchy vegetables is an

invaluable factor both for the prevention and cure of the drinking habit.

One who has abstained from intoxicants until middle life, but who, nevertheless, from incorrect diet or overwork, or any such reason, finds himself or herself in somewhat frail health, if persuaded to take light wine or beer with meals, is apt at first to feel decided improvement. The stimulus of the wine for a time increases the digestive powers, and the patient consequently has an improved appetite, and digests and assimilates a greater amount of nourishment. Unfortunately, the alcohol, which has done some good by stimulating the appetite and digestion, soon begins its work of undermining the nervous system, and in due time, if its entire effect be considered, it will be found to have done decidedly more harm than good.

Likewise, any one who has been in rather frail health up to middle life, and perhaps somewhat emaciated, and finds himself or herself eating more food and with a better relish than formerly, and notices also a gradual increase in weight and roundness, considers these unmistakable evidences of improved health. Very few, even among physicians, are aware of the dangers which threaten such an individual. If a person in such circumstances should so manage his or her diet as not to permit a greater accumulation of flesh than is normal or natural, the threatened dangers would be avoided.

Unfortunately, nearly all persons—including a large proportion of physicians—are under the impression that a moderate obesity, when occurring in middle life, is

natural to many human beings. Scientific physicians are aware that there is only a small amount of adipose tissue—some seven pounds in a person weighing 154—in the human organism, and are also aware that each pound above the normal amount is a detriment in various ways. Among the more serious of these may be mentioned the pressure upon the vital organs caused by increasing surplus flesh, and the degeneration of the heart and other organs that frequently follows in obesity's train. But a majority of these same physicians, unaware of the readiness with which obesity or corpulence can be controlled, regard this infirmity as if it were inevitable, and have no thought whatever either of its serious nature or of advising such measures as are sure to reduce and control it. As before stated, the most unfortunate feature in regard to the encouragement of this disease is the well-nigh universal ignorance concerning it—the conviction on the part of most persons that a moderate rotundity and increase of weight in middle life is desirable rather than otherwise. Many people have rheumatism in middle life. Among some races and peoples cases of rheumatism are far more frequent than are cases of obesity or corpulence among others. But rheumatism or similar disorders give a convincing demonstration of their unnaturalness the moment they take possession of the human frame; whereas, during the early years of obesity, the victim is quite apt to feel an increase of vigor, and enjoy better health than before the obesity commenced.

It is not alone in the presence of a surplus amount of

flesh in the system, encroaching upon the vital organs, and interfering with their natural and needed activity, that the danger of obesity lies; the obese are more susceptible to attacks of illness of all kinds than persons of normal weight. In the matter of taking cold, the obese are, as a rule, much more liable than they were before obesity supervened. Rheumatism is more frequent and more severe. The same is true of the frequency and severity of attacks of sick headache, neuralgia, and similar disorders. Mr. Banting, whose name has become famous by his writings upon this subject, was afflicted with partial deafness, and the reduction of his obesity largely restored his hearing. Inflammatory diseases of all kinds, as before said, are most apt to attack the obese or corpulent, and readers will be able to perceive from observation among their own acquaintances that the corpulent are not as long-lived and do not enjoy as good health as others. A gifted hygienic physician writes:

"A very fat person rarely has a sound tissue in his body; not only is it frequently the case that the entire muscular system is degenerated with fatty particles, but the vital organs—heart, lungs, brain, kidneys, liver, etc.—are at the same time mottled throughout, like rust spots in a steel watchspring, liable to fail at any moment. The gifted Gambetta, whom Rochefort styled the fatted satrap, died—far under his prime—because of his depraved condition; a slight gunshot wound, from which a clean man would have speedily recovered, ended this obese diabetic's life. Events sufficiently convincing are constantly occurring on both sides of the Atlantic; every hour men are

rolling into ditches of death because they do not learn how to live. These ditches have fictitious names—grief, fright, apoplexy, kidney troubles, heart disease, etc.—but the true name is chronic self-indulgence."

The exciting cause of obesity is the ingestion of more food than the system requires, together with the weakening of the excretory organs, which results in the failure of the system to adequately throw off its waste matter. But the profound and primal cause of obesity will one day be recognized to be the use of cereal and starch foods. An obese person, weighing twenty-five, fifty, or eighty pounds more than is natural, may be given a diet of flesh with water, with or without the addition of starchless vegetables, and the patient will be gradually but surely reduced to his normal weight. A perseverance in this diet is sure to prevent a return to obesity. It is plain that without starch foods corpulency would not exist. Chemically starch foods are chiefly carbon; adipose tissue is also carbon, and it would naturally be expected that a diet of oil and the fat of animal flesh would contribute quite as much to obesity as bread and starch foods. But experience proves that such is not the case. The reason for this is not, in the present state of science, understood; it will likely be found in the fact that starch foods undergo a complicated process of digestion, whereas oils require only emulsion to render them assimilable by the system.

If an autopsy be held upon the body of an obese person, the abnormal weight will be found to be due to an accumulation of adipose tissue and water—the presence

of water in the tissue is plainly visible and adds considerably to the bulk. From this fact has arisen the practice of advising obese persons to drink as little water as possible. A moderate amount of shrinkage can be accomplished by this course; but it is one which we do not recommend. Water is a necessity to the organism; it is invaluable, not only in keeping up the volume of the blood, but in aiding the excretion of waste matter through the bowels and kidneys. And a reduction can safely and quite rapidly be induced by a nonstarch diet and an unlimited amount of water.

The digestion of starch involves great loss of digestive and nervous energy. The reader is asked not to lose sight of the fact that starch is the nourishment commonly used for keeping up the heat of the body, and that, as starch, it is insoluble and unassimilable; that it only becomes soluble and assimilable by a chemical change, *first* from starch into dextrine, and *secondly* from dextrine into glucose. Wheat usually contains about 70 per cent of starch, and bread, because of the greater proportion of water, 35 to 40 per cent. The ordinary dried figs of commerce are said to contain about 68 per cent of glucose, which glucose, when eaten, is in the identical condition that the starch of cereal food is converted into after a protracted and nerve force wasting digestion. It would seem to be, as before said, a matter of the merest common sense to perceive that a food that may be said to be predigested by nature, and that is all ready for absorption and assimilation when first ingested, requires much less strain upon the nervous system than a food

having similar chemical elements, but which require complicated digestion before the system is able to make use of them. An interesting fact in regard to diet is in order in this connection. Invalids the world over are given their bread in the form of toast. The lay world is generally quite ignorant of why this is done, and the average physician is also ignorant. It is because toasting bread until it becomes brown largely converts the starch into dextrine; and hence, so far as the brown portion is concerned, one of the processes of digestion is gone through before the bread is taken into the stomach. It will be found that the thinner the slices of bread, and the more thoroughly they are toasted, the easier digestion will be, and when all portions of the slice of bread are thoroughly toasted—not burned, but still changed to a deep brown color—it will be found to be still more easily digested than ordinary toast. The sweet fruits are removed a step beyond. If there were some method by which a piece of toast could undergo a second transformation, and the dextrine be converted into glucose, it would then, in all probability, be substantially as easy of digestion as the sweet fruits, for the simple reason that it would already be glucose; in a word, no digestion would be necessary.

If it be accepted that man's natural diet is fruit and nuts—and it will be found difficult to construct any other hypothesis that will fulfill all the conditions and requisites of the case—it is easy to see, not only that the diet of primitive man consisted of a single dish or food, but that such diet was continued meal after meal, and day after

day, as long as the supply from a given tree or grove held out. Just so surely as the not overfed lad of the street has a better appetite and relish than the pampered child of fortune, it is true that whoever will continuously pursue a diet of a single dish of simple and adequate food at a meal will find a distinctly better relish for such food than is possible to the luxurious diner-out, or to any person in the habit of eating a variety of foods from day to day. Soup is a mistake at the very outset. In a natural state man would get all the water needed from his fruits; digestion goes forward much better when the gastric juice is not diluted with fluids. If not enough fresh fruit is taken at meals to afford the needed amount of water—and most people will find their digestive powers too weak to properly digest and dispose of so large an amount of fruit as is needed for this purpose — it will be advisable to drink from a half-pint to a pint of water —preferably pure soft or distilled water—an hour before eating, which provision having been attended to, it will be found that no drink whatever is needed at meal-time; and persistent following of this rule will show the great majority of persons that they not only will have no inconvenience in doing without drink at meals, but that they will enjoy such meals distinctly more than those in which drink forms so important a part. The experiments by Dr. Beaumont showed that soup made no progress toward digestion until the larger share of the liquid was absorbed into the circulation, and it is now well known that many soups are very difficult of digestion.

The contention that bread, cereals, and starch foods

are an unnatural and injurious food for man is confirmed by reference to the physical conformation of the digestive organs, the main stomach being a large, and the second stomach a relatively insignificant, organ. The regimen of which cereal and starch foods form the basis necessitates the digestion of a major portion of our food in the second stomach, which entails a gradual, ruinous strain upon the nervous system. We contend that fruits and nuts and foods similarly digested are the natural and physiologic foods for man, being a diet in which much the larger proportion of the nourishing elements are digested in the first stomach, and only an insignificant portion, corresponding to the relative size of the organ, is relegated to the second stomach for digestion.

It has been shown that, whereas starch foods, unassisted by the irritating effects of bran and coarse grains, directly tend to constipation, fruits, on the contrary, while performing the same office in the system—namely, supporting the heat of the body and the vital force—contain an acid that causes a secretion of fluid in the intestines, and hence is always aperient; moreover, that fruit food, while it saves the expenditure of vital force required in the protracted digestion of starch foods, scarcely needs digestion at all, but is already in a condition to be absorbed and assimilated when first ingested, and likewise contributes to a prompt action of the excretory functions from the fact that its nutritive elements are readily used up by the system; whereas starch foods, which are necessarily retained in the system some hours longer than fruits before digestion takes place, are shown

by this prolonged retention to have a necessarily constipating as well as nerve-prostrating tendency.

Mr. Rowbotham relates most interesting and startling cases where the substitution of a fruit for a cereal diet wrought remarkable benefits, notably in the case of the woman who, during three previous confinements and the preceding periods of gestation, suffered agonizing pains and distressing illness, and in a fourth confinement, when fruit was substituted for bread and starchy vegetables for only a portion of the period of gestation, the distressing ailments that had been engendered during the early months of gestation while partaking of a starch diet were entirely overcome, the confinement being prompt and painless, and the power to resume ordinary duties returning immediately.

Sir James Crichton Browne clearly proves that the natural term of man's life is at least a hundred years; and, moreover, that the usual characteristics of old age, as lameness, impaired sight, teeth, and hearing, grey hair, etc., are not naturally the results of old age, but arise from transgressions of physiologic law. Further, this authority clearly proves by statistics that instead of the rate of longevity being lengthened, as is usually supposed, in point of fact it is decreasing. Such general results clearly indicate a general cause; and since it is shown that bread, cereals, and starchy foods are not man's natural diet, and that the assimilation of these foods entails an unnatural strain upon the digestive functions and a waste of vital power, the curtailment of longevity

in modern life is reasonably explainable on the hypothesis of the use of bread, cereals, and starchy foods.

The strain and waste of vital force required in the digestion of bread and starch foods is itself an adequate reason for all persons suffering from these causes to reach out for an artificial stimulant. These stimulants are, in the first instance, seasonings and spices, next tea, coffee, and tobacco, and next opium and alcohol. And while intemperance, which is decimating and undermining England and America, is thus shown to be the legitimate and logical outcome of cereal food, a fruit diet, on the contrary, by its nourishing and satisfying qualities, its simplicity and completeness, and its ease of digestion, calls for no stimulants, and makes intemperance impossible where it is followed.

A discussion of the natural food system has revealed—what was before only dimly perceived—that fruits are aperient by virtue of the chemical action of an acid which they contain; whereas bread, cereals, pulses, and starch vegetables inevitably have a constipating effect, which is only overcome by the mechanical and inflammatory action of the rough bran of the wheat, or the rough coats of other grains and pulses. This continuous irritation of the stomach and bowels, if persisted in for months and years, is sure to bring about chronic inflammation and an eventual breakdown. If the bran is coarsely ground this breakdown may be accomplished in months; if finely ground it is likely to require years. Thus the widespread popularity of wholemeal bread and

coarse oatmeal is a great delusion; originating with Sylvester Graham and the vegetarian propaganda, its influence has become widespread, and has far outrun the movement from which it sprung.

Another widespread error prevalent among vegetarians —and one the influence of which has also extended beyond that movement—is the belief that the use of butter, fat, and oil is injurious. That this teaching is wholly wrong is for the first time pointed out by the fruit and nut theory. Nuts having been shown to be a factor in man's natural food, it is plain that oil or fat in some form is an indispensable requisite; and this explains why it is that the southern negro as surely demands fat bacon with his maize as the Esquimaux is sure to demand large quantities of oil and blubber; and why it is that every race of man, in barbarism or civilization, insists upon vegetable oil—as in Spain and Italy—or upon a substitute in the form of butter, cheese, or the flesh of animals.

Since the sweet fruits of the south, together with nuts, are the natural food of man, a physiologic reason is given for the first time why all nations and races of men—being deprived of the sweet fruits intended for their use by nature — insist upon sweets, desserts, and confections, both at and between meals. While physiologists and chemists have been aware that the sugar of fruits is glucose, and all ready for assimilation, and that the sugar from cane, beet-root, maple, sorghum, and vegetables is insoluble and nonassimilable by the system until after having undergone digestion, both in the stomach and intestines, these physicians and scientists have not been

aware that man has, in the prolific sweet fruits of the south, a sugar that is far less expensive than sugar manufactured from cane or beet-root, and which, as before said, requires no digestion, and hence no expenditure of vital force.

The physiologic effect of salt, pepper, and like irritants, as well as such narcotics and stimulants as tea, coffee, tobacco, and alcohol, upon the system, is, first, to goad the nerves to undue action, which is naturally followed by a corresponding depression. This continual action and reaction serves to benumb the nervous system until, generally, no food will be relished unless the accustomed goad in the form of salt and other strong seasonings is administered; and if the narcotics and stimulants (tea, coffee, tobacco, or alcohol) be indulged in, a still further benumbing and destruction of the nerves is accomplished.

Cereal, pulse, and vegetable foods require the addition of large quantities of salt to neutralize the injurious effect of the excessive quantity of potash contained in these vegetable foods. Fruit and nuts, on the contrary, are adapted to the tastes and appetites of man without the addition of salt or other irritants.

The science of forestry shows that trees are a necessary element to make the planet habitable by man; that great spaces which are now rainless, barren wastes were once fertile with fruitful products and dotted with trees, which in their turn insured an abundant rainfall. Cereal agriculture denudes the earth of trees which nature so abundantly supplies, to make room for the plow and the grain;

and the result of this denudation is seen in America in the increasing number of dried-up beds of streams that were formerly filled with running water, and the increasing number of hurricanes and tornadoes with which that fertile country is yearly visited, dealing death and destruction in their path. In the discovery that fruits and nuts were the primal, and are the natural, diet of man, science points out a food which, compared with bread and cereals, is not only more prolific, more easily produced and prepared for the table, more easily digested and thereby conserving of vital force, and a food which is itself aperient and a blood purifier, and therefore making for health and longevity, but a food which involves the planting of orchards, and the restoration to the earth of its natural and needed trees with their foliage and bloom and fruit. In short, it will be seen that as the race increases in numbers, and more and more of the earth's surface is denuded of trees to make way for the plow and corn, the logical sequence of a cereal diet is to a great extent to denude the earth of trees, which, in its turn, causes tornadoes, droughts, and deserts; whereas the result of a fruit diet is to restore trees to the earth, and hasten the coming of the prophesied day when every man will sit under his own vine and fig tree—paradise regained.

A survey of the results arising from the substitution of a fruit for a cereal diet reveals other changes of immense magnitude. Agriculture as now known will give way to horticulture; and the exchange and commerce of the world will be based on fruit instead of grain.

If the correctness of the position taken in foregoing chapters be admitted, namely, that it is as natural to be well as to be born, that illness is always the result of transgression of physiologic law, and that man's natural term of life is 120 years, changes still vaster than the revolution of agriculture and commerce, or at all events of far greater importance, will inevitably follow. Not only will the chemists and drug-stores—so far as the preparation and sale of drugs and remedies are concerned—be done away with, but sending for a physician for any other purpose than surgery will be unknown. Parturition without pain will be considered as a matter of course. Emaciation and obesity will be seen to be the result of the transgression of physiologic law, abhorrent and deplorable. These diseases are correlated in ways of which there is now no thought or suspicion. They are both the result of prostration of the organs of nutrition. Emaciation is abhorrent in that it simulates the deformity and decrepitude of that diseased condition which is mistaken for old age; and obesity, while not so abhorrent as a tumor upon one side of the body, is yet a monstrous deformity, destructive of grace, and of "the human form divine."

Beauty will come to be recognized as no more the property of youth than of old age. An immature apple or peach may be symmetrical, but it does not reach perfection until it is not only full grown, but fully matured as well. So, too, in the coming time, will the man or woman at four or five score years be as superior in the sense of beauty, as in all senses, to the youth or maiden

of twenty as the brilliant and fragrant mature peach is superior to the colorless and odorless one, however symmetrical it may be.

As prophesied by Shelley, in the coming time "the athletic form of age," with its "open and unwrinkled brow," will have no "gray deformity," and no "deadly germ of languor and disease" — no gray hairs, no wrinkles, but perfect hearing, clear eyesight, sound teeth, elastic step, physical vigor, and spiritual contentment.

The average life of man will be some fourfold greater than at present. Adult useful life now begins at the age of twenty-five, and continues only twenty-five to thirty-five years—the exceptions to this rule are not common. When man comes to live physiologically he will enjoy between ninety and a hundred years of vigorous adult life, or more than threefold what he now enjoys. But this is not all. Louis Cornaro taught that a man is of no real worth until he has reached the age of fifty years, and gained control of his passions; and Sir James Crichton Browne teaches, as has been seen, that his powers of wisdom do not develop until after that age. At the present time, those who reach that age encounter a multitude of infirmities, and find their usefulness fettered with premature decrepitude. How different to this will be the natural life. When man has attained to that term at which Cornaro says his usefulness begins, he still will have fifty to seventy years of vigorous work before him. And, with such conditions, what useful devices would not an Edison invent, what poems a Shelley

write. Of what a wealth of music have we been deprived by the death of Wagner when he had reached only half the natural term of life. What histories might not Carlyle have unearthed and chronicled and illumined if he had been free from his aches and pains, his dyspepsia and resultant gloom, and were still with us in the enjoyment of full vigor. And what additional contributions to science and philosophy might we not have had from Herbert Spencer if, during his years of work, he had been freed from the ill-health that has accompanied and delayed him, and if he still had forty or fifty years of vigorous work in store.

FROM

HEALTH BY GOOD LIVING.

By W. W. HALL, M. D.

All machinery, the most perfect piece of mechanism which ever came from human hands, will wear out, because there is friction. Its cogs, its wheels, its bearings, its axles, and its cylinders all move upon one another, more or less directly. Such motion implies friction, and friction causes loss of substance necessarily. Millions of money are expended every year for the purchase of oils and other lubricants to lessen the tremendous wear and waste in the running of our locomotives, the trains on our railroads, and the machinery of our numberless mills and manufactories. But the living human body is the perfection of mechanism, and has within itself the power of growth and development; and more, it makes its own repairs, and provides its own lubricants; it works incessantly day and night for a hundred years. It never stops, it never wears out, until the work is completed. It is made of its hundreds of muscles, and bands, and sockets, and hinges, and pulleys, all playing upon or dragging across each other. The very smallest of these motions involves waste; indeed, not a single crook of the finger, not a bend of the arm, not a twinkle of the eye, not a thought of the brain, but is at the expense of some

solid portion of the human machine; and yet, at the end of a century, it remains a whole in all its parts; while the most perfect constructions of man come to a dead stop in a very few months, and would stand still forever, unless some new cog, or pin, or pulley was supplied. But the tongue which speaks to-day spoke a hundred years ago just as well, and the eyelid winks as easily at four-score as in infancy; it does not even wink tiredly. And all this, not because there are no wastes of substance in this wonderful frame of ours, but because they are as promptly repaired as made.

The stomach is a combination of muscles, hence it is called an organ; it is in the nature of a machine. The work which the stomach performs is to prepare the food for yielding its warmth, growth, strength, and repair to the whole body. A part of these is almost instantaneously withdrawn from the food while it is in the stomach; other parts, in its progress through other portions of the body downwards. It has been ascertained that an ordinary meal is digested, as far as the stomach is concerned, in about five hours; at the end of that time all the food has been passed out of it; it is empty, and, in a sense, goes to sleep, but not for long, for in an hour or two certain vessels connected with it become filled with a fluid, and their distention causes the sensation of hunger, and we want to eat again; no sooner is this done, than these vessels which caused the sensation of hunger empty their contents in among the food, dissolving it and preparing it for yielding its nutriment to the system, as before described.

But if more food is eaten before the stomach has been emptied, the process of digestion is arrested as to the food which was first taken, and does not go on until the food taken later has been brought to the condition in which the first was, and then all goes on together.

It is, however, a law of our nature, that if the food taken into the stomach remains there too long, being kept as it is at a temperature of about a hundred degrees, it begins to sour, just as any moist food would begin to sour if kept warm for the same time. It is then unfit to give nourishment and strength, and hence does not answer its legitimate purpose.

Another ill result is, the food being imperfectly digested, it gives an imperfect nutriment; and, as this imperfect nutriment is the material out of which new blood is made, that blood is imperfect and impure; but, being distributed all over the body, it not only does not meet the requirements of the system, but causes an unnatural sensation or condition of things wherever it goes, more particularly to parts which, from any cause, have been injured or debilitated. Hence, there is found an easy explanation of the many and varied complaints which dyspeptics have, scarcely any two being alike in the combination of their symptoms; all, however, agreeing in one thing, that they are wretched, that life is a burden, and enjoyment impossible.

The tendency of down-town luncheons upon the health and morals of all ought to be pointed out. Every merchant proposes to himself the general plan of "taking a snack," a "hasty plate of soup," or some other form of

light repast at noon, so as to prevent the stomach becoming too empty, or the system from too great exhaustion from the long interval between breakfast and the regular dinner at four or five o'clock, or later. The object is good, and the philosophy of it is founded on true physiological reasons; but the manner of the performance makes all the difference in the world. In the first place, there is no regularity in the lunch; and regularity, order, is Nature's first law. Every business man will confess that emergencies of trade and traffic are such that the time of taking lunch varies several hours, and sometimes is forgotten altogether, until it is too late to take one without interfering with the regular dinner in the afternoon. There is no habit of the body, no function of any organ, which will not be injuriously affected, if not destroyed, by irregular action or working. All know the value of regular sleep; and yet cases are given in medical works where persons have become deranged by continuously broken sleep, or have fallen into such a habit of wakefulness that an uneasy sleep of three or four hours was all that could be had in any twenty-four. Nature can never be baffled with impunity. Perhaps no other one thing engenders so many and such a variety of diseases as constipation of the bowels, which is brought on, in innumerable cases, by the person resisting the calls of nature, for the sake of some fancied convenience or some unwisely imagined necessity. If this is done, even for a short time, Nature seems, as it were, to become indignant, and calls no more; and a habit is set up which will make the subject a martyr to some form of human

suffering as long as life lasts. So with hunger and the stomach; if the sense of hunger is resisted, if the stomach is not supplied with food at stated times, it loses its tone, its vigor, its power to work, and dyspepsia follows, to sour the disposition, to irritate the temper, to depress the spirits, to change the whole moral nature, causing unhappiness, not only to the sufferer, but more or less to all those who may have to meet him in business or in domestic life.

Men do not dine down town long before they get into the habit of "taking something" at their meals. In fact, most of the eating-houses calculate to make as much in the way of profit on what their customers drink as on what they eat; and boys, and clerks, and young men, very soon begin to feel that it looks manly to call for "something" at lunch. They think it adds to their importance in the estimation of the waiters to take a glass of wine, or beer, or other drink; just as, a little earlier, they thought it "manly" to smoke a cigar or "take a chew." Men often invite their friends to go and take a lunch with them, when it is expected, as a matter of course, some form of stimulant will be ordered; this is sooner or later reciprocated; and thus the man, who, a while ago, had taken a glass only occasionally, finds himself taking it every day; and if, from any cause, he does not get it, there is a disagreeable sensation of wanting some thing, and this is not appeased until the accustomed glass is supplied, with, as a rule, its attending results.

The common vice of our people in the United States, in both town and country, in city and village, among old

and young, rich and poor, is rapid eating, when the stomach, like a dark bottle which is attempted to be filled with a funnel, gets full, and overruns before one knows it. There are two ill effects from hasty feeding; the food expands considerably, both by increased warmth and by its being divided and liquefied, so that if the stomach is not full when one ceases to eat, it will be full enough in a very few minutes by the heating and liquefying process; thus it happens when a person is called from the table, he may feel as if he could very easily have eaten more.

Healthful digestion is sometimes described as a churning process; the muscles are in continual motion, pressing the food forward in a kind of circular direction; and to do this, there must be room for a "purchase"—a point to push from and an open field to push to, so that it is easily seen that when there is an unnatural distention, there is no more room for work than for a man so beset by a crowd that he cannot move his arms from contact with the body. There being no room for work, the food cannot be property manipulated, is kept longer than nature designed, and the result is long hours of uncomfortableness, which dyspeptics, and heavy feeders, and rapid eaters have intelligent experience of.

Chew food deliberately, because bits of food in the stomach are like pieces of ice in a glass of water; the ice is melted in thin layers, from without inward, and any one can see that the pieces of ice disappear with a rapidity proportioned to their smallness, and with the same rapidity is the water cooled. Precisely so is it with the

particles of food in the stomach: each one is acted upon on the outer surface by the gastric juice in which it floats; and if each piece has been slowly and leisurely chewed with good teeth, it enters the stomach so well divided or cut up that it is taken hold of by the gastric juice, and wholly dissolved in a very short time.

It was observed by Beaumont that when meat or other food was cut up very fine, in smaller than pea-sized pieces, it seemed to digest quite as soon and easily as when it was chewed and swallowed in the natural way.

There are two essential requisites of a healthy digestion. There must be gastric juice. There must be strength in the muscles of the stomach to contract upon the food in such a way as to keep it in motion in the gastric juice, for the purpose of promoting its dissolution.

Medicine cannot make gastric juice. As seen awhile ago, it is a liquid prepared as a consequence of the need of repair; this need of replenishment and repair is occasioned by a previous waste or wear; that waste or wear cannot be brought about without motion of the muscles, which is expressed by the word "exercise"; it is muscular exercise which creates gastric juice. Without gastric juice there never can be any digestion of food, any converting of it into healthy blood; and here at this point are found the countless millions of failures in the cure of dyspepsia, it being sought to be done in every possible way than in the procuring of gastric juice, the absolutely essential element under all conceivable circumstances. It is so much easier to swallow medicine every day than to go to work, that human ingenuity has been taxed to

the utmost to find some thing which will make the stomach digest the food. Acting on the presumption that dyspepsia was simply a weak stomach, every conceivable tonic and stimulant has been given to "strengthen the stomach"; but, even supposing it were accomplished, a previous prime necessity existed in the presence of gastric juice, which is a product of muscular exercise, voluntary or involuntary, and of nothing else known to man.

It is seldom advisable to eat by weight and measure; hence, in adapting food to the capabilities of the stomach, rather than the needs of the system, it is better to follow a simple rule. If discomfort is experienced after a meal, then at the next take less and less, until the amount of food is so small that no discomfort whatever is experienced afterwards; continue this amount for a few days, and the stomach, as well as the whole body, will become stronger; for the small amount eaten, having been well digested, and converted into nourishing and pure blood, gives many times more strength and comfort than if a much larger quantity of food had been taken, and which, not being properly handled, would have been a hindrance, instead of a help, in building up the system. After living a few days in the manner described, the stomach getting stronger with the rest of the body, a little more food may be ventured upon, and in a day or two a little more still, with the result of increasing general health, strength, and vigor.

There is reason to believe that the happy time will come when we may be able to remedy disease by the free use of sugar candy, cordials, fruit, and roast beef. The world

has gradually fallen into the use of medicine in disease from the simple observation of cause and effect; and the result has been that the practice of medicine, in the hands of the educated physician, has been reduced to a science, in several directions to a mathematical certainty.

It has been observed that tartar emetic, introduced into the stomach, caused vomiting; it has been used a million times, and a million times has exhibited the same effect; hence, when tartar emetic is swallowed, we feel sure of the result. The next step was a deduction. If tartar emetic, taken into the stomach, causes vomiting, causes the stomach to empty itself, then, if there is any thing in the stomach which we want out of it, it is a very natural conclusion that tartar emetic is "good for" making the stomach "stand and deliver." It came by degrees to be noticed that opium caused sleepiness if swallowed; a million times opium was swallowed, and a million times were the recipients made sleepy; hence the very natural inference that opium was "good for" putting a man to sleep; and when men want to go to sleep, they know that they can do so if they swallow a little opium. Hence the various things which are used for remedies in disease have come by degrees into use—some by accident, others by induction, and all more or less relied upon. The general idea of medicine is, then, that it is some thing which will remove some disagreeable sensation, some "symptom" of disease. It is, then, fair to infer that whatever uniformly removes a symptom is a medicine. If a man is as blue as indigo,

in reference to depression of spirits caused by the want of a dollar to buy him a dinner, give him a ten dollar bill, and he will be one of the happiest of mortals—until the ten is gone; a million times give a ten, and a million times will he brighten up most amazingly, and naturally we begin to feel a perfect conviction that money is "good for" low spirits and very many other "symptoms"; hence money is a medicine, efficient, easy to take, and, like all other "simple" remedies, "will do no harm if it does no good." In the same line of reasoning it will be shown that various articles of food are medicinal, are good for removing symptoms of a disease, and hence can be used medicinally in a considerable variety of cases of actual suffering; and the time may be nearer than is generally supposed when a sick man will be restored to permanent health by good eating.

FROM AN ESSAY BY

DR. HELEN DENSMORE.

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When a man who has been addicted to the use of stimulating drinks desires to reform, and stops the use of such drinks, taking water instead, he is quite apt to feel ill at first. He often loses his appetite, grows thin, and finds himself in a less vigorous state physically; but he knows well enough that if he resumes his accustomed drams, he will soon brace up, and for the time feel better. Similar experience is likely to follow the breaking off of any poison habit. Indeed, it is the opinion of eminent medical authorities that, after the habit of arsenic eating has been followed for many years, it is impossible to wholly discontinue it without fatal results. This condition is well understood in regard to leaving off tobacco, morphine, chloral, etc., and, when lassitude and loss of strength follow, no apprehension is felt.

The truth is, that errors in diet become a fixed habit to which the system will cling, notwithstanding injurious results; tea and coffee are unnatural stimulants, and when one has used them for thirty, forty, or fifty years, the habit is fixed, and nature, true to her purpose of preserving life at all hazards, proceeds to adjust the system to the intruder in the most favorable manner.

Physiologists explain that a dose of poison strong enough to kill instantly may be divided into small doses, and taken at intervals, and the effect not be noticeable at the time, but that it becomes cumulative in effect; and, though it takes much longer, it does its full work in time. So the results of injurious diet is cumulative, and has its effect in ten, twenty, forty, or more years, in rheumatism, gout, kidney affections, cancer, pulmonary consumption, and so on to the end of the chapter; and when the system is released from this cause of trouble, when the habit is changed from the diet of civilization to a more natural one, relieved of the necessity of standing guard at the digestive tube to dispose of the poisonous elements daily taken into the stomach to the best possible advantage, nature at once proceeds to set up a curative action—the elimination of accumulated disease germs; and this action is quite likely to create some of the same symptoms seen in the case of the reformed drunkard, viz., lassitude, loss of appetite, dyspeptic symptoms, etc., for a period. Then will follow all the joys—and they can hardly be overdrawn—that are painted by the most enthusiastic devotee of a natural diet.

If it were true that, after so many years of abuse, we could stop the wrong course of living, and all the blessings of health follow immediately, it would be proof that this disobedience is not so bad after all. When we consider the wonderful mechanism of the human organism, the certainty with which all of its organs perform their allotted work, the inevitable penalty that has to be paid for every physiological sin that is committed, and then

consider the transgressions committed for so many years before the bills of credit began to mature, we ought not to be surprised that it takes a few years to repair the damage done in a lifetime; and, instead of complaining at the discomfort entailed, we should rather be thankful that it is not too late; that our accounts are not closed, and that we are not totally bankrupt in health.

It is true that some do make this change with very little or no discomfort. Such persons are favored with strong constitutional powers that have enabled them to resist the inroads of disease and the development of hereditary tendencies, or are free from such tendencies. Others, having strong digestive powers, are enabled to digest and assimilate unaccustomed food from the first, and so get on comparatively well; being well nourished, the craving for the stimulating foods abandoned is not so great, and improvement in the physical condition begins to be felt immediately. This would happen generally with the young at once. But by far the larger number meet the curative action sooner or later, and it may not come for some time.

With the drunkard, the curative action is recognized at once; all know that it is not the water that is making him ill, but the alcoholic poison which he had been before accustomed to. So mother, sister, sweetheart, and friends, with one accord, appeal to him to keep up his courage, notwithstanding his apparently bad symptoms. How differently is the poor dyspeptic treated when he attempts to reform in diet! With one accord his friends try to prevail upon him to abandon it; assure him that

he is killing himself; read him tomes of medical authorities to show that he is impoverishing his blood by this "low diet"; and when he returns to the old injurious diet, just as with the dram of spirits in the case of the drunkard, the effect is to stop the curative action; he feels braced up, and this is taken as proof that he was all wrong, and the accumulation of disease commences again.

It is well known, when one has become accustomed to the poison habit of opium, alcohol, or tobacco, that it is a slavery difficult to overthrow. It will be found that the habit of eating improper food, when once formed, is also difficult to be overcome; and if to this there has been added the baneful habit of tea and coffee drinking, the inconvenience is increased. The difficulty of overcoming these pernicious habits is made still greater when the attitude of one's companions, friends, and society is taken into account.

A mistake is often made in counseling a too abrupt change. If one is young or has great vigor, and the powers of digestion and assimilation have not been too much weakened by unnatural foods, and the necessary quantity of natural foods can be easily digested and assimilated, such a person can be advantageously put upon fruit and nuts at once, and all will go well. But most persons have so long depended upon improper foods for a large share of their nourishment that their digestive organs have become weakened; and if such people change abruptly their weakened stomachs may not have the required vigor necessary to abstract needed nourishment.

But after all these difficulties are fully acknowledged and appreciated, and due weight allowed for all the drawbacks it is possible to discover, there is quite enough of blessedness and compensation to charm any earnest soul who has an ambition to take his birthright—Health. It is just this ambition for health that is sadly lacking in the modern mind. There was a glimpse of sanity in the old Spartan practice of putting to death the weak, sickly, and deformed children at birth. It was a dim perception of the truth that to be ill is a monstrosity. And when we learn that illness is always the result of disobedience to law, when we come to know that it need never be—that it comes only with the violation of plainly written laws of health—we shall see an entirely different attitude towards illness, in whatever form it makes its appearance. And, moreover, when we learn that the pleasures of life, judged from the sensuous standpoint alone, are much greater when following this simple diet—that we enjoy more physical delight in the newness and fullness of increased vitality, clearer brains, stronger powers in every direction, and no illness, lassitude, or fear of these—surely this will be motive strong enough, when once conviction is secured, to induce all men and women, whatever their station in life, to adopt it.

FROM "EDUCATION," BY

HERBERT SPENCER.

Consider the ordinary tastes and the ordinary treatment of children. The love of sweets is conspicuous and almost universal among them. Probably ninety-nine people in a hundred presume that there is nothing more in this than gratification of the palate, and that, in common with other sensual desires, it should be discouraged. The physiologist, whose discoveries lead him to an ever-increasing reverence for the arrangement of things, suspects something more in this love of sweets than is currently supposed; and inquiry confirms the suspicion. He finds that sugar plays an important part in the vital processes. Both saccharine and fatty matters are eventually oxidized in the body; and there is an accompanying evolution of heat. Sugar is the form to which sundry other compounds have to be reduced before they are available as heat-making food; and this *formation* of sugar is carried on in the body. Not only is starch changed into sugar in the course of digestion, but it has been proved by M. Claude Bernard that the liver is a factory in which other constituents of food are transformed into sugar, the need for sugar being so imperative that it is even thus produced from nitrogenous substances when no others are given. Now, when

to the fact that children have a marked desire for this valuable heat food, we join the fact that they have a usually marked dislike to that food which gives out the greatest amount of heat during oxidation (namely, fat), we have reason for thinking that excess of the one compensates for defect of the other—that the organism demands more sugar, because it cannot deal with much fat. Again, children are fond of vegetable acids. Fruits of all kinds are their delight; and, in the absence of any thing better, they will devour unripe gooseberries, and the sourest of crabs. See, then, the discord between the instinctive wants of children and their habitual treatment. Here are two dominant desires, which in all probability express certain needs of the child's constitution; and not only are they ignored in the nursery regimen, but there is a general tendency to forbid the gratification of them. Bread and milk in the morning, tea and bread and butter at night, or some dietary equally insipid, is rigidly adhered to. . . . . We contend that, were children allowed daily to partake of those more sapid edibles for which there is a physiological requirement, they would rarely exceed, as they now mostly do when they have the opportunity. Were fruits, as Dr. Combe recommends, "to constitute a part of the regular food" (given, as he advises, not between meals, but along with them), there would be none of that craving which prompts the devouring of crabs and sloes. And similarly in other cases.

This relatively greater need for nutriment being admitted, as it must be, the question that remains is, Shall we meet it by giving an excessive quantity of what may

be called dilute food, or a more moderate quantity of concentrated food? The nutriment obtainable from a given weight of meat is obtainable only from a larger weight of bread, or from a still larger weight of potatoes, and so on. To fulfill the requirement, the quantity must be increased as the nutritiveness is diminished. Shall we, then, respond to the extra wants of the growing child by giving an adequate quantity of food as good as that of adults? Or, regardless of the fact that its stomach has to dispose of a relatively larger quantity even of this good food, shall we further tax it by giving an inferior food in still greater quantity?

The answer is tolerably obvious. The more the labor of digestion is economized, the more energy is left for the purpose of growth and action. The functions of the stomach and intestines cannot be performed without a large supply of blood and nervous power; and in the comparative lassitude that follows a hearty meal, every adult has proof that this supply of blood and nervous power is at the expense of the system at large. If the requisite nutriment is obtained from a great quantity of innutritious food, more work is entailed on the viscera than when it is obtained from a moderate quantity of nutritious food. This extra work is so much loss, which in children shows itself either in diminished energy or in smaller growth, or in both. The inference is, then, that they should have a diet which combines, as much as possible, nutritiveness and digestibility.

EXTRACTS FROM THE BOOK OF THE

RALSTON HEALTH CLUB.

It is hard to believe that there are disinterested people in the world. That one or more persons should seek to investigate the great laws of life for the purpose only of benefiting humanity is too strange to be true. The condition of the human heart is such that it can accept no act of pure philanthropy as unalloyed. To lose faith in our fellow-beings is sad.

The green-hued cynicism which stains the heart is the outgrowth of an experience composed of disappointments. Have you ever met one true, noble soul on earth? Or has all your life been one continuous confirmation of the cynic's distrust of human honesty? There are so many pretenders abroad who seek to win our confidence under the guise of honest purpose that it is hard to know whom we shall believe.

Therefore, when the Ralston Health Club declares that it is a charity, and that the sole object of its existence is to aid in the creation of a new race of men and women, it must expect to meet either the quiet doubts of those who have been unfortunate in their dealings with others,

or the open hostility of evil thinkers; for as the heart is, so the mind thinketh.

CREED OF RALSTONITES.

ARTICLE I.—We believe in the existence of a LIFE PRINCIPLE, or vitality, buoyancy, or spiritual energy, which is superabundant in good health, and is lacking in sickness, as may be seen in the lives of persons. For convenience of name we call this vitality glame; and we believe that it dwells in the universe, and may be drawn into the human body by an act of the WILL expressed in certain exercises invented for that purpose.

ARTICLE II.—We believe that the absence of this vitality is the cause of ill-health, and is also caused by ill-health; that, during sickness, the buoyancy of the body droops, but returns again with the restoration of health; and that vitality, buoyancy, cheerfulness, glame, or by whatever name it may be called, is an impelling force, which may direct all the impulses of growth and development.

ARTICLE III.—We believe that (as no scientist has hitherto made a special study of this LIFE PRINCIPLE) the ignorance of the human race upon this, the most vital fact of existence, has much to do with the prevalence of disease, the untimely approach of old age, and death.

ARTICLE IV.—We believe that it is possible for man (by special study, experiment, and investigation) to learn about the LIFE PRINCIPLE OR VITAL SPARK, and to draw it into the body, and increase the power of our vitality for the purpose of securing health and prolonging life.

ARTICLE V.—We believe that as a weakened vitality yields quickly to disease and death, so a strengthened vitality may baffle these monsters for many years, and delay even the approach of age.

ARTICLE VI.—We believe that ill-health is due to one or more of the following causes:

1. Inheritance. 2. Carelessness. 3. Ignorance. That medicine is positively injurious and unnecessary, except in a crisis, and even then is only the substitute of one ill for another; and that exercises and regime for the generation of the LIFE PRINCIPLE will give a diseased body a NEW BIRTH.

ARTICLE VII.—We believe that the adulteration of food is increasing every year at an alarming rate, and is the cause of diseases of the liver and kidneys, and that every man and woman in America should aid in an organized effort to drive these adulterations from the market.

ARTICLE VIII.—We believe that a knowledge of what is the best food for the stomach, and the obtaining of such food in a pure state, also the cultivation of habits consistent with the laws of health, and the practice of exercises for increasing the power of the LIFE PRINCIPLE, *must* and *will* result in absolutely *perfect health*, and the prolongation of human life far beyond its present duration.

ARTICLE IX.—We believe that there are ways of preventing, and ways of curing, by natural methods, without medicine and without cost, all the ills that "flesh is heir to," from common headaches and colds to the great disorders.

ARTICLE X.—We believe that every honest physician should be willing to encourage the rapid recovery of his patient by the aid of Nature, as found in the Four Cardinal Points of Health.

ARTICLE XI.—We believe heartily and unreservedly that the Four Cardinal Points of Health—glame, food, exercise and cheerfulness—are founded on Nature's primeval, permanent, and perfect laws of existence.

ARTICLE XII.—We believe that the HOME is the mother of the great moral and social fabric of the nation, of advanced civilization, individual prosperity, and national supremacy; that HAPPINESS is the father of the HOME; that HEALTH is the progenitor of HAPPINESS; and, through Nature, that perfect health may attend the life of every human being on the face of the earth.

THE RALSTON DOCTRINES OF LIFE AND DEATH.

We are in accord with the best science of to-day. The German microscopists are men of accuracy; their microscopes are the wonders of civilization; and it is to the shame of American skill that this is so. Prof. Ralston and his colaborers have gone no farther than others; but they declared years ago, what scientists now admit, that disease is a sin, and the longevity of youth and health a positive duty.

No one desires old age. Yet, if one could arrive at one hundred and look only forty, with wealth, ease, power, and happiness, would age then be undesirable? No. Now that is the Ralston doctrine; and science, scientists, facts, and Nature all indorse it. We will lay

down the principles which underlie the new doctrine, or this exposition of the first laws of life.

Nature affords a process to youth, which she intends should be reversed when growth is attained.

This claim has never been stated by any scientist except Ralston; yet, although the statement is new, the facts which support it are old and authenticated. These facts we will look at now. A glance at a diagram will show the large formation of bone in the vital parts of the body, and near the heart. At birth this bone was gelatine. Life begins in gelatine and ends in bones. Physicians will tell you that old age is but the osseous tendency of heart, brain, and arteries; that ninety-seven per cent of all people past middle life are ossifying, or turning to bones, in the *heart*, in the *brain*, and in the *arteries;* that a steady, gradual change in this direction is going on from youth to age; and that when any part of the body, excepting the bones, begins to secrete bony matter, disease follows: first, by reducing the circulation; second, by impoverishing the blood; third, by breaking down tissues; and fourth, by exposing the organs to the ravages of germ life. These facts are stated by Koch, Grumaine, Browne, Lewes, Bichat, Baillie, and a score of others; and are proven by observation.

It is necessary that the osseous tendency should occur in youth. This process makes the bones and gives the hardness. All foods and liquids, except fruits and distilled water, contain carbonate and phosphate of lime and other calcareous salts, which develop bones, and, by a continuous action, carry the tendency to every part of the

body. When the bones become hardened, the body reaches its limit of growth. If a young person should eat fruits, drink only distilled water, and follow the Ralston system of foods, the bones would not harden for many years, and the body would attain to great size.

This hardening of the bones determines why some persons are small and others large. In one hundred families of Ralston followers, the experiment is being tried of giving the proper foods, fruit, and water to children, and the claim is proven already; although further reports will be made at intervals.

Medical works say "it is as natural to die as to be born." Until within a few years all physicians have asserted that "there comes a time when the body wears out, and death is the penalty, visiting all that live."

Apart from disease which destroys life, the wear and tear of the body which brings on age are absolutely unnecessary.

We have seen that ossification is necessary to youth, in order that the bones may be formed and made strong. This action of the blood which deposits bony matter *is kept up through life.* WHY DO WE NOT REVERSE THE PROCESS? Old age, the wear and tear of life, the breaking down of the functions of the body, are all caused by this osseous process, which is itself caused by calcareous deposits.

What do these calcareous deposits cause?

1. The hardening of the skin; thereupon the skin wrinkles, gets old, the hair is killed, and the blood does not circulate freely, causing an aged look in place of the freshness of youth. *We say this can be prevented.*

2. The brain turns to bony substance in its intricate parts; it loses flexibility, becomes hard, gets "set," and deep thinking is impossible.

3. The heart is likewise clogged; its circulative action is impeded, the body suffers by reason of poor blood, all the organs begin to break down from lack of blood, and sickness or severe exhaustion is liable at any moment to cause "heart failure." *We say this can be prevented.*

4. The arteries all through the body become clogged by the osseous tendency, and weariness results, causing the most serious loss of energy. *We say this can be prevented.*

5. The bones, muscles, sinews, tendons, ligaments, and tissues become stiff, and old age—"rheumaticky" old age—even at forty, sets in, attended by multitudinous ills. *We say this can be prevented.*

HOW PREVENTED?

Experiments, everywhere universal, prove that our theories are correct. Nature and Nature's God decreed to man the power of reasoning out his life; to animals the misfortune of a diminished brain. So animals die from the osseous tendency. Yet we can prolong life and buoyancy of any animal by giving it distilled water altogether. Animals cannot, of their own volition, reverse the process of youth; *man can.*

THE RALSTON RULE.

At the age of twenty-one, and ever after, habitually dissolve the osseous deposits of the body.

Distilled water of itself is sufficient; but, as it cannot always be obtained, the use of the following fruits will aid to a great extent:

Apples at all seasons, pears, grapes, orange juice (not the pulp), cherries, plums, peaches, and berries.

THE NATURE OF FOOD.

The body is composed of fourteen elements, which are as follows:

1. Oxygen. 2. Carbon. 3. Hydrogen. 4. Nitrogen. 5. Calcium. 6. Phosphorus. 7. Sulphur. 8. Sodium. 9. Chlorine. 10. Fluorine. 11. Iron. 12. Potassium. 13. Magnesium. 14. Silicon.

These are stated as elements, but are required in combinations. Thus, water is a combination of oxygen and hydrogen, and, as such combination, is needed as food.

Without trying the patience of the reader too much by the use of scientific terms, we will state the chemical names only of these combinations, and try hereafter to describe all facts in simple, every-day language.

In the human body, there are seventeen combinations of the Fourteen Elements of food:

1. Water. 2. Gelatin. 3. Fat. 4. Phosphate of Lime. 5. Albumen. 6. Carbonate of Lime. 7. Fibrin. 8. Fluoride of Calcium. 9. Phosphate of Soda. 10. Phosphate of Potash. 11. Phosphate of Magnesia. 12. Chloride of Sodium (common salt). 13. Sulphate of Soda. 14. Carbonate of Soda. 15. Sulphate of Potash. 16. Peroxide of Iron. 17. Silica.

Our purpose in furnishing a list of the seventeen combinations which are found in the body is to give them as they are required in food; as for instance, in the example of oxygen and hydrogen, which the body receives in the combination called water, although they are in other forms of food also.

The nature of food may now be seen by examining the above list of seventeen combinations.

The process of life in the body has the following divisions:

1. The governing portion; consisting of the brain which orders the muscles, and of the nerves which carry all communications between the brain and the muscles.
2. The executive portion; called the muscular system.
3. The fuel, which, by burning (in a chemical sense) in the body, keeps up a supply of heat, which is the source of all activity or motion.

Food must therefore supply these three great divisions of the processes of life, and the nature of the food should be determined by its ability to do this. Every day we live we must take into the system every one of the fourteen elements in their seventeen combinations, as before described, or there will be some thing the matter. The absence of any one element, or its deficiency, will result in some disarrangement tending to sickness and death. It is better at the present time to keep the classification of foods in the three great divisions, which furnish:

1. Vitality; or brains, nerves, and bones.
2. Strength; or muscle development.
3. Heat; or fat.

Of the fourteen elements needed in the body, and which must be supplied in the food taken in the system, those which supply the three great demands, vitality, strength, and heat, are classified under general terms as follows, the words being used in their popular, and not their chemical, sense:

1. The Phosphates, in which phosphorus predominates, supply vitality, or brain, nerves, and bones.
2. The Nitrates, in which nitrogen predominates, supply the muscles for strength.
3. The Carbonates, in which carbon predominates, supply heat and make fat.

It is a sad fact that people in general know nothing of the nature of the food they eat, and many wonder why they are not well. It is physically impossible to live upon any one kind of food more than a month or two; that is, if food contained only carbonates, the person would soon die; or if the carbonates were in excess, although accompanied by the nitrates, the person would have fever, headache, poor blood, pimples, and humors. There is also disarrangement in the system when nitrates or phosphates predominate.

These three words, carbonates, nitrates, and phosphates, should be committed to memory by all persons who intend to enter upon that higher life of health which is provided for Progressive Ralstonites. The words are popular, and not the scientific words that have the strict meaning given them in deeper science. It is not hard to speak of carbonates as heat makers; nitrates as mus-

cle makers; and phosphates as brain makers. The brain is identical in its life with the nervous system, and the phosphates therefore strengthen the brain and nerves, and furnish substance for the bones, after having been useful in supplying vitality.

Are all foods to contain an equal share of carbonates nitrates, and phosphates? No. The proportion is furnished by Nature, and should be maintained by use in taking food.

LAWS OF EATING.

FIRST FACT.—What is good on one day may not be so good on another, and what may suit one person is not sure to suit another.

SECOND FACT.—There are many varieties of days in the course of a year, and the health and comfort of the body demand that the kind of food eaten should, in a reasonable degree at least, conform to the day on which it is eaten.

THIRD FACT.—If foods suitable for cold weather are eaten on a hot day in summer, the blood will become feverish, and the heat of the atmosphere will be unendurable.

FOURTH FACT.—If summer foods are eaten on a cold day in winter, the body will surely catch cold. The popular idea is that colds are due to a draft.

FIFTH FACT.—We can prove that a person whose food on a cold day is suited to the day, will not readily catch

cold under any exposure; whereas one who eats summer food in winter will take cold, even when most careful.

SIXTH FACT.—Nature, in her wonderful bounty, has provided a certain class of eatables, the sole purpose of which is to furnish WARMTH to the human body, and to make its blood hot and active. These foods we shall call *heaters*. Science calls them carbonaceous, because they are forms of carbon, an element that burns (in a chemical sense) in the body.

SEVENTH FACT.—If you eat *heaters* on a hot summer day, it is as though you build a fire, put on heavy clothing, and try to refrain from being irritable or nervous.

EIGHTH FACT.—Many a person has been stricken with fever by not knowing the laws of FOOD SELECTION, and partaking of winter eatables in summer.

NINTH FACT.—Of recent years running sores, tumors, ulcers, humors in the blood, face-pimples, and skin diseases have been found to be due to eating too large a proportion of *heaters*, thus enabling bacteria to live and increase. The practice of treating such disorders by giving the patient a proper *proportion* of food has been eminently successful. In fact, no other rational remedy exists.

TENTH FACT.—On a damp or chilly day, when the hands and feet are cold and the circulation of the blood seems poor, an increase of the proportion of *food heaters* will so quickly remedy the trouble that the cure will seem miraculous.

ELEVENTH FACT.—Nature has provided certain kinds

of food, whose sole purpose is to supply the elements and tissues which develop the general muscular system of the body, and on which alone the strength depends. These we shall call *muscle-makers.*

TWELFTH FACT.—Nature has completed her work in this regard by supplying certain other kinds of food, whose sole purpose is to supply the vitality of the nerves and brain. As the nerves emanate from, and are a part of the brain, some physiologists call these eatables *brain foods.* We shall call them *vitalizers*, which is much the same thing.

All foods, therefore, belong to one of three classes:

1. *Heaters.* 2. *Muscle-makers.* 3. *Vitalizers.*

[*Consult Table showing Analysis of Foods.*]

Nutrition to the body can come only through the activity of the body.

Food attracted to any part of the body by exercise gives health and vigor to that part.

Food, no matter how nutritious it may be in its elements, is not so easily drawn into the organic life of the system, or "assimilated," as physicians say, unless muscular activity is going on. Much of the best food, not being assimilated, is lost as waste.

Assimilated food, after having served its purpose, becomes effete; and such effete matter should be thrown off by exercise and the eating of fruit.

PHOSPHORUS.

FROM DE LACY EVANS, DITTMAR, LIEBIG AND OTHERS.

The word "phosphorus" was long used to signify substances which shone in the dark without burning. In 1678 the German alchemist, Brand, of Hamburg, hoping to obtain an essence for the "ennobling" of silver into gold, subjected urine solids to dry distillation and produced phosphorus. In 1771 Scheele obtained it from bones by a process which is in general use at the present day.

Phosphorus exists in the most highly developed organs or structures of men and animals. The brain and other nerve centers contain a substance termed protagon, of which phosphorus forms an essential constituent.

The brain contains cells, and also fibers which are joined to, and issue from, the cells, which, with the spinal marrow and nerves—the latter reaching every portion of the body—form a perfect telegraphic apparatus, controlling every thought and action.

The first cause of thought is not organic, but spiritual; the business of thinking is organic. During thought, worry, remorse, or hard study, phosphates are largely increased in the *excretæ*. As the brain is the center of thought, it is clear that this waste of phosphates is due

to oxidation or loss of phosphorus from the brain, resulting from mental exertion.

Phosphorus, even in sleep, gradually oxidizes in the cerebro-spinal axis; electricity is developed, and when it has reached a certain tension, is discharged along the nerves which supply the heart, causing its pulsation and the resulting circulation of the blood.

It is a chemical fact that on the oxidation or burning up of phosphorus in the atmosphere an electric charge is given off; also, that on passing a current of electricity along the course of one or more nerves of an animal body muscular contractions result. Thought, the mind itself, many nervous actions with which the mind has no connection, volition and common sensation, are intimately connected with the presence of phosphorus in the cerebro-spinal axis.

Every thought, every sensation, is accompanied by a change in the composition of the substance of the brain. A man wills his hand to reach a certain object. Phosphorus is oxidized in the brain cells, which either communicate or are in contact with nerve fibers, and the electric current caused by oxidation of phosphorus in the brain passes down these fibers (on exactly the same principle as the telegraph wire) to the arm or hand; contractions of muscles result—the action willed is completed.

According to careful estimates three hours of hard study wear out the body more than a whole day of hard physical exertion. "Without phosphorus, no thought," is a German saying; and the consumption of that essential ingredient of the brain increases in proportion to the

amount of labor which this organ is required to perform. The wear and tear of the brain are easily measured by careful examination of the salts of the liquid excretions.

The importance of the brain is verified by the fact that although it only weighs one-fortieth of the weight of the body yet it requires one-fifth of the blood. It is generally believed that the supply of phosphorus is derived from earthy or alkaline phosphates taken into the system in articles of diet, and that some action must exist with power to deoxidize phosphates and extract free phosphorus, but, whatever the source may be, it must first exist in the blood and be carried by it to the brain, which we may therefore compare to a gland, one purpose of which is the secretion or absorption of phosphorus from the blood for the purpose of taking part in some of the most important functions and manifestations of vital phenomena. Direct experiment and many records of the chemical pathology of the brain show, that although phosphates by gradual deposition often increase in the brain, the quantity of oxidizable phosphorus decreases in "old age."

Phosphorus may not be a vital principle, but it plays an important part in organic life. As the brain derives its supply of phosphorus from the blood, which circulates in vessels which gradually indurate, ossify, and become lessened in caliber as age advances, so must the brain and nerves gradually lose their powers of selection and imbibition and be deprived of their nourishment. Thus the quantity of oxidizable phosphorus in the brain decreases in "old age."

In the present age of rapidity and despatch phosphorus is often a deficient constituent of the brain and nerves. It is often wasted in the turmoil of business, in anxious moments pending loss or success, in grief and sadness, and in the mental applications of the scholar; also, in the excessive indulgence of the inebriate, as alcohol in excess dissolves and removes phosphorus from the brain, hence the tremor and other symptoms dependent upon a deficiency of nerve power.

To demonstrate the action of phosphorus upon the system, after its absorption into the blood, we may divide it into two portions. One part is carried by the circulation to the brain, which assimilates and fixes it in its own substance. The other part is carried by the general circulation to every structure and organ of the body. During its passage it fixes and combines with oxygen existing in the blood, and becomes hypophosphorus, afterward phosphoric acid. Phosphoric acid combines with the alkaline and earthy bases existing in the blood, forming neutral salts. As the amount of phosphoric acid increases, part of the insoluble earthy compounds become superphosphates, which are soluble and circulate again in the blood, and a portion is removed from the system in the liquid excretions. This prevents the accumulation of earthy compounds, *the cause of old age*, and even removes those already deposited, thereby prolonging life for a lengthened period.

Hypophosphites have a similar action; they fix oxygen from blood and become phosphates, thus preventing undue waste of the system. This is the reason—and the

only one—that the hypophosphites act so beneficially in consumption. The alkaline hypophosphites only are of service for the purpose now under consideration.

Therefore, in the agents best adapted to prolong life for a lengthened period, we notice chiefly distilled water used daily as a drink; unoxidized phosphorus, in syrup, glycerine, etc., in doses of one or two drachms, according to the strength of the solution; the alkaline hypophosphites, and the dilute phosphoric acid in doses of from ten to twenty drops in a glass of water. The latter has all the properties of a decided acid, but, for a mineral acid, the exceptional qualities of an agreeably sour taste and of non-poisonousness. These preparations may be taken two or three times daily (according to the degree of ossification) as an article of diet and not as a medicine.

TREATMENT OF THE SKIN.

No article on longevity is complete without reference to the proper condition and treatment of the skin. The importance of this organ is not generally understood. The adult man has an average of 2,500 square inches of skin, containing about 5,000,000 pores, which in health are in a state of activity. It is claimed that nourishment may be ingested through these pores by baths of milk or other fluids. It is not, however, from this fact that the skin derives its importance. It is essentially an organ for the constant disposal of waste products of the body. Water and many poisonous substances, such as uric and biliary acids, malarial poisons and general epidermic debris, are expelled through the pores of the skin.

Perspiration is one of the fluids in which the body washes out its waste materials. In temperate weather an adult perspires about a quart per day. It is a regulator of bodily heat, as by evaporation it aids in maintaining a uniform temperature. When evaporation ceases, internal heat is raised above the normal, and fever occurs.

Many experimenters have carefully considered skin transpiration. The most notable, Sanctorious, for thirty years daily weighed his food and drink, and the natural excretions. He determined that about one-half of the ingesta was eliminated by the skin.

The skin is also claimed to be a subsidiary respiratory organ, inhaling oxygen and exhaling carbonic acid gas. When the pores are clogged by waste products the normal action is impeded, and other organs, especially the kidneys, are forced to double work. "A child was once gilded to represent an angel at a papal festival at Rome, and died in four hours from suppression of this excreting and heat-evaporating function."

The human system bears changes in temperature of air better than changes in temperature of water. Seventy-five degrees of heat in air is summer heat, but a bath at the same temperature seems cold. Water at ninety-nine degrees excites the system; being a better conductor than air it brings more heat to the body and suppresses perspiration, while air increases it. A bath at ninety degrees can be borne longer than at any other temperature. Such a bath affects only the surface. There is no reaction and the animal temperature is unchanged. Cold baths should be of short duration and used only by the strong and active in whom the powers of reaction are unimpaired. They are always dangerous when the system is in a state of exhaustion. The risk incident to cold baths is congestion of the internal organs, shown by the lips becoming blue. Warm baths are restful and relaxing.

Father Sebastian Kneipp, a parish priest of Bavaria, has become famous through the success of his water-cure establishments. The main feature of his system consists of a plunge into cold water, quick dressing without drying the body, followed by immediate and rapid exercise; the principle involved being reaction inducing perspiration.

Weismann, De Lacy Evans, and others, furnish considerable information concerning the daily habits of centenarians, which data, however, do not mention treatment of the skin. Hence it is necessary to turn to local instances. Reference is here made to three well-known cases:

The first, recently deceased, age 95, for the last forty years of his life used only flesh brushes vigorously applied.

The second, Old Gabriel, who died March 16, 1890, at an authenticated age exceeding 120 years, induced perspiration by heated smoke and vapor, scraping the body usually with sticks.

The third, an active business man in vigorous health and in full possession of all his faculties now in his one hundredth year, has for the past sixty years followed this unvarying habit: Before retiring he has used a towel dipped in water at the temperature of the room, drying by vigorous rubbing.

Here are three cases which differ in detail, but the result accomplished is the same.

A healthy condition of the skin is essential to extreme age, and when one reaches such age we may presume that no neglect in this particular has occurred. The following directions are adapted to nearly all conditions of life, and if persisted in, will be found sufficient to keep the skin in perfect condition:

Before retiring rub the body vigorously with flesh brush, hair glove, or rough towel, until the blood is brought to the surface. Follow this immediately by a sponge bath with water at the temperature of the room.

WHAT TO DRINK.

Thirst is largely influenced by diet. With certain foods the inclination is to drink a great deal; especially is this the case with foods of a starchy or saline character. The heating effects of alcohol (even in light wines) induce thirst. An effect exactly contrary occurs where the diet consists largely of fresh fruits; this is mainly on account of the water contained therein, and the absence of any irritating effects incident to cereal foods, or the heating effects where the carbonaceous element predominates. Temperature, also, from its influence on perspiration, affects thirst.

The average adult weighs 150 pounds; of this weight at least 130 pounds are water. Blood contains 95, muscle 77, and bone a large per cent of water.

Daily secretions and excretions require a quantity of fluid. The tissues are bathed in fluids which bring nutriment and dispose of waste. Ordinarily, one drinks too little water, because of habit and the mistaken impression that it is undesirable to dilute too freely the gastric juice. It is a well-known fact that in many cases the beneficial effects ascribed to watering-places are due, not to any special quality in the water, but to the quantity used. Water

not only gives fluidity to the blood, but it is essential to digestion and the secretions involved in the digestive act.

Water taken into the stomach is quickly absorbed into the current of the blood and circulated through the whole body. It is the only necessary drink, and its purity is of vital importance. Milk is water and food. Wine is water, with the addition of about 15 per cent of alcohol and sugar acids. Tea and coffee are watered infusions of leaves and berries, containing stimulants.

Tea has a retarding effect on salivary digestion, as have coffee and cocoa to a slight degree. This action of tea is due to tannin, which is one of the most soluble substances known, of which tea infused for two minutes contains nearly the same amount as if infused for twenty minutes. The only way to avoid the effect of tea on salivary digestion is to eat first, allowing the saliva to perform its function, and then to drink. It is claimed, however, that a small addition of carbonate of soda will remove this effect.

The effects of tea, coffee, and cocoa on peptic digestion are alike for infusions of equal strength. Cocoa is generally used with the strength of about two per cent; tea four or five per cent; coffee five to seven per cent. The latter has a powerful retarding effect on gastric digestion. They all contain a volatile oil, upon which their aroma depends; a nitrogenous compound, as theine, caffeine, and theobromine; and also an astringent acid, of which the tannic acid of tea is a good example. The experiments of Lehmann, in 1854, showed that when the infusion of three-fourths of an ounce of coffee was taken daily for fourteen days, "the amount of urea and phosphoric acid ex-

creted by the kidneys was less by one-third than when the same food was taken without the coffee." His opinion was that it retarded the waste of tissues. Many authorities, however, contend that the constant use of coffee is decidedly injurious to the general health, and especially to the eyesight. In some of these beverages the amount of astringent matter is too great for assimilation. Those who drink strong decoctions of tea in large quantities suffer from a peculiar dyspepsia, due to the tannin acting on the coats of the stomach. The Russian system of taking lemon juice in tea is good, because of the presence of citric acid, which prevents this astringent action of the tannin.

Undoubtedly a scientific summing up of the *pros* and *cons* of tea, coffee, and cocoa would result, first, in ascribing their general use to stimulating qualities; and second, in condemning their use under any and all conditions as unnecessary, and, when freely used, injurious. The pernicious habit of drinking at meals is largely responsible for the general use of these stimulants. Any one who satisfies natural thirst by a glass or two of distilled water between meals will find no inclination to drink at meals.

Sir William Roberts states that distilled spirits—brandy, whisky, and gin—have but a trifling retarding effect on the digestive processes when used dietetically. Their obstructive effects become apparent only when used intemperately. In moderate dietetic proportions distilled spirits stimulate the glands which secrete the digestive juices, and their effects on the muscular activity of the stomach are generally regarded as distinctly promotive of digestion.

Wines exhibit a different action, as, on account of their acidity, they check the action of saliva on starch foods. The addition of an alkali will neutralize this effect; therefore, by mixing table wines with soda, seltzer, or any other effervescent waters, all of which contain alkaline carbonates, salivary action would not be impeded. Wines also check the speed of peptic digestion; hence the quantity used should be adjusted to bring out their stimulating action without provoking the retarding effect which marks their more liberal use. Effervescing wines are more favorable to peptic digestion than still wines. This is due to the mechanical effects of effervescence and the liberation of gas causing digestive action.

Chambers states that the effect on a healthy man of taking with a meal such a quantity of fermented liquors as puts him at ease with himself and the world around, without untoward exhilaration, is to arrest the wear of the nervous system, especially that part employed in emotion and sensation. Just as often, then, as the zest for food is raised to its normal standard by a little wine with a meal, the moderate consumer is as much really better as he feels the better for it; but where the food is as keenly enjoyed without it, a stimulant is useless. In the autumn of life the use of fermented liquors is more advantageous, and the injuries it can inflict less injurious to the body than in youth. The effect of alcohol with the aged is to check the activity of destructive assimilation, and to arrest that rapid flux of the substance of the frame which in healthy youth is not excessive, but which in old age exhausts the vital force. Loss of appetite is a frequent and serious

symptom of old age. It usually arises from deficient formation of gastric juice, which, with other secretions, diminishes with years.

That wines and malt liquors, used dietetically, have an action upon the stomach which is pleasant and grateful, is generally known by people accustomed to their use. They stimulate the gastric flow, and increase the muscular activity of the stomach, which is the cause of the sense of well-being accompanying their use. Although the action of the liberated carbonic acid gas of effervescing wines is helpful with digesting food, it will be found that the acetic acid of flat malt liquor is distinctly injurious to weak stomachs.

Until well into middle age most persons will find pure water to be the only perfect beverage. Science has shown this to be a truism. But in advanced years, and especially in the wane of life, the intelligent use of wines will usually be found beneficial.

WHAT TO EAT.

Ordinary diet is largely a matter of habit, influenced to some extent by temperament. That which is palatable is generally chosen without regard to the needs of the system or to chemical constituents. The quantity ingested usually far exceeds actual requirements, because food is indulged in largely from a pleasurable standpoint, and long-continued abuse of the stomach has partly destroyed the natural sensation which should warn one of over-eating. The object of food with adults is the nutrition of the body, and the most careful study should be given to selection and quantity. However important the selection of food may be in the earlier years, it rarely becomes of personal interest until the approach of middle age.

The individual who scientifically selects his food is deemed a crank, and yet the question is perhaps the most important in the human economy, and, as such, deserves the consideration of all who desire perfect health. It is now freely admitted by the best authorities that nearly all diseases result from overeating, and through ignorance of the quantity and quality of food necessary to sustain life. The average authority places the amount required at seven and a half pounds per diem, comprising from twenty to twenty-four ounces solids, the balance liquids.

That such a quantity may far exceed the needs of the system is shown in the case of the centenarian, Cornaro, who retained vigorous health after the age of forty by the daily use of twelve ounces of solid and thirteen ounces of liquid food. This result was due to patient and careful personal experiments, unaided by the scientific knowledge now obtainable by students of hygiene. There is no natural law governing quantity, for the human system is influenced by a variety of conditions.

The three main divisions of food are:

The CARBONACEOUS, which supplies the bodily heat;

The NITROGENOUS, which builds the tissues of the body;

And the PHOSPHATIC, which forms the blood-salts and furnishes the food required by the brain.

Although the daily amount varies greatly, the proportions of one phosphatic, four nitrogenous, and eighteen carbonaceous, should be maintained in a temperate climate. With a lower temperature increase of carbonates is required, while a corresponding decrease is essential in higher temperatures.

The CARBONACEOUS foods (starch, sugar, fats, etc.) supply heat and the vital power. Starch is found in all cereals—wheat, barley, corn, etc.; also in the pulse family—peas, beans, etc.—and in rice, buckwheat, tapioca, arrowroot, potatoes, carrots, parsnips, and, to a less extent, in turnips. Starch is also found in unripe fruit, which accounts for its indigestibility. It is changed into sugar by the process of ripening.

Disintegration and solution constitute the digestive act. In the digestion of starch the saliva first acts upon it in

the mouth, changing some of the starch into sugar. This sugar passes through the wall of the stomach into the portal vein, which conveys it to the liver, where it undergoes a chemical change and is stored for future use as the system requires it. The undissolved starch remaining in the stomach is acted upon by the acid gastric juice, and, passing from the stomach to the duodenum, is again acted upon by the bile and pancreatic juices; this latter action, forming the most important part of starch digestion, involves an excessive strain upon the system which may be avoided by the substitution of other carbonaceous foods.

Sugar may be divided into crystalline or cane sugar and glucose or grape sugar. The former comes from sugar cane, beet root, and the maple tree. The latter is found mainly in fruits. Although cane sugar requires no digestion to fit it for absorption, it certainly undergoes conversion wholly or in part into grape sugar or glucose before leaving the alimentary canal. This grape sugar is the natural body fuel.

Fat is not affected by salivary or gastric juices, but is acted upon by the bile and pancreatic juices, which effect a change causing emulsion or a separation into particles, which pass into the lymphatics. It is certain that fat is utilized to some extent in the formation of tissue, and that which is not utilized for this purpose is burned for body fuel. Fat is not bilious, and is most digestible in the form of cod liver oil. A certain amount of fat is essential to adults, especially nervous people. There is no proof that fat eaten is deposited in the body as fat, but there is abundant proof that the fat of the body is the surplus of starch

and sugar which has been stored beyond the bodily needs. "Ebstein has successfully advocated the substitution of fat for starch and sugar in the treatment of obesity."

The NITROGENOUS-ALBUMINOID food element repairs tissues and supports muscular activity.

The cereals contain from five to ten per cent of nitrogen. Vegetables and fruits contain a small per cent; cheese a large per cent; while all meats, poultry, fish, and eggs are rich in nitrogen. This latter class of foods is stimulating in character, and therefore suited to those inclined to physical activity, as a liberal supply of nitrogenized matter is necessary to build up and maintain muscles in condition for hard work. With decreased muscular effort incident to indolent or sedentary conditions, the nitrogenous proportion should be reduced.

"The more nitrogenous substance a food contains, the less is the amount required to nourish the body: and inversely, the less the proportion of this substance, the greater is the amount required to sustain life. If we take cheese and rice as an example, the former contains far more nitrogen, and also far more earthy salts, than the latter. Hence a small quantity of cheese will sustain life, while in order to live on rice a large quantity is required."

Albumen contains sixteen per cent of nitrogen. De Lacy Evans states that the development, growth, and nutrition of human life depend on albumen, and that an excess of earthy salts will be found in nitrogenous (direct nourishment) substances, and that, as a rule, the less nourishment the less amount of earthy salts in the food. "Most

of the maladies which fasten on the body as age approaches are due to an excess of albuminoid waste in the blood."

Liebig says: "Only those substances which contain albumen, or a substance capable of being converted into albumen, are in a strict sense nutritious articles of food." Vegetable albumen—that is, its purest form—exists in fruit. By experiments we find a comparatively small quantity of nitrogen necessary to sustain life in good bodily health. In fact, fruits taken as a class contain sufficient nitrogen to nourish life. All fruits contain carbon, hydrogen, and oxygen, and most of them small quantities of nitrogen. Nitrogen is also supplied to the system by the lungs.

An excess of nitrogen in foods entails much work for the liver, which in health may stand it, but which will eventually cause disease.

"Of all elements of the animal body, nitrogen has the feeblest attraction for oxygen: and what is still more remarkable, it deprives all combustible elements with which it combines, to a greater or less extent, of the power of combining with oxygen — that is, of undergoing combustion. The muscular framework of the body consists largely of this element, and thus the tissues are prevented from combustion—'they rust, but do not burn.'"

The Phosphatic element supports the brain and nerve tissues. Phosphates abound in all fish and fruits, especially figs. They exist to some extent in nearly all foods, and are found in all the structural elements of the body.

Phosphate of lime is requisite for the bones of the body, and is furnished by the cereals and milk. "Casein, al-

though a nitrogenous principle, is conspicuous for the tenacity with which it holds a large quantity of phosphate of lime incorporated in it."

In considering the influence of food on longevity, the following order of excellence should be maintained: Fruit, fish, eggs, fowl (young), animal flesh (young and growing lamb and veal), other animal flesh, vegetables, and lastly cereals.

Fruit is the ideal food. It has a wide range, and is freely produced in all countries, while an increasing demand is giving a wonderful impetus to its culture. The production per acre far exceeds that of any other food product. Under the influence of intelligent cultivation a single tree of certain varieties will produce sufficient nutritious food to sustain life in an adult for months. The productiveness of the banana as compared to wheat is as 133 to 1, and as against potatoes 44 to 1. A crop of nearly fifteen hundred oranges per tree has been marketed from the older groves of California. The apple, also, is enormously productive. Hence, from an economical standpoint, fruit should be the food of the world.

Chemically, the advantage over other foods is still greater, as fruit contains the least amount of earthy matter, and most fruits contain a large per cent of distilled water holding in solution nourishment in the form of vegetable albumen. Therefore, one who eats freely of apples or oranges will seldom feel thirst, even though addicted to stimulants, but will gain physically and mentally through the use of a pure, nourishing food and drink.

Phosphates and alkalies are found in most fruits. The

latter are left in solution in the blood, increasing the solubility of albumen and fibrin, and preventing, in a measure, accumulations around the small blood cells. The acids—citric, tartaric, malic, etc.—increase the solubility of the blood, causing it to flow more readily. They also lower the temperature of the body, thereby lessening the waste incident to combustion or oxidation. Some fruits contain tannic acid, which, De Lacy Evans believes, benefits the system by hardening the gelatinous structures, rendering them more leather-like, and hence less liable to decay.

While the wisdom of a sudden change from long existing habit to a fruit diet may well be questioned, it is nevertheless true that fruits contain every chemical constituent necessary to life. Many people believe that fruits do not agree with them. In such cases, as a rule, the trouble may be traced to abuse of the stomach resulting in its weakened condition, or to a lack of intelligent judgment in selection, time of eating, and amount. Whoever will experiment patiently, using the same thought and skill required to succeed in other pursuits, will soon discover that a gradual change from starch food to fruit will result in the return of a natural appetite which will give notice of satiety. Persistence in a fruit diet will soon result in a clearer vision and an improved complexion, increased activity, and an inclination for physical exercise or mental labor. Less time will be required for sleep. Fatigue or thirst will hardly be experienced, and quick reaction will follow hours of toil.

The most important food fruits are the banana, orange, apple, fig, date, and prune.

THE BANANA.

This plant is now extensively cultivated in all tropical and subtropical climates. Improved means of communication have resulted in placing an abundance of this valuable food at all seasons in all the markets of the world. During the past twenty-five years the consumption in many cities has increased a hundred-fold. As an article of diet it is gaining in favor everywhere. It is a staple article with nations. In its immature condition it contains much starch, which, on ripening, turns to sugar. From the unripe fruit, dried in the sun, a flour is made containing about 70 per cent of starch, which is about the amount in wheat flour. The plant requires little cultivation. When the stalk of a banana plant is cut down, all the sprouts are removed but one, which grows with the vigor imparted by the main root, and bears fruit in from three to four months, while the transplanted sprouts require from nine to ten months to mature their fruit. Each plant bears several clusters of fruit, each weighing from fifty to eighty pounds. The chemical analysis of the banana is as follows:

Nitrogen	4.8
Sugar	19.7
Fatty and saline matter	1.5
Water	74.

THE ORANGE.

This fruit is rapidly working its way to the frost line of all countries. Trees bear fruit from fifty to eighty years,

and produce in favorable seasons from five to fifteen hundred oranges per tree. Besides being an agreeable and wholesome article of diet, the orange abounds in citric acid, and hence is of value medicinally. Its juice is used as a cooling drink in fevers. At the beginning of the Christian era the fruit was about the size of a walnut, and quite bitter to the taste. Its greatest improvement in size and quality has occurred during the last two hundred years. Starting from Southern China and the Burmese Peninsula the orange spread westward through the agency of the Moors, first through Northern Africa and later through Spain. The Crusaders brought it from Palestine to Italy. The Spaniards introduced it into Cuba; and from Cuba it has spread over a large portion of the Western continent. An analysis of the juice of the orange shows citric and malic acids, citrate of lime, sugar, albumen, and water.

THE APPLE.

This is the most widely cultivated of all fruits, and is grown in nearly all of the inhabited portions of the temperate zone. There are a great number of varieties, usually classed under three heads: for dessert; for culinary purposes; and for the making of cider. By far the finest of all apples is the Newtown pippin—a solid, globular, very juicy apple of the finest flavor. It ripens in the fall and may be kept in good condition until late in the spring. Its chemical analysis is as follows:

Water	81.87
Sugar	10.36
Free Acid	.48
Albuminoids	7.29

FIGS.

(Dried and Fresh.)

This fruit constitutes a large part of the food of the inhabitants of Western Asia and Southern Europe. Great Britain annually imports about 9,000 tons of dried and pressed figs, besides growing a small amount of fresh figs in Southern England, which there, however, require shelter from frosts. The large amount of grape sugar in figs admits of their easy preservation by the process of drying in the sun. The chemical analysis of figs (dried) is as follows:

Sugar	62.5
Fat	.9
Gum and Phosphoric Acid	5.6
Fibrin, etc.	15.
Water	16.

DATES.

Palgrave says, "Those who know the date only from the dried specimens in stores can hardly imagine how delicious it is when eaten fresh and in Central Arabia. Nor is it, when newly gathered, heating; nor does its richness bring satiety."

In Arabia it is the staple food and the chief source of national wealth. There are many varieties. The ordinary commercial date contains a large amount of sugar. The finest variety for table use is known as the Fard date. It contains a much smaller per cent of sugar then the ordinary date. Served with cream at breakfast it is a delicious dish, and in the winter months should supersede the ordinary oatmeal. Its chemical analysis is:

Sugar	58.
Pectine	8.9
Gum and Fat	3.7
Bassorin	4.1
Fiber	2.3
Water	23.

PRUNES.

The prune is a certain species of plum, dried. Not many years ago it was considered a delicacy, and as such was imported in small quantities, mainly from France. To-day hundreds of orchards in the United States are devoted to its culture. The largest of these are located in Santa Clara county, California, and in 1895 this county produced forty million pounds of prunes.

The Californian prune is preferred to the imported, because it is larger and more tender, as it loses less weight by evaporation, and is cheaper.

Prunes with cream make a delicious summer dish, and those who substitute cooked prunes at breakfast for bread, hot cakes, or rolls will feel the gain mentally and physically. Prunes are also a natural and gentle laxative, and even the most obstinate cases of constipation may be cured by eating freely of this fruit each morning on arising.

The consumption of this nutritious food is increasing enormously, many families using from two to three hundred pounds annually.

The value of prunes as a food and their palatability depend largely upon their preparation.

All dried fruit should be soaked in clear water until the moisture lost in drying has been nearly replaced. In

drying, the tissues of the fruit shrink and chemical changes take place, evidenced by the change in flavor. Soaking separates again these tissues and reforms the juice.

Dried fruit should not be boiled, as boiling hardens the tissues, breaks up the fruit, and changes both its flavor and digestibility. The temperature should never be raised above 180° Fahr. (a low simmer), at which it may stand for hours.

All sugar should be cooked with the fruit. When prunes are cooked properly they remain whole and the liquor is clear; the skin is tender and the pulp uniformly soft and delicious.

Dried fruit should be kept in a cool, moist place, protected from dust and insects. If the surface shows sugar its freshness may be restored by dipping in boiling water containing an ounce of borax to the gallon. After draining it should stand two hours before boxing.

Fish, fowl, and animal food taken as a class contain, next to fruit, the least amount of earthy salts. The flesh of most fish contains from 1.2 to 1.4 per cent of salts, which is a less average than most animal foods, the difference being considerable. It is therefore better adapted as a diet to longevity than butchers' meat. Fish also contains phosphorus. The salmon is especially rich in this ingredient. Shell-fish contain considerable phosphorus, but more earthy matter than fin and scale fish.

The necessity of phosphorus for brain workers or for those of sedentary habits is an established fact; hence the diet of this class should include fish in preference to meat.

In ease of digestion fish is next to fruit. Of all fish, trout, salmon trout, and tomcod are the most easily digested. Fish with butter is especially desirable for nervous people. Oysters, when raw, require two hours and fifty-five minutes for digestion; when roasted, three hours and a quarter; and if stewed, three hours and a half.

The flesh of poultry and game contains less earthy salts than beef or mutton and is easier of digestion, especially that of short fiber. The white meat of the turkey is a good example of short fiber, and is digested in two hours and thirty minutes; while the long and coarse fiber of the goose is digested with difficulty. The leg of a chicken or duck is less digestible than the breast.

Animal meat may be of use to those who lead a life of great physical exertion, but it certainly is not suited to those of sedentary habits. The necessity for meat is a debatable question. Liebig has written: "It is certain that three men, one of whom has had a full meal of beef with bread; the second, cheese or salt fish, and the third, potatoes, regard a difficulty from entirely different points of view." Dr. Guy states: "We possess conclusive evidence of the sufficiency of a diet from which meat is wholly excluded." Dr. Pavy is careful to state that he does not advocate a non-meat dietary, but is opposed to the prevalent view that a certain quantity of meat is necessary to vigor. Dr. Beaumont, an authority on digestion, states that the flesh of animals is slow of digestion. Undoubtedly a greater feeling of satiety is produced by meat than by other food. It forms a greater stay to the

stomach, arising from the fact that the stomach constitutes the seat of its lengthy digestion.

	Time required for digestion.
Beef (fried)	4 hours
Beef roasted, fresh, lean, rare	3 "
Beef salted	4¼ "
Beef suet	5½ "
Mutton, broiled	3 "
Mutton roasted	3¼ "
Lamb broiled	2½ "
Veal broiled	4 "
Veal fried	4½ "
Pork broiled	3¼ "
Pork fried	4¼ "

Meats, as a class, contain an excess of albuminoids, as shown by the following analysis of the muscles or lean parts:

	Water.	Albumen.	Gelatin.
Beef	.74	.20	.06
Veal	.75	.19	.06
Mutton	.71	.22	07
Pork	.76	.19	.05

It is generally conceded that the Anglo-Saxon race eats too much meat. Fothergill believes that in health the liver is able to deal successfully with a quantity of albuminoids far in excess of the bodily needs. While it possesses this spare power all is well, but, long continued overwork, in dealing with excessive quantities of this food, must result in the gradual impairment of its functional powers.

Eggs contain 1.5 per cent of salts, much less than beef or mutton. Milk contains about .7 per cent of salts. Cheese contains salts in about the same proportion as

milk deprived of its water. Analysis shows 5 per cent which is in proportion to its highly nourishing properties. Butter is composed of fat, and contains about 2 per cent of salts. The potato contains about .9 per cent of salts, 1.4 per cent of albuminous matter, 15.5 per cent starch, some sugar and a small quantity of fat and free citric acid. The onion is very nutritious. It contains a small quantity of phosphate of lime and an excess of phosphoric acid. Most other vegetables have about the same nourishing properties as the potato, about the same amount of earthy salts, but contain more water and less starch. The cucumber and mushroom are exceptions, and resemble fruit.

Cereals contain large quantities of mineral matter. Dr. Pereira states that they furnish more of the earthy substances than the system requires.

"Notwithstanding that bread is denominated the staff of life, alone it does not appear to be capable of supporting prolonged human existence. Boussingault came to this conclusion, and the reports of the inspectors of prisons on the effect of a diet of bread and water favor this opinion."—*Pereira.*

Herodotus described a visit of some Persian Ambassadors to the long-lived Ethiopians (Macrobi). An ambassador asked what the Persian king was wont to eat, and what age the longest lived of the Persians had been known to attain. They told him that the king ate bread, and described the nature of wheat, adding that eighty years was the longest term of man's life among the Persians. He remarked, it did not surprise him, if they fed

on dirt (bread), that they died so soon; indeed, he was sure they never would have lived as long as eighty years except for the refreshment they got from that drink (meaning the wine), wherein he confessed the Persians surpassed the Ethiopians. The Macrobi ate boiled flesh, and had for their drink nothing but milk. They lived to the age of one hundred and twenty years.

Leguminous seeds (peas, beans, etc.) are supposed to be less nutritive than the cereals, although the former contain more nitrogen than the latter. Broconnot gives peas as containing 9.26 grains per ounce of earthy phosphates. This is nearly twice the quantity found in wheat, and more than twenty times the amount in an equal weight of beef.

Many interesting and well-conducted experiments of agricultural chemists agree on the following facts:

1. Vegetables and cereals grown in soil containing a small per cent of earthy salts contain a less amount than those grown in soil rich in earthy salts.

2. The greater the quantity of earthy salts contained in the food on which an animal subsists, the greater is the amount found in the flesh of the animal, and the greater is the amount found in the secretions and excretions.

3. The less the amount of earthy salts in the food, the less the amount found in the secretions and excretions, and the less the amount in the flesh.

From these facts it is clear that, in growing cereals and vegetables directly for the use of man, or for the food of animals on which he partly subsists, lime or any of the

compounds should not be used as a fertilizer. Alkalies do not accumulate in the system, and there is, therefore, no objection to their use.

Phosphoric acid and the alkalies have both of them remarkable properties, and play an important part in the growth and nutrition of plants and animals. This cannot be said of earthy salts. They develop the bones, but when this is accomplished they accumulate, and cause ossification, "old age"—even "natural death." Adults should, therefore, as much as possible avoid earthy salts in their food.

It is obvious from the foregoing facts that fruit is pre-eminently the food for longevity; and those who are ambitious to attain great age will largely include this food in their dietary.

THE STARCH TABLE.

	Per Cent.		Per Cent.
Arrowroot	82.	Haricot	45.
Rice	82.	Peas	41.
Pearl Barley	78.	Beans	40.
Barley Meal	70.	Lentils	39.
Rye Meal	69.5	Vermicelli	38.
Corn	67.5	Sweet Potatoes	21.8
Wheat Flour	66.3	Potatoes	15.5
Indian Meal	64.7	Parsnips	14.5
Oatmeal	58.4	Carrots	12.2
Buckwheat	53.	Turnips	4.

TABLE OF FOODS.

ARTICLES.	Carbonates.	Nitrates.	Phosphates.	Water.	Waste.
Asparagus	5.4	0.6	0.4	93.6	.....
Bacon	62.5	8.4	0.5	28.6	.....
Barley	52.1	12.8	4.2	14.0	16.9
Beans	40.0	24.0	3.5	14.8	17.7
Beef	14.0	19.0	2.0	65.0	.....
Buckwheat	53.0	8.6	1.8	14.2	22.4
Butter	100.0	.....	.....	.....	.....
Cabbage	6.2	1.2	0.8	91.3	0.5
Carrots	12.2	1.1	1.0	82.5	3.2
Cauliflower	4.6	3.6	1.0	90.0	0.8
Cheese	28.0	30.8	4.7	36.5	.....
Cherries	21.0	0.6	1.0	76.3	1.1
Chicken	1.9	21.6	2.8	73.7	.....
Chocolate	88.0	8.8	1.8	.....	1.4
Clam	very little	12.0	2.5	.....	.....
Codfish	1.0	16.5	2.5	80.0	.....
Corn, northern	67.5	12.3	1.1	14.0	5.1
Corn, southern	39.2	34.6	4.1	14.0	8.1
Cream	4.5	3.5	.....	92.0	.....
Cucumber	1.7	0.1	0.5	97.1	0.6
Currants	6.8	0.9	0.3	81.3	10.7
Dates, fresh	73.7	.....	.....	24.0	2.3
Eels	some fat	17.0	3.5	75.0	.....
Eggs, white of	.....	13.0	2.8	84.2	.....
Eggs, yolk of	29.8	16.9	2.0	51.3	.....
Figs	57.9	5.0	3.4	18.7	15.0
Flounder	some fat	15.0	3.5	78.0	.....
Green Gages	26.8	0.3	.....	71.1	1.8
Haddock	0.6	14.0	2.6	82.8	.....
Halibut	some fat	18.0	3.5	74.0	.....
Ham	32.0	35.0	4.4	28.6	.....
Herring	some fat	18.0	4.5	75.0	.....
Horseradish	4.7	0.1	1.0	78.2	16.0
Kidney	0.9	21.2	1.4	76.5	.....
Lamb	14.3	19.6	2.2	63.9	.....
Lard	100.0	.....	.....	.....	.....

TABLE OF FOODS.

ARTICLES.	Carbonates.	Nitrates.	Phosphates.	Water.	Waste.
Lentils	39.0	26.0	1.5	14.0	19.5
Liver	3.9	26.3	1.2	68.6	.....
Lobster	very little	14.0	5.5	79.0	.....
Milk of cow	8.0	5.0	1.0	86.0	.....
Milk, human	7.0	3.0	0.5	89.5	.....
Mutton	14.0	21.0	2.0	63.0	.....
Oats	50.8	17.0	3.0	13.6	15.6
Onions	5.2	0.5	0.5	93.8	.....
Oysters	.....	12.6	0.2	87.2	.....
Parsnips	14.5	2.1	1.0	79.4	3.0
Pearl Barley	78.0	4.7	0.2	9.5	7.6
Pears	9.6	0.1	.....	86.4	3.9
Peas	41.0	23.4	2.5	14.1	19.0
Pigeon	1.9	23.0	2.7	72.4	.....
Plaice	very little	14.0	5.5	80.0	.....
Pork	16.0	17.5	2.2	64.3	.....
Potatoes	15.8	1.4	0.9	74.8	7.1
Prunes	78.6	3.9	4.5	13.0	.....
Radishes	7.4	1.2	1.0	89.1	1.3
Rice	82.0	5.1	0.5	9.0	3.4
Rye	75.2	6.5	0.5	13.5	4.3
Salmon	some fat	20.0	6.5	74.0	.....
Smelt	very little	17.0	5.5	75.0	.....
Sole	0.8	17.0	2.5	79.7	.....
Suet	100.0	.....	.....	.....	.....
Sweet potatoes	21.8	1.5	2.9	67.5	6.3
Trout	0.8	16.9	4.3	78.0	.....
Turbot	very little	17.0	5.5	79.0	.....
Turnips	4.0	1.2	0.5	90.4	3.9
Veal	14.3	17.7	2.3	65.7	.....
Venison	8.0	20.4	2.8	68.8	.....
Vermicelli	38.0	47.5	1.7	12.8	.....
Wheat	66.4	14.6	1.6	14.0	3.4
Whey	4.6	.....	0.7	94.7	.....
Whiting	very little	15.0	5.5	78.0	.....

SUMMARY.

It may be said generally of those who die between the ages of fifty and seventy, from the effects of contracted organic disease or the breaking down of the system, that crimes have been committed against Nature's laws. Civilization has produced statutes which exact penalties for every form of human culpability. Through mitigating and other circumstances these laws are frequently rendered inoperative. It is not so with the laws of Nature, for exact compensation is demanded for each and every transgression, and from such demand no appeal may be taken.

The question, "Is life worth living?" is answered by the successful always in the affirmative. Success is usually the result of mental activity based on sound physical condition. Certainly the possession of the latter gives a tremendous advantage in the race for a competency, and a well-balanced mentality should be equal to the problem of regulating the outgo with the actual income. The advantage of living within one's income cannot be overestimated, for it represents the difference between happiness and misery. Most people at some period of their lives have had more or less experience with financial worries, and the resulting wear and tear of the nervous system. In the majority of cases the trouble may be traced to extravagance in current expenses.

The exact cost of living scientifically is so small that one must be poor indeed who cannot secure the required amount. Assuming that the average adult requires daily from 15 to 25 ounces of solid food, a simple calculation of market prices of food products will show the necessary expense. Comparison of same with existing habits will, as a rule, show a wide difference between what is and what should be. The great error of mankind springs from the palate, which usually becomes the master rather than the slave. The first transgression invites continuance, and if habit, based on the pleasures of the palate, becomes fixed, it is difficult to overthrow. Once conquered, however, it may be as firmly fixed in a new direction, involving lessened quantity and consideration of chemical constituents. It has been shown that if food and drink contains lime and earth salts a thickening of the inner walls of the arteries due to these mineral deposits must ensue, and when the arterial system becomes clogged death from this cause is near.

Extreme care and attention are bestowed on machinery, the handiwork of man. Every effort is made to increase its term of service. The tubular boiler is fed as far as possible with condensed (distilled) water to lessen the calcareous and salty deposits which form a coating on the metal. Occasionally chemicals are used to eliminate these deposits from the tubes, which correspond to human arteries. It is only an inferior engineer that allows the boiler under his supervision to become clogged in this manner; and yet the most skillful mechanic gives little

heed to that complicated piece of machinery always under his care—his physical being. Yet, whether we consider the tubes of a boiler or the arteries of man, the proposition is the same, and it is to the food and drink that we must look for the preventive as well as the cause.

One of the strongest instances of the effect of food and drink may be found in a comparison of the domestic with the wild horse. The latter is graminivorous (grass-eating), while the food of the former is of a starchy or ossifying character. An equal difference probably exists in the drink. The wild horse lives to the age of fifty years, and is vigorous and strong at double the age reached by the domestic animal. The latter soon becomes prematurely old from the deposition of earthy salts. This process is to some extent accelerated by hard work, which increases transpiration, thereby requiring additional water, which is frequently of a hard character.

The following analysis of meadow grass will show that the food of the wild horse is largely nitrogenous and contains from 66 to 70 per cent of pure water.

	Cut June, 1887.	Cut Oct. 1887.
Water	66.55	70.99
Digestible Albuminoids	1.63	2.40
Indigestible Albuminoids	.88	.78
Non-Albuminoid Nitrogenous Comp'ds.	.48	1.03
Fat, Wax, and Chlorophyl	.82	.88
Extractive Matter (nitrogen free)	17.05	14.49
Ash	2.42	3.20
Woody Fiber	10.17	6.23
	100.00	100.00

Densmore, in his valuable work, "How Nature Cures," writes as follows on the subject:

"Since, however, starchy seeds are naturally wide-spread over the earth, it would be strange if no animal were found whose organs are adapted by nature to utilize them as a food; and it is quite in keeping with the universal harmony of nature that there are a multitude of animals for which starchy seeds are a natural food."

The following extract is taken from the *Hartford Journal*, and may serve to answer that oft-repeated inquiry, What are the grains sent for?

"Before the food is prepared for digestion, therefore, the grains must be subjected to a triturating process, and such as are not sufficiently bruised in this manner, before passing into the gizzard, are then reduced to the proper state by its natural action. The action of the gizzard is in this respect mechanical, this organ serving as a mill to grind the feed to pieces, and then, by means of its powerful muscles, pressing it gradually into the intestines, in the form of a pulp. The power of this organ is said to be sufficient to pulverize hollow globules of glass in a very short time, and solid masses of the same substance in a few weeks. The rapidity of this process seems to be proportionate generally to the size of the bird. A chicken, for example, breaks up such substances as are received into its stomach less rapidly than the capon, while a goose performs the same operation sooner than either. Needles and even lancets given to turkeys have been broken in pieces and voided without any apparent injury to the stomach. The reason undoubtedly is that the larger

species of birds have thicker and more powerful organs of digestion."

"When all these facts are carefully considered, there can be no doubt that birds are the only animals for which grains are the natural food, and for this reason birds are provided by nature with a totally different digestive apparatus from that possessed by any other animal; and furthermore, the only other animals living principally on starch foods are man and those animals under his control.

"When we consider the universality of the reign of law, and the fact that man and the animals which he has controlled are the only ones which are habitually out of health; that man in a state of nature must have excluded cereals and starch foods from his dietary; and that the herbivora, the graminivora, the omnivora, the fishes, and many birds live on a diet in which cereals and starchy foods constitute only an insignificant portion—when all these facts are considered, is there any reasonable ground for considering that nature made an exception in the case of the single animal, man? Is it not more reasonable to believe, since man in a state of nature did not have cereal foods, and since all the other species of the animal kingdom subsist on food largely nitrogenous, that man in substituting cereals for his sweet fruits has departed from the order and intent of nature, and in so doing has brought upon himself the inevitable penalty of broken-down organs, and laid the foundation of modern diseases?"

Robotham is the authority for the following interesting facts and statistics:

Bread and potatoes constituting so large a proportion of the diet of the working class, and containing so large a quantity of earthy matter, must inevitably render them more liable to disease and premature old age and death than the wealthier classes who use more animal food, fowl, fish, fresh vegetables, fruits, wines, and other luxuries. And so it is found that the rate of mortality among the poor is much greater than among the rich, as the following table will show:

From	the	age	of	25	to	40	205	rich	and	550	poor die.
"	"	"	"	40	to	50	244	"	"	426	" "
"	"	"	"	50	to	60	349	"	"	718	" "
"	"	"	"	60	to	70	737	"	"	1501	" "
"	"	"	"	70	to	80	1489	"	"	2873	" "

Women are generally more analogous to children in choice of their food than men; they also consume a smaller quantity, but are mostly fond of the best description. Instead of a large amount of rough solid food, they prefer a smaller proportion of aliment, and that of a more fluid, pulpy, and nutritious nature. It is not so much the quantity as the quality they care for. The consequence of this course is the avoidance of a large amount of earthy matter, and they are therefore softer and more flexible—less ossified than men, and require more time to harden to that degree which produces death; hence women are found to live longer than men.

On this principle we may at once account for the fact that, notwithstanding the causes of disease and dangers peculiarly incidental to females, the number of females in England is far greater than the number of males. This

difference cannot be attributed to the sacrifice of male lives in war; but solely, or chiefly at least, to the greater longevity of females; which extra longevity is the consequence of their being less attached to solid, earthy food. It is true that many women are as stout and bony, and as rough as men, and are as liable to premature decrepitude and death; but these will always be found to eat and drink like men.

If two persons, or two classes of persons, subsist upon the same kind of food and drink, and one consumes less than the other, a less amount of earthy matter will be taken into the system, the process of ossification will necessarily proceed less rapidly, and life will be enjoyed for a longer period. A direct practical proof of this is found in the following statistics of prisons and workhouses.

Weekly cost of food in the	s. d.	Amount of sickness per annum.
Wakefield House	1: 8½	6 per cent.
Suffolk County Jail	1: 9	10 "
Woodbridge Jail	3: 6	18 "
Northallerton Jail	5: 0½	37 "

By this we clearly perceive that sickness and disease increase in proportion as food increases.

From the returns respecting the diet and mortality in sixty different prisons, sickness and mortality appear to increase in proportion as the consumption of food increases.

In 20 prisons the average weekly consumption of	Sickness.	Deaths.
Solid Food was 188 oz.	3 per cent	1 in 622
In 20 others the amount was 213 oz.	18 per cent	1 in 320
In 20 others the amount was 218 oz.	23 per cent	1 in 266

Although we have seen by the foregoing tables and other evidence that sickness and death advance with an increase of solid food, it by no means follows that this is applicable in the contrary direction beyond a certain point. It certainly would appear, at first sight, that the less food we take the better will be our health, and the longer we live; but when we know that the human body is continually wasting—that its elements are constantly being thrown off, we shall see the necessity for supplying, at least, as much nourishment as will equal the amount wasted. This is the minimum point. Below this we cannot go without producing injury to the system. If we fail to take in as much nutriment as the body throws off, sickness and death will speedily and inevitably follow. But through all degrees above this minimum point, the less we eat and drink the more shall we retard the process of ossification; the longer will it take to choke up or consolidate the body to that degree which constitutes old age or decrepitude; and the longer shall we enjoy existence. Abstemiousness, as far as it regards the food in ordinary use, such as bread, potatoes, and other gross, solid articles, will certainly conduce to health and long life.

The following interesting address on "Old Age," by Sir James Crichton Browne, was published in the *British Medical Journal*, October 31, 1891:

It is of old age that I would speak to you, and the subject, although at a first glance it may seem of little immediate concern to you, still in the heyday of your youth, is yet well deserving of your thoughtful consideration, for it ought to be one of your great aims in life to grow old

yourselves, and to be the cause of old age in others Now, the popular impression assuredly is that it is well with old age in these days. Paragraphs which appear in the newspapers now and again, pointing out that a dozen old people whose deaths are recorded in the *Times* on some particular day have collectively beaten the record of Methuselah, and the striking decline in the death rate of England and Wales which has been going on for the last thirty years, has created a belief, fostered by those genial optimists whom we have always with us, that we are advancing toward health and longevity all along the line. Well, the reduction in the death rate in this country is an indisputable and gratifying fact. The new census returns indicate that that reduction has not been quite as great as our calculations founded on estimated population had led us to hope, but still it has been large and remarkable. The improved drainage of land and construction of houses, the enforcement of vaccination, the vastly increased attention bestowed on cleanliness (personal, domestic, and civic), and on all sanitary requirements, and the accumulated wealth of the nation leading to a higher standard of living, have resulted in an enormous saving of life; but I must call upon you to note, what is often overlooked, that this saving of life has been effected mainly in its first half. It is among infants, children, and young persons that the large reduction in the death rate has taken place, while among persons past middle age the reduction in that rate has been comparatively trifling. I am not going to worry you with statistical tables which I have prepared, but I may tell you generally that since the year

1859 the decline in the death rate has been 17.6 per cent at all ages under 55, and only 2.7 per cent at all ages above 55. The principal decline has taken place at ages under 35; after 45 the decline is insignificant, and from 65 to 75 there has actually been an increase in the death rate.

It is incontestable that old age is being slowly shortened, and that the present increased mortality at higher ages cannot be explained by diminished mortality at lower ones, even supposing increased delicacy in those who survive. It is not satisfactory to find in our population an enormous increase of babies, children, and callow young men and women, without any proportionate increase in the number of ripe and experienced specimens of our race, of goodly matrons and tried veterans.

But matrons and veterans—ripe and experienced specimens of our race—have participated with the young and immature in the benefits of those improved sanitary and social conditions to which the reduction in the death-rate has been ascribed. Fever, small-pox, and phthisis have been less fatal to the aged of late years than they formerly were; and if the death rate due to them has diminished, while the general death rate has risen, it is clear that the mortality from some other diseases must have increased to an extent to compensate for the diminution thus caused, as well as to account for any increase in the general death rate.

What, then, are the diseases which have become more prevalent and fatal of late years, and in consequence of the increased fatality of which fewer persons in this

country can expect to reach old age? A detailed answer to that question would involve long explanations and abstruse figures, but my present purpose will be served by naming to you three or four of the diseases, or groups of diseases, the mortality from which is largely on the increase. Cancer carried off 35,654 persons in England and Wales in the five years from 1859 to 1863, but it destroyed no fewer than 81,620 in the five years from 1884 to 1888, the ratio of deaths from it being 354 per million living in the former period, and 585 per million in the latter, and seven-eighths of the victims of malignant cancer are above 45 years of age. Heart diseases carried off 92,181 persons in the five years 1859 to 1863, but they destroyed 224,102 persons in the five years 1884 to 1888, the ratio of deaths to each one million living being 915 in the former quinquennium and 1,606 in the latter, and the heavy mortality from these diseases falls after 35 years of age. Nervous disease carried off 196,906 in the five years 1864 to 1868, but they destroyed 260,558 persons in the five years 1884 to 1888, the ratio of deaths to each one million living being 1,585 in the former quinquennium and 1,793 in the latter, and the increased mortality from these diseases comes after 35. Kidney diseases carried off 23,176 in the five years 1859 to 1863, but they destroyed 61,371 persons in the five years 1884 to 1888, the ratio of deaths to each one million living being 230 in the former and 445 in the latter quinquennium, and these diseases are most fatal in middle and advanced life.

But still more unsatisfactory reflections in connection with old age remain behind, for it would seem that if that

stage of life is being shortened at one end, the end at which we should gladly see it extended, it is being lengthened at the other end, the end at which we should gladly see abbreviated. While increasing mortality from degenerative diseases diminishes our prospects of enjoying a ripe old age, the increasing prevalence of minor degenerative changes enhances the probability that we shall be plunged into a premature old age, and become decrepit while still in what used to be considered the prime of life. Men and women are growing old before their time. Old age is encroaching on the strength of manhood, and the infirmities associated with it are stealthily taking possession of the system some years earlier than they were wont to do in former generations. Deaths due simply to old age are now reported between 45 and 55 years of age, and in large numbers between 55 and 60, and there has been a reduction in the age at which atrophy and debility—another name for second childishness—kill those who have passed middle life.

Senile insanity due to atrophy of the brain, or exaggerated dotage, is, I feel sure, far more common than it once was, and declares itself on the average at an earlier age than it used to do; and I know few more gloomy experiences than to visit our mammoth metropolitan asylums, and, wandering among the masses of human wreckage there heaped up, to notice the number of prematurely old men and women. And senile melancholia, which is sometimes the precursor of dementia, but which often stops short of it, is in a more marked degree spreading among us, and including in its victims

an increasing number of those who are not really senile as years are counted. Suicides are increasing at all ages; they rose in England and Wales from 1,340 in 1864 to 2,308 in 1888, and from a ratio of 64 to one of 81 to a million living; but it is after 45 years of age that the vast majority of them occur, and it is between 45 and 65 that they are increasing most rapidly. And it is to be remembered that each case of suicide represents a large number of cases of melancholia so pronounced as to be certificable, and an exceedingly large number comparatively mild, of which we have no official cognizance. My belief is that mild senile melancholia—a state of mental depression falling short of madness, but still morbid enough—occurring at the turning-point of life or soon after it, is a lamentably common complaint, often concealed, but sometimes accidentally discovered, and revealed far more frequently to the practitioner than specialist. Scores of men around us, showing their first grey hairs, who in business and social intercourse wear a smiling countenance, are tormented in private, during the silent watches of the night or at the garish dawn, by a despondency that they can scarcely explain, or that centers in fears they know to be groundless, but that embitters existence, and sometimes renders it almost unbearable.

The fact that what we habitually regard as the infirmities and maladies of old age are not essential to it, you will the more easily realize if you look at them singly and in detail, instead of in groups, as we generally meet with them and think of them; for then it will become

apparent to you that there is scarcely one of them that is invariably present in old age. As a rule, the body becomes bent in old age; but we frequently meet extremely old men of an erect and martial carriage. As a rule, the skin becomes dry and wrinkled in old age, but there are many cases in which it continues smooth and soft in octogenarians, even without the assistance of any patent soap. As a rule, the teeth fall out in old age, but instances occur in which they remain sound in their sockets after the average span of life has been exceeded. As a rule, sight and hearing are impaired in old age, but now and then venerable men and women present themselves in whom these senses retain their pristine acuteness. As a rule, memory fails in old age, but not rarely it remains vigorous and trustworthy when senility has reached its utmost limit. And if we turn from the common physiological modifications observed during old age to the pathological manifestations which are most often associated with it and peculiar to it, occurring at no other era of life, we perceive even more clearly that these are not of its essence, but accidental accompaniments, attributable not to senile involution, but to degenerative influences of various kinds. Senile osteomalacia, senile gangrene, senile gout and rheumatism, senile atheroma, senile softening of the brain, and many other senile morbid conditions, although they occur only in the aged, affect but a very limited proportion of them, arise from causes operative long before old age supervened, and must not be confounded with old age itself. Old age may run its course to the century goal without being

complicated by any of these senile maladies or crippled by any of the senile infirmities enumerated; and to think of it thus stripped of adventitious misfortunes is to recognize it as a less formidable and deplorable phase of existence than we have been accustomed to suppose it to be. Of course, old age as we actually know it, as it abounds around us, is for the most part "wedded to calamity" and dowered with weakness; but my object is to convince you of the possibility of a typical old age free from all these—a long-drawn-out euthanasia, a simple retrogression, the nature of which I shall presently more fully define.

It is in the nervous system that the most instructive illustrations of late and long-sustained evolutions are to be observed.

There is one group of very highly integrated psychomotor centers situated in the ascending frontal and ascending parietal gyri, in which are represented the movements of the thumb, fingers, wrist, elbow, and shoulder—the movements, in short, of the hand and arm. The evolution of these centers, which commences soon after birth, proceeds actively and visibly during childhood, more deliberately during youth, and I presume we should most of us say that it is complete about the nineteenth or twentieth year, when the maximum of stature is arrived at, for at that time the upper limb seems to have attained its full range of strength and precision of movement But that is not the case. There is evidence that the hand and arm centers go on evolving till a much later age. It is obvious that great painters and artists of all sorts advance in manual

dexterity, in exactness of execution, in everything that goes to make up masterly handling, till middle life or beyond it.

When subjected to no unreasonable treatment, but well and wisely used, the hand and arm centers retain their cunning in its highest degree long beyond the forty-fifth year, and although some failure in their power is among the inevitable consequences of advancing years, that failure need never be extreme. In rare instances the hand has kept its full potency at a ripe old age. Michael Angelo was drawing superb designs for St. Peter's at Rome shortly before his death in his eighty-ninth year, and I know examples now of men over seventy whose handwriting is as good as it was at forty, and who, after testing themselves, assure me that they write with as much facility and rapidity as they then did.

But there are other centers in the brain, evolved later than those for the hand and arm, which longer than they remain fully competent to the performance of their duty. The emissive speech centers in the brain, the motor centers for the lips, tongue, mouth, or organs of speech, which are situated in the third frontal convolution, and perhaps in the island of Reil, on the anterior edge of the motor area, are slower than those for the hand and arm in growing to adult strength and skill. The infant and child laboriously learn to articulate, and throughout youth and early manhood the acquisition of language goes tardily on. I cannot pause to explain the mechanism of speech or distinguish between the parts played in its production by the auditory and motor centers and the higher

center in which concepts are elaborated; but taking volitional language as a whole, I would point out that the command over it is greatest between 45 and 55 years of age. I do not mean to convey that men and women are most talkative then, but I maintain that, as a rule, it is then that they use the greatest number of words to express their ideas, and employ them with the most precision and propriety.

With respect to written language, the evidence that its choicest evolution comes in what is called middle life is, I think, cogent and conclusive. Literary genius has often blossomed early and withered too soon to allow us to judge of the best bloom of which it was capable; but whenever literary men have lived to middle life or beyond it, a progressive expertness in their use of the verbal instruments of thought is discernible in their writings. I must not weary you with illustrations, but let me just recall to you that "Paradise Lost," a poem which, if it possessed no other merit, would be forever remarkable for its wealth of words, was completed when Milton was 57, having been written in the five previous years; that the translation of Virgil—"noble and spirited," as Pope calls it, and "Alexander's Feast," of which Hallam has said, "Every one places it among the first of its class, and many allow it no rival," were written when Dryden was 66, and that "The Lives of the Poets," Johnson's greatest work, was composed, when he was 72 years old.

In front of the speech center, in the brain, there are large masses of cerebral substance—the frontal lobes that yield no response to electrical stimulation. These lobes,

which are rudimentary in the different orders of animals, reach their highest development in man, and in different races of mankind and different individuals of the same race are always best developed in those that have the highest intellectual powers. Destruction of these lobes, experimentally in monkeys and by disease in man, is followed by loss of faculty of the attention, marked intellectual deficiency, and instability of character, and it is no longer doubtful that in these lobes are situated the substrata of the psychical processes that lie at the foundation of the higher intellectual operations. In them are a series of centers subserving the highest human powers, evolved later than the speech centers, and probably longer than the speech centers retaining their functional vigor. An analysis of the powers here located is of course impossible on this occasion, but it will be sufficient for my present purpose to tell you that judgment and reason are certainly dependent on the integrity of these centers. Now, judgment and reason, I would suggest, come to their perfection later than speech—in all likelihood between the fifty-fifth and sixty-fifth years, and may be exercised justly until an advanced age. Wisdom does not always come with years. Heine made his good Pole say, "Ah! that was long, long ago; then I was young and foolish, now I am old and foolish"; but still the counsels of gray beards, free from the ardent passions of youth, and well stored with experience, have been valued in all stages of the world's history, and it would be easy to show that a preponderance of the works pre-eminently implying the use of calm and powerful reason must be ascribed to men over fifty-five. Bacon

was fifty-nine when he produced the first two books of the "Novum Organon"; Kant was fifty-seven when the "Critique of Pure Reason" appeared; Harvey was seventy-three when his great work on "Generation" was given to the world; Darwin was fifty when his "Origin of Species" was issued, fifty-nine when his "Variation of Plants and Animals under Domestication" was published, and sixty-two when his "Descent of Man" appeared. In almost all nations the decision on the most momentous affairs of state has been reserved for a senate; and it is highly noteworthy that our system of jurisprudence in this country —a fabric of which we are justly proud—has been built up by judges from fifty-five to eighty-five years of age. The late Dr. W. B. Carpenter said to me when nearly seventy years old: "I am conscious of the decline of life. My perceptions are a little dull, and my memory has lost its grasp. I could not now trust to its safekeeping long strings of words as I did when learning my Latin grammar as a boy, but I am convinced that my judgment is clearer and juster than it ever was, and my feelings are not blunted."

But besides judgment and reason there are other powers of mind in all likelihood localized in the frontal lobes. The moral sense and religious emotions have probably here the substrata necessary for their manifestation, and these, although influential in some degree throughout life, evolve most munificently last of all. The fruit is mellowest when it is ready to fall, and the old man free from canker or blight sometimes displays new sweetness and magnanimity when his course is all but run.

The imitation of Shakespeare would not be an adequate or feasible ideal to place before mankind in these days; but no better pattern of the temper, spirit, and piety that ought to preside in life's closing scenes can possibly be presented than that set up in the romantic comedies of the fourth period. We toil and moil through four-fifths of life with our eyes fixed on the last act—a short span of gilded dotage, an almshouse, a pension, or a peerage. Would it not be wiser to hold in view a crowning evolution of our qualities, a choice abstract of our experiences, a sublime crisis in which, although natural force is abated and the physical powers flag, the moral nature, disentangling itself from selfish ties and the thraldom of passion, rises to serene heights of virtue, where love drives out fear, and faith, strengthened by suffering, reigns supreme over all?

And such an old age is not an idle dream. Cicero looked at old age from the standpoint of self-assertion, rather than from that of self-sacrifice. His ideal old man was an august Roman patrician, crowned with the laurels of the victor, powerful in the counsels of the state, stern and rigorous, still capable of new acquirements, like Cato the Censor, at 84. But even Cicero has left us softer pictures of the epoch—as in that of Appius, old and blind, but revered and beloved, and animated by the fervour of youth—and has described it as a time that may be easy and delightful, in which, after a long voyage, sight of land is obtained, and the heart discharges itself of petty rancor. We, with our horizon wider than that of Cicero, are able to see in old age, even in humble life,

blessings and alleviations that were beyond his ken, and obtain at least glimpses of the truth that its chief glory consists, not in the remembrance of feats of prowess or in the egotistic exercise of power, but in the conquest of peevish weakness, in the brightness of hope, and in the dissemination of happiness around. Depend upon it, the best antiseptic against senile decay is an active interest in human affairs, and that those keep young longest who love most.

I have hinted to you, ladies and gentlemen—for in the time at my disposal I can scarcely more than hint—that in the higher nervous centers evolution goes on late in life, and that even in what is called old age the freshness of youth may sometimes survive. And I have hinted also that the natural evolution of the nerve centers is largely interfered with by our habits of life and methods of work; and that retrogression is prematurely induced, and old age abbreviated and so loaded with infirmities that it is regarded with apprehension instead of with quietude and contentment. And if you ask me now to what extent retrogression is hastened and old age abbreviated, I must tell you that I think it a good working hypothesis that the natural life of man is 100, and that in so far as it falls short of that it is "curtailed of fair proportion."

Flourens' neat and portable formula that the duration of any animal's life may be calculated by multiplying by five the number of years occupied in the union of the epiphyses of its long bones with their shafts is not applicable in every case; it fails, indeed, in the case of man, in whom the coalescence of the epiphyses is not complete until his

twenty-fifth year; but, nevertheless, Flourens' conclusion that man is entitled to a century of existence was, it must be maintained, substantially correct. Buffon thought that the duration of life was six or seven times that of growth, and in this he was in error, for it is probably about five times; but he did good service in insisting on the truth that as each animal has its definite form, its limit of size, and its fixed period of gestation and of growth, so each has its fixed period of life, which depends neither on food, climate, or variety, but on the constitution of the organism. According to Buffon's view, each animal is projected into life with an impetus equal to carry it a certain distance against average resistance, and that impetus in the case of man ought to carry him just 100 years; but the increased friction to which he is exposed by all sorts of artificial obstacles strewn in his course leads, in an immense majority of cases, to his arrest in his career at a point far short of his natural goal. Still, however, a select few do reach that goal, and even run beyond it; and it is upon this accomplished fact, rather than on *a priori* reasoning, that we should base our hope that in the good days coming, when sanitary wisdom shall prevail in the land, and the gold fever and typhoid fever are alike stamped out, numbers of our species may be able to count on a round hundred years of wholesome happy life, and an inevitable old age, tranquil and interesting, unmarred by the morbid accessories which are now generally attached to it. It is the power of reproduction possessed by the cells of the organism as controlled by certain nerve

centers that really determines the duration of life and the character of its decline.

Centenarians are not now the *raræ aves* which they were once supposed to be. In England and Wales in 1889 the deaths of seventy-six reputed centenarians were reported, and of late years a great number of cases have been strictly inquired into in which there could be no reasonable doubt that life had been prolonged beyond 100 years. And these cases have been inquired into, not only as to the legitimacy of their claims to have made out their century of life, but also as to their bodily and mental characteristics; so that we now know something of centenarian pathology, and recognize the fact that those who live to a hundred do so by virtue of their freedom from degenerations, and succumb to an inevitable old age, which may be described as simple and general atrophy. But this simple and general atrophy, although of gradual invasion, need not very seriously cripple the centenarian until close upon his term of dissolution, and cases might be quoted of much activity and enjoyment in life even beyond a hundred years of age.

According to our estimate, a man at 80 has a fifth of his life before him, and in twenty years what may not happen? Sir David Brewster married at 76. Four years ago, in Vienna, Janos Meryessie, age 84, attempted suicide, his reason being that he could no longer support his father and mother, who were aged 115 and 110, respectively; and in the *British Medical Journal* of May 9th last there was given the portrait of a brave old man, who at 102 had undergone an operation for cancer of the lip without anæsthetics and without flinching.

The atrophic changes which have been enumerated as characteristic of old age are not altogether beyond remedial treatment. Curable, perhaps, they can scarcely be called, but much may be done by change of climate, by regulation of diet and of habits of life, and by therapeutic agents, to slacken their progress or arrest their advance. You will be able in many ways to lessen the frailties of your senile patients, although you will not be able to confer upon them that rejuvenescence which many of them, and those generally the most dilapidated, will expect of you.

There is no short cut to longevity. To win it is the work of a lifetime, and the promotion of it is a branch of public medicine. Perchance, one of these days, we may have an International Congress on Old Age, with an exhibition of dotards for warning, and of hale and hearty centenarians for encouragement. At any rate, you may rest assured that it is by steady obedience to the laws of health that old age may be attained, and by judicious regimen that it may be prolonged. The measures necessary for the promotion of old age on the large scale lie beyond the control of the medical profession. We cannot change the spirit of the age, abolish avarice, vainglory, and the lust of power, or quell even the gratuitous excesses of the struggle for existence that rages around; but we can do something by pointing out to those who will listen to us some great perils that may be avoided by inculcating the principles of mental hygiene; and we can give the weight of our support to all movements calculated to promote the betterment of our race.

"Man has degenerated—this degeneration is due solely to his diet. He has *fallen;* but we hope that he has *risen* to the highest point of shortening his days, and that in the present generation he will commence to gradually *fall* back on his original and ordained diet. For many centuries the days of man's existence have been little by little decreasing—it has been a gradual *fall;* but science assures us that he must *rise* again, that his life on earth must be prolonged. This can only be accomplished by a gradual alteration in his diet."

"'Nature is frugal, and her wants are few.' Man in the savage state is generally healthy, in the *civilized* state he is generally unhealthy; and, as Dr. Thompson says, 'There is no doubt that a simple diet is more fitted to accelerate health than unnatural and stimulating foods.'"

"On reviewing nearly two thousand reported cases of persons who lived more than a century, we generally find some peculiarity of diet or habits to account for their alleged longevity; we find some were living amongst all the luxuries life could afford, others in the most abject poverty—begging their bread; some were samples of symmetry and physique, others cripples; some drank large quantities of water, others little; some were total abstainers from alcoholic drinks, others drunkards; some smoked tobacco, others did not; some lived entirely on vegetables, others to a great extent on animal foods; some led active lives, others sedentary; some worked with their brains, others with their hands; some ate one meal a day, others four or five; some few ate large quantities of food, others a small amount; in fact, we notice great divergence both

in habits and diet, but in those cases where we have been able to obtain a reliable account of the diet, we find one *great cause* which accounts for the majority of cases of longevity: *moderation in the quantity of food.*"

The following instances where great age has been reached are reasonably authentic. They are from Easton, Hufeland, Bailey, Evans, and other sources:

Judith Bannister, of Cowes, Isle of Wight, died in 1754, aged 108.

"She lived upon biscuit and *apples*, with milk and water, the last sixty years of her life."

Ann Maynard, of Finchley, died in 1756, aged 112.

"She lived with *moderation*, and took much exercise."

John Michaelstone (grandson of Thomas Parr) died in 1763, aged 127.

"He lived to the above great age by *extreme temperance.*"

Owen Carollan, of Duleck, county Meath, died in 1764, aged 127.

"By *temperance* and hard labor he attained so great an age."

Elizabeth Macpherson, lived in the county of Caithness, died in 1765, aged 117.

"Her diet was *buttermilk and greens;* she retained all her senses till within three months of her death."

Mr. Dobson, of Hatfield, farmer, died in 1766, aged 139.

"By much exercise and *temperate living* he preserved the inestimable blessing of health."

Francis Confit, of Burythorpe, near Malton, Yorkshire, died in 1767, aged 150.

"He was *very temperate in his living*, and used great exercise, which, together with occasionally eating a *raw* egg, enabled him to attain such extraordinary age."

Catherine Noon, *alias* Noony, lived near the city of Tuam, in Ireland, died the same year, aged 136.

"Was *very temperate at her meals.* Her husband died, aged 128."

Donald M'Gregor, a farmer in the Isle of Skye, died at 117.

"*He was temperate at his meals*, and took much exercise."

Mrs. Keithe, of Newnham, Gloucestershire, died in 1772, aged 133.

"She *lived moderately*, and retained her senses till within fourteen days of her death."

Mrs. Clum, lived near Litchfield, Staffordshire, died in 1773, aged 138.

"By frequent exercise and *temperate living* she attained so great longevity. . . . She resided in the same house 103 years."

Mary Rogers, of Penzance, Cornwall, died in 1779, aged 118.

"Lived the last sixty years on *vegetables.*"

Henry Grosvenor, of Inch, county Wexford, a gentleman of French extraction, surveyor of the coast of Blackwater, died in 1780, aged 115.

"*He was very sparing in his diet*, and used much exercise, and was an agreeable, cheerful companion at one hundred, when he married his last wife."

James Le Measurer, of St. Jean Pied de Port, in Navarre, died in 1784, aged 118.

"His common food for some years was *vegetables.*"

Cardinal de Salis, Archbishop of Seville, died in 1785, aged 125.

He himself observed: "I led a sober, studious, but not a lazy or sedentary life. My *diet was sparing*, though delicate; my liquors the best wines of Xeres and La Mancha, of which I never exceeded a pint at any meal, except in cold weather, when I allowed myself one-third more."

John Wilson, of Worlingworth, Sussex, died in 1782, aged 116.

"For the last forty years of his life his suppers were almost uniformly made out of roasted *turnips;* to which vegetable, thus prepared, he always ascribed peculiar sanitary virtues."

Bernard le Borier de Fontanelle, of Rouen, France, died in 1757, aged 100. He was a man of great talent, was Dean of the French Academy, Fellow of the Royal Society of London and of the Royal Academy of Berlin.

"Till upwards of ninety he does not appear to have experienced any of the maladies usually attendant upon old age. After this time he was subject to a periodical attack of fever in the spring, when he used to say, 'If I can only hold out till *strawberries* come in I shall get well.' He always *attributed his longevity* to a good *course of strawberry eating* every season."

Petratsch Zartan died in 1724, aged 185 years. He was born in 1537, at Kofroek, a village three miles from Temeswaer, in Hungary, where he lived 180 years.

"Being a member of the Greek Church, the old man was a strict observer of the numerous *fasts* established by

its ritual, and was at all times *very abstemious in his diet*, save that once a day, with the milk and leaven cakes which constituted his sole food, he took a good-sized glass of brandy."

Galen, a physician of Pergamus, died about A. D. 270, aged 140.

He himself informs us that he always *ate* and drank *sparingly*, irrespective of his appetite, and, although of delicate constitution, he attributed his longevity to his temperance.

William Mead, M. D. (possibly grandfather of the celebrated Dr. Mead), died at Ware, Herts, in 1652, aged 148.

"He was distinguished for his great *temperance* and regular habits of life."

Mary Meigan, of Donaghmore, Ireland, died in 1813, aged 129.

"During the last thirty years of her life she lived apparently in the greatest penury and distress, *scarcely affording herself the means necessary for the keeping together of soul and body.*" She, however, saved £1,600.

Bridget Devine, of Alean street, Manchester, died in 1845, aged 147.

Her husband was a hand-loom weaver, and died about twenty years before her. They were *very poor*, and after her husband's decease she was *supported* chiefly from the *parochial funds.*

Ephraim Pratt was living at Shaftesbury, U. S., in 1803, aged 116.

The Rev. T. Dwight states that this man was born at Sudbury, Mass., in 1687, and that throughout his life he

had been *very temperate*, both in *diet* and habits. His general drink was *cider;* he was accustomed to take animal food, but in *less quantity* than most persons around him. Milk was also a common article of his diet.

Jonathan Hartop, of the village of Aldoborough, near Boroughbridge, Yorkshire, died in 1790, aged 138.

"*He ate but little*, and his only beverage was milk."

Anne Froste, of West Raisin, Lincolnshire, died in 1722, aged 111.

"Married her last husband in her ninety-third year. . . . For many years past she had lived on *milk and tea diet.*"

Mrs. Thomson, lived near Dublin, died in 1796, aged 135.

"She was very active; and by a *regular mode of living*, together with much exercise, attained so great age."

Baron Baravicio de Capellis, died in 1770, at Meran, in Tyrol, aged 104.

"His usual food was *eggs;* he never tasted boiled flesh; he sometimes ate a little roasted, but always in *very small quantity;* and he drank abundance of tea with rosa-solis and sugar candy."

Charles Macklin, of James street, Covent Garden, an eminent dramatic writer, and comedian of Covent Garden Theater, the veteran father of the stage, died in 1797, aged 107. In the former part of his life he lived intemperately; subsequent thereto he determined to proceed by rule, which he scrupulously observed.

"*He was moderate at his meals*, and ate fish, flesh, etc., till the age of seventy; when finding tea did not agree

with him, he substituted milk, with a little bread boiled in it, sweetened with brown sugar. . . . For the last forty years his principal beverage was white wine and water, pretty sweet. . . . He strictly observed the dictates of nature, ate when hungry, drank when thirsty, and slept when sleepy."—*Vide* Memoirs of his life.

William Thompson, of North Keyme, Lincolnshire, lived to 108.

"He smoked two pipes and drank some ale on the day of his death."

William Riddell, of Selkirk, in Scotland, died in 1718, aged 116.

This man was "remarkable for his love of brandy, which he drank in very large quantities. . . . He was not a drunkard (habitual), but he had frequent paroxysms of drinking which continued several successive days. For the last two years of his life his chief subsistence was a little bread infused in spirits and ale."

Pascal Seria, of Valencia, died at 111.

"Frequently smoked tobacco."

Richard Brown, of Peterchurch, Hereford, died in 1794, aged 108.

"In the instance of this old man, the assertion that smoking tobacco is prejudicial to health is completely refuted, as he was seldom seen without a pipe in his mouth, and took his last whiff a few hours before his death."

John Saunders, of Stratford, died in 1798, aged 106.

"He would walk to the Old Castle House to drink a cup of ale and smoke his pipe."

John de la Somet, of Virginia, died in 1767, aged 130.

"He was a great smoker of tobacco, which, agreeing with his constitution, may not improbably be reckoned the cause of his uninterrupted health and longevity."

Joseph Creole died in Caledonia, a little town of Wisconsin, on January 27, 1866, aged 142.

"He was an inveterate smoker."

"We do not advise either drinking or smoking as a means of prolonging life, but still there is a philosophy noticed in the cases before us. Both drinking and smoking take away the appetite; less food is eaten, therefore a less amount of earthy salts are taken into the system, and the cause of old age is delayed in its results; still sufficient food is taken to support life, and great age follows."

"Total abstainers must not forget that alcohol is formed in their own bodies, and, as Dr. Richardson says, "No man can be, in the strict scientific sense, a non-alcoholic, inasmuch as, 'will he, nill he,' he brews in his own economy 'a wee drap.' It is an innocent brew, certainly; but it is brewed, and the most ardent abstainer must excuse it The fault, if it be one, rests with Nature, who, according to our poor estimate, is no more faultless than the rest of her sex."

Alcohol in excess is injurious to health, especially to the mental capabilities—the reasons of which do not admit of argument. But there is no evidence to show that alcohol in moderation, and judiciously used, is detrimental to health.

Tobacco affects the brain, the heart, circulation, and temperature. In excess it is therefore injurious. Tobacco

is, to a certain extent, a disinfectant; it mitigates the pangs of hunger and soothes depression. How often it calms the temper! How many cross words are prevented in domestic life by the *moderate* use of tobacco!

Louisa Truxo, a negress, was stated to be living in June, 1780, at Cordova, in the Tucuman, South America, aged 175.

The council of the city took every means to verify the authenticity of this statement:

"On examination of the woman, it appeared that she perfectly remembered having seen the prelate Fernando Truxo, her first master, who died in the year 1614; and that a year before his death he gave *her*, together with other property, towards a fund for founding the university of that place. As no registers of baptism existed so long back, care was taken to collect every circumstance that could be brought forward in corroboration of the woman's statements. One of these proofs was the deposition of another female negro, named Manuela, who was known to be 120 years old, and she declared that, when she was quite a child she remembered that Louisa Truxo was then an elderly woman."

Thomas Carn, according to the parish register of the church of St. Leonard, Shoreditch, died January 28, 1588, aged 207 years.

He is stated "to have been born in the reign of Richard II, A. D. 1381, and lived in the reigns of twelve kings and queens of England."

The *Petersburg Gazette* published in 1812 an instance of a man in the diocese of Ekaterinoslau having attained an age of more than 200 years.

Dr. Mussey, formerly a professor of anatomy and surgery at Dartmouth college, says that John Gilley, born in the county of Cork, Ireland, 1690, died at Augusta, Maine, July, 1813, aged 123. "I saw him," says Dr. Mussey, "after sunset of a cold evening in December, at the age of about 118. At that time he took the whole care of the cattle at his barn, and cut all the wood for the fire at his house. He lived a bachelor till he was 78, when he was married to a girl of 18. They had eight children who had gone out into the world to seek their fortune, leaving the old folks to take care of the homestead."

Nina Zahn, near Berlin, died at the age of 141, having never tasted meat in her life, nor used beer.

John Rovin and his wife, of Temesvar, Hungary, died 1741, he in his 172d year, she in her 164th, having lived together, man and wife, one hundred and forty-seven years. He was married at the age of 25 and his wife at 17.

The Hon. Mrs. Watkins, of Clamorganshire, visited London at the age of 110, the last year of her life, to witness one of the performances of Mrs. Siddons. She ascended the many flights of steps which lead to the whispering dome of St. Paul's.

Lord Bacon says the Countess of Desmond, who lived to 148, *renewed her teeth* once or twice.

The *Dublin Freeman* of July 29, 1854, stated that Owen Duffy, of Monaghan county, was then alive, aged 122 years. Having lost his second wife when he was 116, he married a third, a young woman, by whom he had a *son* and a *daughter*. At this time his youngest son was two years old, while his eldest was ninety.

John Rousey, Esq., of the island of Distey, in Scotland, died in 1738, aged 137.

"He had a *son* at *one hundred* years of age, who inherited his estate."

John Riva, of Venice, died at 116.

"He always chewed citron-bark, and had a child after he was 100."

Margaret Krasiona, of the village of Koninia, in Poland. When ninety-four years of age, she married her third husband, who was then 105.

"They lived together fourteen years, and had two boys and one girl. This is certified in the parish registers of the village of Ciwousin, district of Stensick, in the palatine of Seudomir."

Thomas Parr, a native of Shropshire, died in 1635, aged 152. He married at the age of eighty-eight, "seeming no older than many at forty."

He was brought to London by Thomas, then Earl of Arundel, to see Charles I, "when he fed high, drank plentifully of wines, by which his body was *overcharged*, his lungs obstructed, and the habit of the whole body quite disordered; in consequence, there could not be but speedy dissolution. If he had not changed his diet he might have lived many years longer."

On his body being opened by Dr. Harvey, it was found to be in a most perfect state. "The heart was thick, fibrous and fat; *his cartilages were not even ossified as is the case in all old people*," and the only cause to which death could be attributed was "a mere plethora, brought on by more luxurious living in London than he had been accus-

tomed to in his native country, where his food was plain and homely."

"Constantinople is a tolerably ancient city, as European capitals go, but, old as it is, it never entertained within its gates since the date of its foundation a more remarkable visitor than the Circassian chieftain, Hod Bey, who recently arrived in Stamboul for the purpose of paying homage in person to his liege lord and hereditary commander, the Padishah. This warrior has attained an age which justifies him in regarding the venerable German emperor as a mere stripling. He was born in 1762, and entered the Turkish military service in the year 1777, under the reign of Abdul Hamid I. Eight successive sultans have known Hod Bey as one of the most faithful and valiant officers of the Ottoman army, to which he still belongs after an active military career of 105 years. He has fought in sixty-five pitched battles and innumerable skirmishes, received three and twenty wounds, and earned over and over again every war decoration in the gift of the Grand Seignior. Although well advanced in his hundred and twentieth year, he is strong and hearty, retains the use of all his faculties, and enjoys an excellent appetite. The present sultan has shown him every attention that a sovereign can offer to a subject. No honor can be too great, no distinction too conspicuous, for a stanch old soldier who has fought for the Crescent throughout considerably more than a century."—*Daily Telegraph*, Sept. 19, 1882.

Miguel Solis, of Bogota, San Salvador, who is supposed to be at least 180. At a congress of physicians, held at

Bogota, Dr. Louis Hernandez read a report of his visit to this locally famous man, a country publican and farmer:

"We are told that he only confesses to this age (180 years); but his neighbors, who must be better able to judge, affirm that he is considerably older than he says. He is a half-breed, named Miguel Solis, and his existence is testified to by Dr. Hernandez, who was assured that when one of the 'oldest inhabitants' was a child this man was recognized as a centenarian. His signature, in 1712, is said to have been discovered among those of persons who assisted in the construction of a certain convent (Franciscan convent at San Sebastian). Dr. Hernandez found this wonderful individual working in his garden. His skin was like parchment; his hair as white as snow, and covering his head like a turban. He attributed his long life to his careful habits; *eating only once a day*, for half an hour, because he believed that more food than could be eaten in half an hour could not be digested in twenty-four hours. He had been accustomed to *fast* on the first and fifteenth of every month, drinking on those days as *much water* as possible. He chose the most nourishing foods, and took all things cold."—*Lancet*, Sept. 7, 1878.

From this and other sources we gather the following habits of this man:

1. He eats but once a day, and only for half an hour.

2. He eats meat but twice a month; from which we may justly infer that he is to a certain extent abstemious in his daily meal.

3. He drinks large quantities of water.

4. He fasts two whole days every month.

From these habits it follows that, compared with the majority of mankind, he eats little, yet enough to support life; he therefore takes into his system a small amount of earthy compounds, which therefore take a longer period to accumulate, and produce the symptoms of decrepitude and old age at a far later period than they occur in most individuals who live upon an ordinary quantity of food, whose bodies become rigid, decrepit, and ossified, we will say, at about "three-score years and ten." Further, that he drinks large quantities of water, which if not unusually hard, will tend to dissolve and remove those earthy compounds which are not the *effect* but the *cause* of old age. We have not thought it necessary to make further inquiries concerning the diet and habits of this man. Our information is derived from numerous periodicals, and we only arrive at the above conclusions because we are convinced, from ascertained facts and experiments, that man may by diet alone attain the age which Miguel Solis is supposed to be.

"Henry Jenkins lived to the extraordinary age of one hundred and sixty-nine years. He was born on the 17th of May, 1500, at Ellerton, in Yorkshire, and died in 1670. He assisted his father in his early years as a fruit-grower and market gardener. All his family were remarkable for longevity. An only sister of his died at the age of one hundred and twenty-five, and his grandmother lived to the age of one hundred and thirty-eight years. Old Jenkins was always a great admirer of nature, and extremely fond of fruits, flowers, and herbs. It was his daily

custom to rise very early, with the song of earliest birds, and wander through the woods or over hill and meadow at peep of day in quest of divers medicinal herbs, the study of which he was so fond of.

"With regard to the diet of this wonderful old man, it was always simple, consisting mostly of cold meat and salads, of which he partook, with water for his drink, in moderate supplies. It was in the year 1524, during the reign of Henry VIII., that the hop plant was introduced into England from Flanders, and cultivated for the preparation of beer, which Jenkins, being a great advocate for bitters, used for that purpose; and he never found a moderate portion of that beverage, taken once a day, at all to disagree with him, or hurt him. He partook of light suppers, frequently walking out in his garden afterward for a short time to promote digestion. Water was, however, his favorite beverage, and he usually drank nearly half a pint of it every morning when he first arose. Besides abstemiousness in the article of food, his general habits were regular and sober. Following the directions of his mother, he always continued the use of flannel and warm clothing, which had been commenced in infancy. He was robust and healthy to old age—a hearty, respectable, good-looking old man, who never knew what real illness was until a year or two before his death. He warded off the first attacks of disease by resorting, at the first appearance of the enemy, to defensive or preventive measures, never waiting to parley with the insidious foe; and he always found his plan successful."

In the "Philosophical Transactions" of 1696, Sir Tan-

cred Robinson states: "This Henry Jenkins, in the last century of his life, was a fisherman. When 90 years of age a child was born to him. He was able to swim across rapid rivers after he was 100. He remembered the battle of Flodden Field, in 1513. The registers of chancery and other courts prove that he gave evidence, and had an oath administered to him 140 years before his death."

"When Jenkins was near his 160th year, King Charles II., being informed of his astonishing longevity, expressed a desire to see him in London, and sent a carriage purposely to convey him thither. He preferred, however, to go on foot, and actually walked to the metropolis in easy stages—a distance of two hundred miles. On his arrival in London, the hoary patriarch was introduced to his majesty. The king held a long conversation with him, and made many inquiries as to his mode of living; but nothing particular being observable in that, inquired by what means he contrived to live so much longer than other people. To this he replied that temperance and sobriety of living had been the means, by the blessing of God, of lengthening his days beyond the usual limit. The king, who was fond of dissipation and luxury, seemed not much pleased with some of Jenkins' homely maxims, and dismissed him; but allowed him a comfortable pension, which he enjoyed the remainder of his life."

The Boston *Herald* recently printed an account of the death of a man named José Cortez at the age of 193 years, near the city of Morelia, in Mexico. The fact is said to be thoroughly substantiated by the records of the parish in which the man lived.

A wonderful anniversary, the one hundredth, of the marriage of Mr. and Mrs. Jean Szathmary, is reported from Hungary. The marriage of this aged pair is duly and officially recorded as having taken place in May, 1793, at which time, according to the record, they were of marriageable age.

As in Hungary, at that time, a bridegroom must have reached the age of 20 and a bride that of 15, the pair must now be at least 120 and 115 years old. The one hundredth anniversary was celebrated at the town of Zsombolyi, in the Banat, which has for a long time allowed the venerable couple a pension in recognition of their great age and fidelity to each other.—*Youth's Companion.*

A census of centenarians recently taken in France gives 213 persons of 100 years or over, 147 of them women and 66 men. The oldest was a woman who had just died at 150 in a village of the department of Haute Garonne. Nearly all of the centenarians belonged to the lowest ranks in life.

On New Year's day Bazyl la Chappelle, a half-breed Kaskaskia Indian, well known to every one in that section as "Old Bazyl," was buried from his home near Prairie du Rocher.

He was the son of Langlois la Chappelle, a French officer stationed at Fort Chartres. In 1765 his father married a Kaskaskia Indian maiden who had become a Christian, and left her tribe to become his wife. During the year of their marriage Fort Chartres was captured by an English regiment under Colonel Gawry, and the French garrison of twenty-one men fled to Kaskaskia, and with them went La Chappelle and his young Indian bride.

The French possessions east of the Mississippi river were ceded to Great Britain the same year La Chappelle and his wife left Kaskaskia for Fort Genevieve, where Bazyl was born on August 16, 1770. After living in St. Genevieve two years Bazyl's mother fled from her husband and civilization to rejoin her tribe, and La Chappelle, heart-broken, concluded to return to Fort Chartres.

Bazyl's father died at Fort Chartres in 1774, and is buried in the St. Philippe cemetery, near the old fort. The boy had become a favorite with the English soldiers, and was adopted by one of the officers. In 1776 an overflow of the Mississippi cut away the southeast angle of the fort, and the garrison was removed to Fort Gaze, opposite Kaskaskia, where Bazyl was cared for by the English until the capture of the settlement by a company of rangers under Captain Clark in 1779, when Father Brobisquet, a Catholic priest, took the boy and cared for him.

When young La Chappelle was 13 years of age a band of Kaskaskia Indians came to the village to barter furs, and among them was Bazyl's mother. Learning that her son was still alive, she went to him and induced him to leave his home and go with her. The lad soon forgot his religious training, and liking the wild life of his ancestors, remained with the tribe until the death of his mother, which occurred in 1789. He then returned to Kaskaskia and became a trapper and guide in the employ of an Indian trader named Menard. He conducted trading parties on expeditions among the Indians.

After serving Menard for many years he bought a small farm between Kaskaskia and Prairie du Rocher, where he

lived until his death. He was a light eater, never drank intoxicants, but was a great smoker, and was continually puffing at an old clay pipe.

At the time of his death he had five teeth and his hair had some of its original color. He was buried beside his father in the old St. Philippe churchyard, near the ruins of Fort Chartres. His age is positively known to be 125, as the date of his birth has been found in the French records at St. Genevieve.—*S. F. Examiner*, January, 1896.

McDONOUGH, Ga., January 26.—Hiram Lester is dead in the Henry County poorhouse, at the age of 129. He was born in Raleigh, N. C., eight years before the birth of the Republic. There is no question as to his great age, as he leaves a son 92 years old, who is an inmate of the same institution, and a daughter who lives in Heard County, and is 95 years old.

"Uncle Hiram," as he was familiarly known, came from a long-lived ancestry. His father lived to be 100 and his grandfather to be 115. The old man claimed to have enjoyed the hospitality of George Washington for three days, and spoke fluently on the subject of the official acts of Jefferson, Madison, and Jay. In 1881 he was obliged to take refuge in the poorhouse. In 1891 he was married to Miss Mary Moseley, aged 81, housekeeper of the poorhouse.—*S. F. Examiner*, January, 1896.

The oldest citizen of Iowa is Christian Coonrad, aged 116 years. In the matter of flesh he is little better than a skeleton veneered with tawny parchment, and of course his step is slow, feeble, and unsteady, his voice weak, and his eyes dim, but he has not lost his capacity for enjoy-

ment, and if a kite goes up in the township he wants to be there. Just now he is husbanding his strength preparatory to attending Delaware County's annual harvest home gathering at Spring Brook, at which his has been a familiar figure for years.

Mr. Coonrad was born in Cumberland County, Pa., September 22, 1780. He was living on the old homestead, a man over thirty, when the war of 1812 broke out. A cousin brought the news, and Mr. Coonrad abandoned the farm for the field of arms. His company was ordered to the Niagara frontier, and as a private in the ranks he took part in Colonel Miller's historic and successful charge on Queenstown Heights. He also participated in the battle of Fort Erie, and witnessed Commodore Perry's famous victory on Lake Erie.

Upon the close of the war Mr. Coonrad returned to the farm, where he remained until the opening of the Erie canal, upon which he operated a line boat for seven years. He also navigated the Susquehanna for some years, and in 1845 settled in McHenry County, Ill. In 1860 he removed to his present farm in Delaware County. His habitation is a log house with two rooms, and his companion is his wife, who, at the age of over eighty, still performs the duties of housekeeper, and is cheerful as a matron of forty. They were married sixty-two years ago, and their eleven children, ranging in age from thirty to fifty-eight years, are all living, besides forty-two grandchildren and thirty-four great-grandchildren.—**From** a recent issue of the Chicago *Times-Herald.*

December 29, 1895, the San Francisco *Examiner* published photographs, with a lengthy description of the lives, of five centenarians now living in California, from which the following data are taken.

Señora Isabella Villa of Merced was born in Tapulpa, Mexico, in March, 1795.

The señora is more spry than many ladies of fifty. She has smoked cigarettes constantly since she was ten years of age. She never takes spirituous liquors save on rare occasions.

Señora Villa's cigarette smoking habit, coupled with her extraordinary vitality, are things to make all hygienic reformers wonder. For ninety years or so the señora has been smoking and inhaling the fragrant weed, and even now, at over five score, is remarkably active, mentally and physically.

Doubtless one reason for the apparently non-injurious effects upon her of the smoke-inhaling habit is the quality of tobacco used. Like all of her race, she scorns the ready-made "coffin-nail cigarette," but rolls her own tobacco in the brownish-yellow straw paper such as all Mexicans use. She rolls her cigarettes with extreme rapidity, and takes even now as much comfort with her frequent smokes as ever any man does with the choicest cigar.

Without her cigarettes she is nervous and restless, but with them she is lulled to rest and repose.

Mrs. Arthur of Stockton was born January, 1787, on a plantation in Knox County, Kentucky. She has given birth to seventeen children. At present she has two sons,

eight grandchildren, one great grandchild, and one great-great-grandchild. Soon after the birth of the only member of the fifth generation in 1882, a picture of the five generations was taken. Mrs. Arthur reads without glasses. She has always been a hard worker and has never known sickness.

The oldest person in the West, according to all records obtainable, is Mrs. Priscilla Nelson, aged one hundred and twenty-six, living at Marysville.

She was born on a farm fifty miles north of Knoxville, Tenn., and came to California in 1854. She has given birth to ten children; the youngest, aged 43, resides with her.

In a recent interview Mrs. Nelson said that she knew of no particular habits of life to which she can attribute her longevity. She drinks coffee and tea and has a splendid appetite. She uses tobacco unsparingly. Her eyesight and hearing are unimpaired, and her voice shows but a slight tremor. For her age she is quite sprightly. She has not attempted any work for twenty-five years. Vegetables have formed a large part of her food for many years.

At the County Hospital near Colusa is Mrs. Sarah Davis. She was born in East Tennessee in 1790. She was married when a mere child, and became the mother of sixteen children. Solomon Davis, over seventy years of age, an inmate of the County Hospital of Yreka, is one of her sons. He visited his mother last fall.

Notwithstanding her old age, her hearing and sight are perfect, but her voice is not very strong.

She is as hearty an eater as a young person, and has yet a fair set of natural teeth. Onions are a favorite dish with her—she eats them three times each day.

Mrs. Maria Foster was born in London, Eng., in 1792. Her father was General Houston, a British commander who was killed at the battle of Waterloo.

Mrs. Foster now has two sons living. One, Edward, is in business in Spain, and another, Thomas, is a London barrister.

Her appetite is wonderfully good, and she eats heartily of everything except meat, which she never touches in any form. She is fond of fruits and sweets, and would eat candy by the boxful if she could get it. She is an inveterate smoker.

It must be obvious to the reader who has carefully studied the preceding chapters, that under certain conditions of life with health, it is possible to hold in check the processes which involve age. This knowledge is of recent date, hence consideration of the foregoing instances, where under ordinary conditions great age was attained, suggests the possibility of greatly exceeding even those limits. The value of this knowledge, however, depends entirely upon its application. The wish for long life is natural, and when in good health and circumstances few individuals desire it shortened.

The only certain means of prolonging life are clearly explained herein, for age is but a disease caused by calcareous and other deposits in the body. The main source from whence these deposits arise is the water used for drinking. If man used only distilled water, either in its

pure form or in fresh fruits, which contain from 75 per cent to 95 per cent, or in a sound wine, which consists almost entirely of water distilled by nature, and only in quantities sufficient to satisfy natural thirst, the main cause of decrepitude would cease to exist, and those diseases due to the formation of calculi in different parts of the system would become of rare occurrence. Every household can with little trouble and expense condense the steam which escapes from the boiling water in daily use, and such distilled water can be utilized not only for drinking purposes, but in the preparation of foods where water forms a component part. Those individuals who find such means of obtaining pure water difficult or inconvenient can purchase the article of the druggists, in five-gallon quantities generally at 10 cents per gallon.

Free phosphorus, by combining with oxygen existing in the blood, *prevents excessive oxidation* or waste of the system. Its action therefore in partially arresting this never-ceasing action of atmospheric oxygen, operates in reducing the amount of food required to support life. It should be used only in the following manner: The Official Elixir of Phosphorus may be obtained of all druggists with a strength of from one-fiftieth to one-hundredth of a grain per fluidrachm (teaspoonful). This should be taken: A teaspoonful three times a day. It is not wise to use this preparation steadily. If used for two weeks it should be discontinued for the next week or two.

The Standard Dilute Phosphoric Acid can also be obtained of all druggists, and may be used continuously in doses of from ten to twenty drops, well diluted with dis-

tilled water, from one to three times a day. Its action is to prevent and even remove earthy compounds, one of the causes of old age.

Avoid table salt. It contains a large amount of calcareous matter. There is no foundation for the opinion that salt is essential to the general functions of the body. Where a craving for this article exists, it will be found that the diet is responsible. Plant-eating animals require more salt than the carnivora. Some of them will travel long distances to obtain it, which is never the case with flesh-eaters. Dr. Burge, by repeated experiments, has proved that where the diet contains potash, salt is required, as potash withdraws from the body chloride of sodium, or its oxide, and soda, both constituents of common salt. Liebig states that there seems to be a popular instinct to add salt to starch foods, and these are the very ones which contain the most potash. Hence, the use of starch necessitates the use of salt, and in proportion as such food is eliminated from the diet will the craving for salt cease.

The chapter on "What to Eat," is sufficiently explanatory except as to the quantity, which after all depends to a great extent on structural development and personal peculiarities. To every individual must be left the decision of this question. It may, however, be said that a sufficient interest in the subject suggests a student of hygiene, and the best evidence of thorough study and wise practice will be in the result attained, which can prove only beneficial. It may be well, however, to refer those who are not inclined to what they may erroneously con-

sider hardships, to an easy compromise, and to such the following quotation may prove of interest:

"Referring to the subject of *quantity* of food required to sustain life, we affirm that most men eat more than is requisite for this purpose—more than is actually good for them. Man does not require four or five meals a day; he would be in far better health on two, or at most three meals in the twenty-four hours.

"Fruits are nutritious in themselves; but should they not contain sufficient nitrogen to satisfy a *theoretical* appetite, we have shown that all other elements are present, and that man may absorb the deficient nitrogen from the surrounding atmosphere, the combination resulting in albumen, or protein. For this reason, together with the fact that they contain little earthy matter, fruits are man's best diet if he truly desires a long life; but considering the difficulties attending a sudden change of diet, and the necessity of conforming to the rules and usages of society, which we do not wish to usurp (and even did we desire this, we fear society would be the victor), we are induced to put forward a few *simple* and straightforward *rules*, which are founded upon observed facts, which are not oppressive or tyrannical, which would not interfere with the avocations and callings of man, and which may be readily carried out by every one of the community for his own individual benefit, for health and long life.

"As we know, there are many who could not be persuaded to make any alteration in the *articles* of their diet, whilst there are others who might be influenced in this direction, we give a few rules for both these classes.

"To those who are not inclined to alter the articles of their diet, we say:

"1. Eat *moderately*, always remembering that you eat to live—to give a balance to the system.

"2. Take no more than three meals a day.

"3. *Avoid* eating *large quantities* of bread, pastry, and other farinaceous foods.

"To those who are willing to make alterations in their diet, the same rules will apply, but with this difference:

"Eat *fruits*, if possible, at every meal, and commence with them; if the appetite is not moderately satisfied, finish with the ordinary articles of diet."

The remaining paragraphs are mainly from De Lacy Evans:

The majority of mankind die unnatural deaths from disease or accident. Polluted air is productive of much more general injury than impure water. The air of rooms in which human beings live or sleep ought to be in a constant state of motion, but not sufficient to produce draughts, which are frequently the cause of colds, inflammation of the lungs, and other diseases. The common idea that the noxious character of confined air is due to a deficiency of oxygen is erroneous. A slight deficiency of oxygen, if counterbalanced merely by a similar increase in the amount of nitrogen, is not injurious to man. But those gases (chiefly carbonic acid) which are produced in close and confined rooms and workshops are the immediate cause, by their poisonous influence on the blood, of that stagnating sub-oxidation which gradually lays the foundation of many wasting diseases. The inhalation of

carbonic acid, even in comparatively small quantities, in the atmosphere, causes the white corpuscles of the blood to enlarge, and thus to become less capable of circulation.

There is no greater preservative of health than regular exercise. It equalizes the circulation, thus preventing congestions, especially those of the liver, which are the prevailing characteristics of the present generation. The circulation of the blood through the arteries and capillaries is one of the means whereby the frame is nourished and supported, and the organs of digestion strengthened. Thus sufficient exercise will not only improve the health, spirits and physical power, but will render such things as tonics and alteratives unnecessary.

Nothing is more necessary to a comfortable and congenial state of existence than that the body should be kept, as nearly as possible, at a uniform temperature. Any degree of cold which produces shivering cannot be endured without injury to health. The purpose of clothing is to prevent the loss of bodily heat by radiation. Wool, being a better conductor of heat, is a better substance for clothing than silk or cotton, and the more loose and easy the fit, the more warmth will the garment afford, because a stratum of warm air is allowed to interpose between it and the body. Tight clothing is dangerous, both by its action in arresting circulation and producing deformity, and by its tendency to confine the movements of the external limbs, and cramp the natural actions of the internal organs.

The action of oxygen upon some of the constituents of the blood and tissues of the body is one of the sources of

animal heat. The skin, by increase of perspiration and its evaporation, carries off the excess, so that the internal parts of the body are in health preserved at a uniform temperature of about 98.2°. The excretory function of the skin is of paramount importance in regard to health. A diminution of the insensible perspiration is a characteristic of many diseases and a concomitant of most fevers. If a man be exposed to a cold temperature (say 40°) his skin becomes almost insensible, and the vessels which supply the perspiration contract, and perspiration ceases. Again, under a very hot temperature, perspiration is increased—its evaporation producing cold. Thus an almost even temperature is kept up. How necessary, therefore, is it, that in winter we should be clad in warm garments to keep off the cold influence of the external air, and that in summer we should be clad in garments which, instead of absorbing heat, refract it, and allow free ventilation and evaporation to the skin.

In regard to marriage, we have only to state that nearly all persons who have attained remarkable longevity were married. Marriage, as Hufeland states, "tends to moderate overstrained hope and enthusiastic speculation, as well as excessive care. Everything, by the participation of another being—by the intimate connection of our existence with another—is rendered milder and more supportable."

When we reflect on the progress of civilized man, we notice wonders and improvements in his surroundings, for his welfare and comfort; we discover a spirit of inquiry among men, a silent march of thought; a steady

progress, impelled forward by an eternal law—nature's law—experience. This law we may compare to a circle; the beginning we know not, the end we know not. This circle enlarges, expands—where is the limit? Opposition, reproach, threats, and violence can be only a temporary check; they cannot control or arrest the progress of inquiry, the keenness of research, the results of experience. But amongst the varied and expanding objects of research, is not that inquiry which appertains to the preservation of life the most important of all to humanity?

To say that everything dies simply because it has lived; that the age of man is *fixed* irrespective of reason or cause, is not only presumption, but confessedly a want of conception, a disbelief in what is and therefore must be, and an assault on the fixed and immutable laws of natural phenomena.

In the present day, when we are so accustomed to wonders that they no longer excite our wonder; when we send our thoughts almost round the world with the velocity of lightning; when we hear voices miles away by the agency of the telephone; the tick of a watch—even the tramp of a fly—by the microphone; when we transcribe the vibrations of sound with the precision of a mathematician; when we freeze water into ice in white hot crucibles; when we cast copper into statues without the aid of heat; when it is possible to illuminate cities without gas—with lamps devoid of flame or fire; when some of the most precious minerals are produced from their elements; when we believe that to-morrow even the diamond may be artificially produced; with all these wonders recently brought

to light for the benefit of mankind, is man *himself* to be debarred from that social progress which is daily manifested? Are the achievements of science of no avail in benefiting his degenerated existence? Will not our daily increasing knowledge of nature and the behavior of her elements eventually tend to this end? In reference to which Liebig asks: "Is that knowledge not the *philosopher's stone*, which promises to disclose to us the laws of life, and which *must finally yield to us the means of curing diseases and of prolonging life?*"

The fields of research become richer and wider with every new discovery, which is often as precious as, if not more useful than gold—actually a transmutation for the benefit and comfort of man. But as yet he has *himself* been little benefited by science, which must of necessity ultimately dictate a *means* of curing diseases and of prolonging life. Is it even just, in the present day of so-called wisdom, to ridicule the alchemists of old, who diligently labored and searched for a "virgin earth"—a mysterious substance which would "change the baser metals to gold, and be a means of curing diseases, of restoring youth to the exhausted frame of age, and of prolonging life indefinitely"? Such a view would be utterly unjust. For the present science of chemistry owes its position, its existence—perhaps its origin—to the untiring observations and researches of the alchemists, which were instilled into them in their laborious searches for the "philosopher's stone." All they sought for exists, and may ultimately be found in the illimitable science of chemistry.

Oxygen it is that by combining with the substance of

fuel during combustion causes the consumption of that fuel. Oxygen it is that by combining in a similar manner with the substance of the human body, chiefly during respiration, causes the waste of the system and the necessity for food. Oxygen it is that corrodes and eats away the solid masonry of palaces, castles, mansions, and churches, and eventually crumbles them to dust. Iron bridges, marble monuments, massive structures—of whatever architecture or material—must eventually succumb to this all-destroying agent.

The Roman proverb runs, "*Tempus edax rerum*," Time, the consumer of all things. But Time would be of no avail without oxygen, which is really the "*edax rerum.*"

Time is also credited with the changes which take place in the human body between youth and old age; but oxygen it is which, by wasting man's tissues, necessitates his supplying himself with food, which food contains earthy and obstructive matter, which matter by accumulating in the numerous organs and structures, increases his density and rigidity, and by hardening the same produces the various characteristics, both in appearance and texture, of old age, and by stiffening his joints, that decrepitude and inactivity which, in conjunction with the induration and ossification of the numerous organs, cause the human machine gradually to move more and more slowly and ultimately to stop, and die a "natural death."

Thus it is seen that oxygen, though necessary to support life, is the primary cause, by necessitating food, of those changes which are only so many steps from the cradle to the grave. The paradox therefore exists that

even while we breathe the breath of life we also inhale the "*edax rerum*" which requires only *Time* to bring about our destruction.

We may therefore say that *oxygen* is but the *primary cause*, because it necessitates food; and that the *earthy* and obstructive *matter* contained in that food is the immediate and *actual cause*, inasmuch as it gradually gives rise to rigidity, ossification, and death.

As a jet kept free from clogging and obstructive matter, and supplied with pure gas, will continue to burn, independent of time, "so the human body, supplied with food free from earthy and obstructive matter, will retain the flame of life."

In the pages of Nature are distinctly and legibly written—to those who will but refer with patience—the laws of life and the laws of death; and in clear, unmistakable characters the reason—the cause—of the *ultimate* death of every animate being. There are abundant materials for investigation and research; the cause of "old age" in man is demonstrated, and a means of *checking* it has herein been clearly explained; and it would not be contrary to the dictates of our nature to hope that *science* may be incited into an inquiry for more general perfection, which may be the means of actually conquering it:

> "By showing conclusively and clearly,
> That Death is a stupid blunder merely,
> And not a necessity of our lives."
>
> LONGFELLOW.

THE END.