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HINTS FOR HEALTH.

BY

J. S. STOCKER, M. D. LOND.

HINTS FOR HEALTH;

BEING

TWO LECTURES

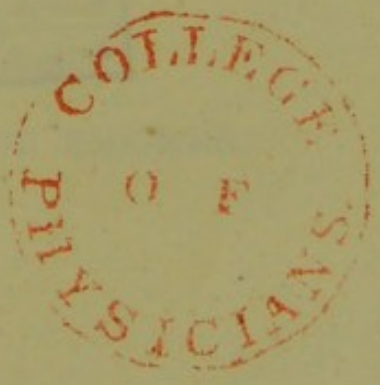
ON THE INFLUENCE OF

AIR, WATER, FOOD, AND WINE ON THE SYSTEM.

BY

J. SHERWOOD STOCKER, M.D.LOND.

PHYSICIAN TO THE WESTERN GENERAL DISPENSARY, ONE OF THE COURT OF EXAMINERS OF THE SOCIETY OF APOTHECARIES.



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TO

RICHARD STOCKER, ESQ.

My Dear Father,

The two Lectures, now published by request, were delivered early in the Spring of the present year, and I feel happy in dedicating them to you, knowing the practical interest you have always taken in Sanitary matters.

Believe me always,

Your affectionate Son,

J. SHERWOOD STOCKER.

2, Montagu Square, W.,
18*th April*, 1874.

PREFACE.

Having undertaken to deliver a Lecture on a popular subject before a mixed audience, I considered that the ordinary conditions of health under the every day aspect of life would be as useful a subject as any to which their attention could be directed.

This Pamphlet therefore treats of the chief facts relating to health from a popular point of view.

I have abstained, as far as possible, from any scientific language, and trust that the facts brought forward and known to be of such vital importance by scientific men may be of use in advancing the progress of Sanitary knowledge.

LECTURE I.

In compliance with the wish expressed by our excellent chairman and secretary, that lectures on various branches of Knowledge and Social Science should be given on the several Tuesday evenings during the winter session of our college, I am induced to give two lectures on hygiene, more particularly since a knowledge of the laws of health is now more especially needed from the vast increase in the population of our country, necessitating the enlargement of nearly all our cities and towns, and from the rapid intercommunication which exists between the various nations of the earth.

We read in classic literature that Hygeia, the goddess of health, was the daughter of Æsculapius, and that she was held in great veneration by the ancients. In some of the statues erected to her, she is represented as veiled, in other monuments she is represented as a young woman holding a serpent in one hand and a cup in the other, out of which the serpent sometimes is represented as drinking.

Herodotus speaks of the Egyptians "as people of all others the most healthy after the Africans." "To this advantage the climate may considerably contribute, changes of all kinds, and especially those of the seasons occasion the maladies of the body." Larcher, in a note on this fact, ὑγιηρέστατον Πάντων ἀνθρωπων, says, "This was true before the time of Herodotus and a long time after, but when they began to neglect the canals, the water became corrupted. The vapours which it exhaled rendered Egypt very unhealthy; malignant fevers soon began to appear and became epidemic, and these vapours concentrating and becoming daily more pestilential, at length occasioned that fatal malady known as the plague. This was not the case before the canals were constructed, nor whilst the canals were properly attended to.

Hippocrates, the Father of Medicine, considered the knowledge of the cause of disease as essential to the Physician, and when asked, "who is a Physician that is an honour to his profession?" replied, he who has merited the esteem and confidence of the public by professional knowledge and long experience; one who has observed the states of the wind peculiar to each country and the quality of its waters, and who marks carefully the locality of towns and the surrounding country.

The advantages of public health were known in many of the cities of Greece at the height of her civilization. The Spartans paid great attention to the physical education of young men and women, and trained them to temperance, sobriety, and athletic exercises. Plato and Aristotle thought no city should exist without health officers; and Epaminondas, Demosthenes, and Plutarch served in that capacity.

The Arabs of the present day follow nearly the same sanitary laws as those revealed by the Almighty to the Jews. The regulations for cleanliness, purification, protection from contagious diseases, and for the preservation of their general health, are said to be well adapted to the country in which they live.*

The Romans were certainly alive to the need and importance of a good and plentiful supply of water to an urban population, and quite aware of the necessity of sanitary arrangements for the inhabitants of the larger cities, as may be proved by the remains of aqueducts, baths, sewers, etc., in Rome at the present time, and no doubt their conquests benefitted in some measure the sanitary condition of the people subjugated by them.

Dionysius, of Halicarnassus, informs us that three things reveal the magnificence of Rome—the aqueducts, the roads, and the sewers.—Of the aqueducts, the ruins of the arches for supporting the leaden pipes, with some of the pipes themselves, for conveying the pure water from the Albanian mountains to the city of Rome, are still extant, and form one of the most interesting and striking features in the Campagna. The pipes still retain the impress of the names of the pro-consuls, in whose term of office they were made.

* Report of Sanitary Commissioners, Massachusetts, 1850.

The extent of the sewers demonstrates both their utility and the enormous sums of money which must have been spent on them—we know from the testimony of Aquilius that the maintenance of the sewers cost the Censors more than twelve million sestertii, this in our own currency would probably represent a sum of £112,500, as the sestertius was of the value of 2¼d. Some few years since, Mr. Chadwick informed the Commissioners of Sewers that he had recently received from Zurich a specimen of an earthenware pipe, such as is now recommended for the distribution of sewage; it had been laid down by the Romans, and had worked under a pressure of 500 feet.

"The sewers are an immense work,"* wrote the elder Pliny. "These excavations being made in the mountains, they would sail with their boats in Rome suspended as high as Thebes.—Agrippa caused to flow these seven torrents which, in their rapid course, hurry along all the refuse; swollen by rain, they beat against the bottom and the walls of the Cloacæ, often driven inwards by the Tiber, the currents struggle with each other in the channel and yet the building exists—masses of water are between these walls without any part giving way:—Houses falling into ruins and destroyed by fire, and even earthquakes do their best against this vault; still the work of Tarquin remains impregnable. What surprises Pliny is more astonishing now, ten centuries later. Let us not omit a fact which has been passed over by some of our most celebrated Annalists. When Tarquin employed the people on these endless, dangerous and detested works, a number of labourers destroyed themselves, but as the Quirines fear above all things shame, the tyrant found a singular means of enforcing them to live, he had the corpses of those who committed suicide exposed upon crosses to the gaze of the vulgar, and the voracity of the birds of prey—once upon a time, thieves, pickpockets, and other scandalous persons sought refuge at the sewers or channels at the edge of the river (Tiber). Titus, who edifies us as to the habits of these men, calls them Canalicolœ. In spite of his authority I should rather believe that our word Canaille comes from Canis, rather than find its birth at the mouth of the Cloaca Maxima."

* Way's "Rome;" published by Chapman and Hall, 1872.

"The remains of the baths of Titus, though not very numerous, prove them to have been very extensive. One of the most considerable monuments, however, in the world is the baths of Antoninus Caracalla, which are situated at the extremity of the circus maximus between the back of the Aventine and that of the Cœlian hills; in one of those stripped suburbs where fields and gardens flourish over the graves of an ancient quarter; contained in a narrow valley, measuring their height with that of the neighbouring hills, these baths are amongst the finest ruins in Rome. There remains some such considerable portions of the two chief blocks, forming two massive squares, the one in the other, between which extends the space of a vast close, surrounded with porticoes, that with the aid of the Thermæ of Caracalla it has been possible to trace out the destination of the analagous edifices of Titus and Diocletian. We should have a false idea of these establishments if we were to take things literally, and see in them only a place of luxurious and very perfect baths. Assuredly the stoves occupied a notable place in them, since, according to Olympiodorus, the baths of Caracalla could supply warm baths for 1600 persons at a time, but that was only a pretext of a monument, the porticoes of which were only erected according to Lampridius, between Heliogabalus and Alexander Severus. Besides the baths of different temperatures, the chambers heated by steam and the fountains, there were found in the Thermæ shops for the sale of perfumery," etc.

From the above extracts I think we may conclude that the Romans had very practical ideas upon the advantages to be derived from bathing, etc.

To the neglect of the laws of health in the construction of streets and houses, must in a large measure be attributed the sweating sickness which prevailed in London in the middle ages. This malady ceased after the great fire, which consuming a vast portion of the city, necessitated its rebuilding more in keeping with the requirements of its inhabitants, and in accordance with the laws of health.

The following abstract of a letter written by Erasmus to the physician of Cardinal Wolsey is extracted from Dr. Guy's

pamphlet on public health, published by Renshaw, 1870. Erasmus "grieves and wonders that Britain had for so many years been afflicted with a continual plague and chiefly with a sweating sickness, a malady that seemed almost peculiar to it. He finds fault with the position and aspect of the houses and the construction of the sitting rooms, in which a great part of the walls were filled with plates of glass that admitted light but excluded air. He tells us that the streets were generally covered with clay and rushes, which sometimes remained undisturbed for twenty years, concealing a mass of filth not fit to mention, and exhaling a vapour not wholesome for the human body."

This dreadful collection of filth was doubtless nothing less than the successive contributions made by the houses themselves. Erasmus also says, "If even twenty years ago I had entered into a chamber which had been uninhabited for some months I was immediately seized with a fever."

Macaulay, in his History of England, describing the condition of London during the reign of Charles II., states that the drainage was so bad that in rainy weather the gutters soon became torrents. Several facetious poets have commemorated the fury with which these black rivulets roared down Snow Hill and Ludgate Hill, bearing to the fleet ditch a vast tribute of animal and vegetable filth, from the stalls of butchers and greengrocers.

At the present moment, each of the various European Nations has sanitary laws of its own, and in many points perhaps each Nation might if so disposed, take with great advantage hints connected with matters relating to health, from their neighbours or from other nations more remote. At this time the English and Russian governments, are I believe, endeavouring by mutual investigations, to discover the origin and spread of Cholera. In some respects, perhaps, the very freedom of our own country acts detrimentally to its interest, and very often the sanitary official sighs for arbitrary laws to stop and stamp out certain diseases known to be infectious.

I would in the first place, ask you to consider with me the course we ought to pursue in surveying and studying this

subject (viz., hygiene), and at the commencement refer to certain facts, which you may have heard from the lecturer on Anatomy, Mr. Bateman, viz., that each minute portion of an organ (in a state of health) of the human body, has a peculiar structure of its own, that the organ goes through certain stages of development, fulfils its duties and dies, and that the same law which holds good in the minute structure of the body is equally binding on the body as a complex whole; the body as we well know grows, becomes perfect, performs, uses, and dies according to fixed and immutable laws.

We may now explain what is comprehended under the term hygiene.

Hygiene in its most extended sense refers to the laws which concern the health and general well-being, either of the community or of individuals.

It comprehends therefore the requirements of the community or the individual respectively with reference to *light, air, food, warmth, clothing, occupation—including mental or bodily exertion.*

Before, however, we can recognise these laws and act upon them, we must have some knowledge of the requirements of the body in a state of health (this science is called physiology), for if not, how can we provide either for the health or safety of an individual or a community.

I need not say it is at the present time quite impossible for me to go into this branch of study, and therefore can only call the fact to your attention. A knowledge of Hygiene will frequently explain the causes of many diseases, which otherwise would be inexplicable. I need only allude to those causes of Typhoid fever, which have recently resulted from milk poisoned with water contaminated with Typhoid excreta; to the dropped hand of painters from poisoning by lead, and to the impaired health arising from arsenical poisoning by papers, dresses, etc., contaminated with this substance.

To the neglect of Hygienic laws may be attributed the difference in the effective health, strength, and rate of mortality existing in regiments deprived of the necessary amount of air, light, and food, compared with other regiments more favourably circumstanced in these respects.

In many instances conscripts have been entirely placed "hors de combat" by sores on the feet (caused by ill-fitting boots), producing such distress as to prevent their marching.

Another illustration showing the evils consequent upon a neglect of natural laws, will at once make the above remarks plain. Most people have at some time or other suffered pain inflicted by a corn at the side of the foot or toe, or from the inconvenience arising from a swelling over the joint of the great toe commonly called a bunion.

These troubles have (in almost every instance) arisen from the faulty construction of a boot or shoe, depending upon ignorance on the part of the bootmaker of the natural conformation, form, and structure of the foot; for really corns and bunions are simply efforts on the part of nature, to protect portions of the skin or joints of the foot from pressure and friction to which they had been unduly subject. Remove the pressure and the corn or bunion will generally disappear.

We must not, however, forget that in particular trades certain portions of the skin become thickened, which otherwise would be greatly inconvenienced from pressure, viz., the palm of the hand in the cobbler, and the inner side of the palm in the calenderer.

Advantage has been taken of the benefit known to have been derived from planting the bamboo (as has been done at Hong Kong and other tropical places) as a prophylactic against ague, malaria, etc., the rhizome of this grass sending off rootlets in all directions, rapidly causing the absorption of the moisture which would otherwise be retained in the earth, to be given forth at other periods; and probably the stalks also of the growing plant absorb a large amount of carbonic acid gas, and also other deleterious matters in the air, which would otherwise prove injurious. In our own country we plant trees in our larger cities and towns, to render them more healthy by absorbing the carbonic acid and moisture, together with other substances noxious to mankind, and increasing the amount of oxygen in the air.

Another plant which has a peculiar interest at the present time, from its having been suggested to transplant it from its native

clime, Australia to Africa, viz., the Eucalyptus Globulus (the gum tree of Australia), possesses a remarkable power of neutralising the poison of malaria. This tree belongs to the Genus Eucalyptus N. O. Myrtaceœ. It is one of a very numerous class, as many as 135 species being numbered among the same class, growing in Australia. The plant has a square stem when young, which, however, soon becomes round and woody; its leaves are glaucous lanceolate when young, becoming falcate when old, sessile, opposite or alternate, giving off a peculiar odour when recently gathered. The flower is large, solitary or axillary in bunches, containing a very large number of stamens, fruit a pyxis, the latter when dried looks very like a medlar. The Eucalyptus has been acclimatised on the shores of the Mediterranean, where it grows to a height of thirty or forty feet or more, but in Australia it attains a height of from two to three hundred feet or even more. I do not know if the tree has flowered in England. It is said to have done so in the South of France. Specimens of this plant may be seen both at Kew and the Botanical Society's Gardens in the Regent's Park. To Mr. Baker of the former and to Mr. Bull of the latter garden, I am indebted for very much of the above information. This tree probably acts as a prophylactic against the miasmatic poison, by its rapid growth absorbing moisture, carbonic acid, and other noxious matters, and by its height breaking the force of the miasmatic growth.

It is a very great advantage to the inhabitants of small rooms to cultivate plants, as unless great attention and care be paid to the plants with reference to light and air, and temperature, they will speedily become sickly and die, whilst by their successful cultivation (besides simply adding to the stock of health) many lessons most useful to the inhabitants of the room may be acquired. It must not be forgotten that plants at night give off carbonic acid and therefore ought to be placed outside the room before retiring to rest.

Another fact recently drawn attention to by the *Times* newspaper and well worthy of notice in connection with health, is the circumstance found out by experience, that Natives of India, who during the late famine in Orissa had been half-starved,

and who having had food given to them were expected to work, died rapidly, whilst others fed on a more liberal diet, anterior to the increased rations, lived, when put to the same work.

Having now briefly alluded to the grave consequences resulting from the neglect of some, amongst very many, of the laws of health, let us pass on to consider the circumstances in relation to health with reference to the special subjects previously spoken of, viz., *light, air, food, etc.*

Who has not observed, when walking along the narrow courts and streets of our densely crowded metropolis, the pale and worn expression of countenance, caused not simply by gin, inefficient food, and pinching poverty, but from a life passed in rooms, whose cubic capacity was insufficient to supply the necessary quantity of pure air to those living in them, combined with the restricted amount of light, an agent equally important to health. Again, who has not seen poor children suffering from weak and sore eyes from neglect on the part of their parents or guardians to provide the requisite amount of warm clothing, or a sufficient supply (either in quantity or variety) of food proved to be necessary for their preservation in a state of health, and freedom from suffering.

With reference to light, Dr. Carpenter has shown, "that when moderately pure water is exposed to light, traces of vegetable life soon begin to manifest themselves, which rapidly grow and develop under the combined influence of warmth and light. The same results do not ensue in specimens of water kept at a certain temperature in a dark cellar. This simple fact shows the importance of light as regards vitality. There are, however, certain well-known facts in connection with light recognised in chemical and physical science—one of which is of great interest and importance, viz., that on breaking up a ray of light by passing it through a prism, different coloured lines are seen, some of which exhibit illuminating, others chemical, whilst to another series, belongs heat-giving properties."

Thus in the solar spectrum, the yellow ray possesses the greatest illuminating, the red ray the heat-giving, and the blue ray the greatest amount of chemical power. To these

various circumstances many of the effects of solar light on the health of mankind in all probability depend. The pallor induced by a total deprivation of the sun's rays is seen both in the animal and vegetable world. If you shut a culprit up in a darkened cell say for two or three days, on the expiration of his term of imprisonment you will find he has become blanched. The same effect in the vegetable world is seen in the white stick of celery used by us as an article of food. The baneful effect of admitting certain rays of light to the exclusion of others, may be seen in people living in kitchens whose walls are stained with yellow wash; in fact, the light in this instance, acts (without heat or chemical power) just as it does in the case of a photographer, who to prevent the action of the chemical and heat-giving rays of the sun, purposely excludes from certain rooms all colours but yellow.

We are all aware how necessary sun-light is to the development of the flowers in floriculture, and to the ripening and flavour of the fruit. Who has not observed the rosy hue of the sailor, villager, or inhabitant of the open country, in contrast with the pallid face of the inhabitant of our large cities and towns.

Dr. Edwardes has shewn that if Tadpoles be kept in the dark, nourished with proper food and exposed to a constantly renewed current of water, they continue to grow, but their respiratory organs do not undergo the change necessary to enable them to live out of the water. A knowledge of the influence which solar light exerts on the human frame in keeping up its vitality and healthy condition, has been long recognised and acted upon by the medical profession, and has been taken advantage of by them for the cure of certain diseases.

Sir James Wylie relates a remarkable instance of the importance of light for the preservation of health, with respect to an extensive Barrack in St. Petersburgh, one side of which was exposed to the light, the other being comparatively dark. The result to the soldiers living in the building, was that uniformly for many years, there were three times as many

taken ill on the dark side, as were attacked on the light side of the barrack.

Dr. Edwardes, of Paris, says, the action of light tends to develop the different parts of the body, in that just proportion which characterizes the type of the *species*, and that in warm climates, the exposure of the whole surface of the body to the action of the light will be very favourable to the regular conformation of the body. Dr. Humboldt confirms this, for he says, after five years residence among many American tribes, I have not seen a single individual with a natural deformity. In India goitre has been treated by the application of an ointment and subsequent exposure to sun-light. It is doubtful if partial absence of sun-light, with other causes tending to lower vitality, may not tend to produce this disorder, known to medical men and others as goitre.

Many plans are now adopted in London and elsewhere, for giving more light to rooms, formerly deficient in the requisite amount, by glass or metal reflectors, and white tiles.

Before quitting the subject of light, we may draw attention to some facts which fall under the notice of every one, viz., how at the break of day, birds and nearly all other animals become active, how the flowers and leaves of many plants expand and open, certain plants (as the sunflower) even following the movements of the sun itself during the day. The Chameleon plant alters its hue as the amount of light varies, and use has been made of the well ascertained fact that certain vegetables, which under the influence of light would become strong and poisonous, may be eaten with impunity when light has been excluded during their growth. These facts tend to illustrate the powerful effect light has on the active development and manifestations of life. In truth, the light and heat and chemical influence of the Sun's rays may be considered as the physical cause of all vital power.

The next element in relation to Hygiene, which we have to consider, is *Air*, and this subject we shall find embraces many points of the greatest interest and importance, both to the individual and to the community. It is well known that atmospheric air consists in every 100 parts, of 77 parts by

weight of nitrogen to 23 parts of oxygen, with about one part of carbonic acid in every 2000 parts—and a variable amount of aqueous vapour. Besides these normal constituents, traces of ammonia are found, in the air especially after thunder-showers and in badly ventilated rooms. This normal condition of the atmosphere may, and does vary considerably in rooms where the free ingress and egress of air is by any circumstance retarded. The evils resulting from a defect in the entrance and exit of air are manifold, the chief of these depending not only on an increase in the quantity of carbonic acid, but also in a diminution in the quantity of oxygen; Oxygen being that constituent of the atmosphere the most necessary for the active manifestations of life. To these two circumstances, viz., diminution in the quantity of oxygen and increase in the amount of carbonic acid, are owing the lassitude, debility, and restlessness which we so often see exhibited by others, and experience in our own persons, in badly ventilated rooms, churches, theatres, lecture halls, etc.

There is a curious and interesting fact of which we ought to be aware, viz., that people who have been accustomed to an impurity of atmosphere, such as would excite nausea and headache in others, can and do live in it though at the expense of an enfeebled condition of body. In England people sit for hours in tap rooms so filled with tobacco smoke and bad air that at first you can scarcely breathe, but after some little time you get accustomed to it—and so in other instances, use becomes second nature.

G. H. Lewes says, in the vitiated air of the houses of the poor, we find those, that have had time to adjust themselves to it, breathing without apparent inconvenience, although each new comer finds the air to be vitiated; and because they get accustomed to it, people naturally suppose that no injurious effect can follow. Here lies the dangerous fallacy. They get accustomed to it indeed, and only because they do so are they contented to remain in it!—but at what price? by what means?—by a gradual depression of all the functions of nutrition and secretion.

A vitiated air will suffice for the respiration of a depressed organism, as it would amply suffice for the respiration of a cold-blooded animal. When we enter a vitiated atmosphere our breathing becomes laborious. The consequence of this is a depression of all the organic functions and then the breathing becomes easy again, because we no longer want so much oxygen or produce so much carbonic acid. This condition is doubtless deleterious although proving that there is indeed a wonderful elasticity in the organism, enabling it to adapt itself to changing conditions, but a frequent depression of functional activity must be injurious, and if prolonged, fatal.

The fact of impure air causing enfeeblement of body, and in many cases disease, has been attended to by our legislators, and tailors, milliners, and others, working in close and heated atmospheres, are cared for by inspectors being appointed to see that the work carried on is done in rooms and places, arranged as far as possible to admit the requisite amount of fresh air.

One of the most fatal diseases in our climate, viz., consumption, depends in a very large degree upon dampness of soil, inefficient food, impure air, defective clothing, and protracted exertion. In years to come, when sanitary science shall have become more widely spread, and people wise enough to be guided by the known laws of health, may we not hope that this complaint, as well as many others, may cease; moreover we must not omit to notice in addition to the above facts, another very important circumstance, frequently to be noticed in schools, low lodging houses, and may I not add sometimes even in the houses of the rich, viz., the disagreeable and sickening odour resulting from defective cleanliness and noxious matters emanating from the breath or skin of the pupils or inhabitants; the injurious effects produced, result not only from an increase in the amount of carbonic acid and deficiency of oxygen, but also from an increase in the amount of aqueous vapour and from ammoniacal gas, the presence of which may be detected by Nessler's Test; the presence of ammonia being (according to Dr. Tidy) one of the most effectual means of detecting impurity of air, by at once producing a brown red colour in the solution. Besides the above impurities, hydrogen and other volatile organic substances are

found which are very putrefiable, and give a fœtid taint to the moisture condensed from the air on the window panes; and also to the moisture which soaks into all the porous substances in the room.

The quantity of atmospheric air required by a man of average capacity of chest is about 1000 cubic feet, and this quantity should be changed at least three times in an hour. To estimate the cubic capacity of a room you multiply its length, breadth, and height together.

"To get rid," says George Henry Lewes in his Physiology of Common Life, "of an excess of carbonic acid in the air we breathe, and to restore the oxygen required for health seems a very trifling process, and only the impressive lessons of tragic experience can persuade men that this process is extremely important. Every child knows we must have air to breathe, every one knows how unpleasant it is not to have fresh air to breathe, but the mass of mankind have no conception that the air which is not fresh is as bad as poison."

A very painful illustration of this ignorance is afforded by a calamity which occurred on board the *Londonderry*, a steamer plying between Liverpool and Sligo. On Friday, 2nd December, 1848, she left for Liverpool with 200 passengers on board, mostly emigrants. Stormy weather came on and the captain ordered every one to go below. The cabin for the steerage passengers was only 18ft. long, 11ft. wide, and 7ft. high. Into this small space the passengers were crowded. They would only have suffered inconvenience if the hatches had been left open, but the captain ordered these to be closed, and for some reason not explained, he ordered a tarpaulin to be thrown over the entrance to the cabin and fastened down. The wretched passengers were now condemned to breathe over and over again the same air; this soon became intolerable, then occurred a horrible scene of frenzy and violence amid the groans of the expiring, and the curses of the more robust. This was stopped only by one of the men contriving to force his way on deck and to alarm the mate, who was called to a fearful spectacle, seventy-two were already dead and many were dying; their bodies were convulsed, the blood starting from their eyes, nostrils, and ears.

The cause of this tragedy was owing to the ignorance of the captain and mate—they had never learned the vital importance of fresh air—they had never been taught that air which has once been breathed can never be breathed over again with impunity, never been taught the fact that air which has once passed to and fro in the lungs is vitiated, and that vitiated air is as bad as poison.

Two Suicides. A few years since a young Frenchman, named Déal, finding his hopes of making a figure in the world were daily becoming more chimerical, resolved to die; and that he might not quit the world without producing a sensation, left this written account of his dying moments.

"I have thought it useful in the interests of science," he wrote, "to make known the effects of charcoal upon man. I place a lamp, a candle, and a watch on my table and commence the ceremony.

"*It is a quarter past* 10. I have just lighted the stove, the charcoal burns feebly.

"*Twenty minutes past* 10. The pulse is clear and beats at its usual rate.

"*Thirty minutes past* 10. A thick vapour gradually fills the room. The candle is nearly extinguished, I begin to feel a violent headache, my eyes fill with tears, I feel a general sense of discomfort, the pulse is agitated.

"*Forty minutes past* 10. My candle has gone out, the lamp still burns,—the veins at my temple throb as if they would burst. I feel very sleepy. I suffer horribly in the stomach. My pulse is at 80.

"*Fifty minutes past* 10. I am almost stifled. Strange ideas assail me. I can scarcely breathe. I shall not go far. There are symptoms of madness.

"*Sixty minutes past* 10. I can scarcely write. My eyesight is troubled. My lamp is going out. I did not think it would be such agony to die.

"*Ten*"—here followed some illegible characters—life had ebbed. On the following morning he was found on the floor, a corpse.

A few hours later, she whom he loved, and who loves him,

hears of this rash act, which annihilates even hope. In her despair she flings herself into the dark and sullen Seine. The next morning a corpse is exposed at the dreadful Morgue. The casual spectator gazes on it with undefinable awe, as he thinks of the stillness of that wonderful organism, which but a few hours before was so buoyant with life. Where is all that mystery now? The body is there,—the form is there,—the wondrous structure is there, but where is its activity? Gone are the graceful movements of those limbs, and the tender sweetness of those eyes,—gone the rosy glow of youth, gone the music of the voice and the gaiety of the heart. The mystery of life has given place to the mystery of death.

The *Pall Mall Gazette* warns the country of the national danger from the neglected state of the dwellings of the poor.

"From time to time the evils of 'over-crowding' are casually referred to as requiring remedy; but the subject is not a pleasant one, and excites at most but a languid attention, for the poorer classes, to do them justice, stow themselves away out of sight, and no one who walks or drives through Regent Street, for instance, is liable to have his eyes or nose offended by the sights or smells to be found in the grimy neighbourhood standing in the rear of that magnificent thoroughfare. Yet, according to a return obtained by the Vestry of St. George's, Hanover Square, some little time ago, it was found that in 25 houses in that district there were packed no less than 450 persons; or, in other words, allowing for each person 500 cubic feet, it was found that in the 25 houses referred to there was a surplus population of 252 people! Some interesting information given on this subject by the *Clerkenwell News* will help one half of London to form some idea of the manner in which the other half lives. From statistical returns bearing on the condition of St. Giles's, it appears that in one district there were 600 families, and of these 570 severally occupied but one room. In another, of 700 families, 550 occupied but one room. In another district, out of 500 families, 450 occupied but one room each. In one room visited in this parish, which was 12ft. by 13ft. and 7ft. 6in. high, eight persons lived, and the rent was 4s. a week; another room 13ft. by 5ft. and 6½ft. high, contained five children and their parents, the rent being 4s. a week also. One curious fact is mentioned which will add immensely to the interest taken in theatrical performances, more especially in those pantomimic displays whose gorgeous effect is so much enhanced by the splendour of the minor performers. Certain classes attending the theatres at night sublet their

beds to market people, and when the latter turn out the theatre people turn into the same beds. In the common lodgings as many as 40 people eat and drink sometimes in one room. When our statesmen and legislators have succeeded in 'elevating the masses,' they will, it is to be feared, have some little difficulty in persuading the masses they have elevated that such a condition of affairs as is here described should be tolerated for one moment in the capital of a Christian and civilized country."

There are certain places in the world where carbonic acid gas issues from the ground in large quantities, and from the greater specific gravity of this gas in comparison with atmospheric air, it rests like a cloud over the place from whence it issues. Such a condition is found to exist in a cavern known as the Grotto del Carne, near Naples, in Italy. It is so named from the following circumstance, viz., that a dog when placed within the influence of this baneful atmosphere, becoming asphyxiated can be restored to health and liveliness, by being taken out and placed in fresh and pure air. A human being can however with impunity go into the same cavern, as the carbonic acid gas does not rise sufficiently high to interfere with the man's respiration.

Our Legislature, by means of its agents, is at present occupied with investigating the amount of cubic feet of air that each school has in relation to the number of pupils educated in it, and School Inspectors have threatened to withhold their certificates for the capitation grant, if the cubic space has been deemed inefficient.

Before bringing my remarks on air to a conclusion, to show how atmospheric impurity (from rapid change of temperature and moisture retarding the removal of smoke) can affect the health of the community, I need only recall to your memory the large increase in the rate of mortality which prevailed in London during the prevalence of the late fog; said to be the most dense that has visited our Metropolis for twenty years. In the Gardeners' Magazine it is said, "that the recent fog was almost as severely felt by the delicate members of the vegetable kingdom as by that of the animal world, the most rapid and fatal effect was seen in the Orchid houses, where plants which were in fine flower before the fog, became flowerless, flabby, and deficient in health and greenness in their leaves, Camelias which had been

densely covered with swelling buds, began to shake them off, old trees shooting their buds like a shower of green hailstones. The hollies were utterly indifferent to the fog, but the thorns and wild roses felt it, and the plenteous crop of scarlet berries they carried, lies for the most part on the ground beneath them."

The fatal effect upon animal life was proved by the disease and death amongst the animals at the Cattle Show, which was held at that time, and by the greatly increased rate of mortality in London during the same period.

We will now pass on to consider the various methods of ventilating a room. In the first place, perhaps you know, there are various ways in which rooms can be ventilated, the great object being, in any arrangement we may make to effect the ventilation of a room, to allow the heated and vitiated air to escape at its upper part, from the known fact, that warm air being lighter than cold, necessarily has a tendency to ascend.

Many of the most recently erected Hospitals and Dispensaries have been built without due attention being paid to this well-known and simple fact, and if you walk through their wards or rooms, you will find the windows, in many instances, ending below the level of the ceiling, causing an arrest to the exit of the highest stratum of impure air. Rooms of moderate size may be generally well ventilated by the customary method of opening the window—and as the early morning air in London is generally the purest, perhaps sleeping in a room with the window open about an inch from the top is a wise and healthy custom. In larger rooms, or where there is a danger of draughts, currents of air, etc., Arnott's or Sherringham's ventilators may be used, with the addition of securing a supply of fresh air, at the lower part of the room, by cutting away a portion of the wall near the door, or by making an aperture in the lower part of the door itself, and covering it by means of a slide, which can be worked backwards and forwards as necessity may require. Other plans of ventilation are by means of panes of glass, either perforated or with slits in them, or by plates of glass, moving by means of a rack in the window frame—by perforated bricks—or by opening the lower sash of the window a certain distance, and keeping it open by a block of wood, similar in length to the

lower portion of the window frame, and fitting, by its size, the space left between the window frame and the window when thus opened. Under such circumstances, the air is permitted to enter between the upper and lower sash of the window. Another very easy way of ventilating a room, preventing dust and draught, is to open the lower sash, say four inches, and to have a thin layer of wood or metal (fitting by means of a slit in a piece of wood affixed to either panel of window frame) placed in front of the open portion of the window. This particularly prevents dust entering.

The present method of lighting and ventilating churches by means of the sun-burners, is extremely elegant, and I should think in a great degree, effectual.

The use of an ordinary fire is not simply at all times to keep the temperature up to a certain standard, but to create a current of fresh air in the room,—especially needful in many cases of disease. Stoves with hot air pipes are used in passages of houses and greenhouses for artificial heat, and benefit, in many cases, is derived from having water evaporating from plates placed on them.

The chief points to be attended to in connection with health, in a town residence, are the following, viz., to take care that all the drains are in good order and communicate properly with the main drain or sewer, which latter ought to have a sufficient fall—or sundry inconveniences will ensue; to have the overflow pipe from your cistern well trapped or cut off from the soil pipes; to have the water-closets as far as practicable out of doors, or communicating with the fresh air: and to take care that a constant current of fresh air is circulating from the basement to the summit by having a dormer window, with perforated glass communicating with the open air; so that neither servants or other people can stop or prevent air making its exit or entering according to variations in wind, temperature, or other circumstances. Many times in stables and other places have I witnessed the best arrangements for ventilation by air bricks frustrated by their being filled with hay, etc., to keep in the warm, but vitiated air. Lastly, though not of least importance, care must be taken that the dust bins have no organic matter, either vegetable or animal, thrown and left in them.

LECTURE II.

THE next subject we have to consider in connection with hygiene, is food.

Food is ordinarily required for four different purposes.*

"1st. For the original construction or building up of the organism.

2nd. To supply the loss occasioned by its continual decay, even when in a state of repose.

3rd. To compensate for the waste occasioned by the active exercise of the muscular and nervous tissues.

4th. To supply the materials for the heat-producing process, by which the temperature of the body is kept up."

Of all the various articles of our diet, water is certainly the one which ought chiefly to engage our attention, from its primary necessity to life.

a. From the fact that water either taken alone or drunk as tea, coffee, etc., is of all fluids the one which is most largely partaken of by mankind, and is the best beverage for people in robust health, and for children, milk excepted.

b. From the vast importance that a pure and plentiful supply of water has on the health and happiness of the community.

c. And lastly from the circumstance that by far the larger portion of our bodies is made up of fluids, of which the principal element is water.

Water chemically considered is a compound of oxygen and hydrogen.

The celebrated chemist, Cavendish, first proved that water was the sole product of the combustion of hydrogen gas. He demonstrated the fact by burning oxygen and hydrogen gases in a dry glass vessel when a quantity of pure water was generated exactly equal in weight to the gases which had disappeared.

* Dr. Carpenter's Manual of Physiology.

The most common source from whence the water for our tables and other domestic purposes is obtained, is from rivers; but besides this, the most common source, other supplies of water are obtained from wells.

The water from whence these wells are supplied, may be either from surface drainage, or from water which has percolated through the soil to a considerable depth.

Water obtained from surface drainage should be viewed with suspicion, as likely to contain organic impurities, which by percolation are removed from water obtained from greater depths.

The water we use should be both pure and soft. By being soft we mean free from, or only containing a very small percentage of the salts of lime (either the carbonate or sulphate). To prove the difference in employing hard or soft water for domestic purposes, Monsieur Soyer has shewn that where five cups of tea could be made with soft water, only three cups of similar quality could be made with hard water, from equal quantities of the leaf. Monsieur Soyer also states, that in extracting the juice of the meat, soft water does it well, whilst hard water hardens the fibre, and fails to extract its flavour.

In the above instances, the hardness of the water is due to the presence of the carbonate of lime, which is held in solution by the carbonic acid gas contained in the water. This gas is driven off on boiling the water, and the chalk is precipitated.

Dr. Playfair also has shewn that water with fourteen grains per gallon of hardness, destroys and renders useless a quantity of soap used for washing purposes, equal in value to 16s. 8d. per year to a family of five individuals.

London water is hard from containing salts of lime, which render it less fitting for culinary and more expensive for other domestic purposes, though from the report of the Water Supply Commission, it appears that moderately hard water, the hardness of which is due to carbonate of lime when used for drinking purposes, is not injurious to health; and lime salts may be even useful in supplying lime to the body, as this substance enters largely into the structure of the bones.

Our Water Companies are now obliged by law to filter all water supplied through their mains to the public. The water,

however, even after being so treated, is not at all times as free from impurities as could be desired, especially after heavy rain falls, *the filtration being simply a mechanical process;* therefore it would be prudent if in every house the water so supplied before being used for drinking and other domestic purposes, was again passed through a filter containing a bed of animal charcoal; animal charcoal having the special property of greatly diminishing if not altogether destroying the injurious effects of both vegetable and animal organic matter. The charcoal of the filter should be renewed from time to time; some of these filters are very small and portable.

To prove the advantage of filtering water, the Lancet Sanitary Commission on the 12th June, 1867, says—

That the results of experiments upon the various kinds of filter were the following, viz:—

In a certain amount of unfiltered water there were 30·90 per cent. impurities.

When treated by Danchell's patent filter	..	15·35.
When treated by the Silicated Carbon ditto	..	28·55.
When treated by the Magnetic Carbon ditto	..	28·50.

In a tract on Water, its impurities and purification, published by the London and General Water Purifying Company, in page 64 it is mentioned:—

"That the animal charcoal through which the New River Company's water has passed, has now been in constant use for six months, nevertheless, the amount of organic matter left in the water after passing through the charcoal has only just perceptibly increased. On the 1st of June, 100,000 parts of the filtered water contained ·07 parts of organic carbon, and no organic nitrogen, whilst on the 19th of November, 100,000 parts of the water through the same charcoal contained ·075 parts of organic carbon, and ·002 parts of organic nitrogen."

In cases where we have reason to doubt the purity of the water, even after filtration, it is very advisable to boil it before making use of it as an article of diet.

If the supply of water is not constant, the cisterns we employ for storing it should be easily accessible, frequently cleaned out, and should have no waste pipe from the water-closet communicating with them.

The chief points to be attended to in connection with the water supply in the country, more particularly if it is derived from surface wells, are to ascertain that the water is pure, and not contaminated with sewage, either from the faulty condition of brick drains, or from the leakage of sewage, through the imperfect cementing of the joints of tubular drain pipes, from carelessness on the part of the workmen employed to secure thoroughly with cement each separate portion of the pipes throughout their circumference.

To see that the water is not acted upon by the lead of the leaden pipes, if such are used to convey the water to the cistern of the house.

To take care that the cisterns for storing the water are of sufficient depth, and that the water they contain is kept from the action of light, by the cisterns having covers made for them, perforated with air-holes, light being the most powerful agent in the production of animal and vegetable life.

Finally. To be especially careful that the soil pipes used for the drainage of refuse matter from the house are carried to a sufficient distance from the house, and end in tanks well cemented and ventilated, as far removed from the wells as possible.

I have dwelt somewhat at length upon the arrangements necessary for the filtration, collection, and storage of water, from the immense importance it has upon the health and well-being of the community.

Hippocrates informed us ages since that the spleens of people who drank the water of marshes became enlarged and hard; and in our own time, very many of the most important diseases medical men are acquainted with, diarrhœa, typhoid fever, cholera, etc., have, in very many instances, nay, I may almost say in all, been proved to have been induced from drinking water contaminated with poisonous organic or decaying vegetable matter, such as typhoid, or other excreta. As sanitary science advances, it is highly probable that many other diseases will be attributed rightly to a vitiated condition of the water used as food.

Let us now pass on to consider the most important points in ascertaining if a water is fit for drinking.

The chief points to be determined in the qualitative examination of water for sanitary purposes, are the following :—

It should be colourless. The colour of water is best observed, by placing a flask containing the sample on a sheet of white paper, and comparing it with a similar flask containing distilled water.

Water should be free from smell. For this purpose, an ordinary bottle is three parts filled with the water, covered with paper, and exposed for some days at a moderately warm temperature. The bottle is occasionally shaken, and if an offensive smell is generated, the water may be considered to contain dangerous organic contamination. It should be tasteless and should be free from organic impurity such as decaying animal and vegetable matter.

The presence of organic matter (animal and vegetable bodies, and the products of their putrefaction) indicating recent contamination with possibly dangerous animal or vegetable bodies, or both, from cesspools, sewers, surface drainage, etc., is commonly determined by evaporating about half-a-pint of the water to dryness at 212° F., subsequently heating the residue to redness, and noticing whether the ash darkens or not. If it turns black, there is much organic matter; if brown, little; and if it does not darken, no organic matter. Water, whose residue blackens or browns, should, if possible, be avoided, or at least filtered through animal charcoal and boiled, before being used. In addition to the chemical tests above referred to, the microscope has been used in detecting animal and vegetable impurities.

If the Nitrates or Nitrites were found in water known to be impregnated with organic matter, the water should be condemned for drinking purposes. To detect the former add a solution of Sulphate of Iron and Sulphuric Acid, when an olive coloured zone will be produced. To detect the latter add potassium iodide, acetic acid, and starch paste, to two ounces of the water, if a blue colour is produced, and organic matters are also present, the water is unfit for use.

The presence of ammonia may be determined by distillation and subsequently adding Nessler's test to a quarter-of-a-pint of

the water in a cylinder. Should it produce a yellow colour or brown precipitate, the water should be condemned for drinking purposes.

If chlorides are found in the water, they either come from sea-water, from strata containing chlorides of sodium or calcium, or from common salt, so largely used in curing meat, etc.

The amount of chlorine found in river water has, to a certain extent, been made use of as a measure of the amount of its pollution by the sewage from towns. Thus:—

The Thames was found to contain

in each gallon at Kew	0·847	grains of chlorine.
At London Bridge	4·452	,,
The Rhine at Basle	0·105	,,
,, at Bonn	1·015	,,

The chlorides are more to be dreaded if nitrous and nitric acids and ammonia are found to be present in the same water. To determine the presence of the chlorides, you test for chlorine by means of a solution of the nitrate of silver, added to two ounces of the water in a cylinder. If a white curdy precipitate be obtained in large quantity, sewage contamination may be inferred. This re-action cannot, however, be by itself considered conclusive, as many wholesome natural waters contain chlorides.

As a quantitive test the previous addition to the water of a small quantity of neutral chromate of potash, and the subsequent addition of a test solution of Nitrate of Silver shews the exact amount of Chlorine present; for so long as there is Chlorine the orange red precipitate is readily dissolved. Chloride of silver being white gives no colour, but when all the Chlorine is exhausted the colour of orange red chromate of silver persists.

To ascertain the presence of *lead*, boil a quarter-of-a-pint of the water in a flask, with a few drops of sulphuric acid, and add sulphuretted hydrogen. Should a brown or black colour appear, lead or copper is indicated, and the water should be condemned.

Having finished the remarks on the purity of water, let us now pass on to consider water as a constituent of our bodies.

The greater portion of the body, more particularly in the

earlier period of its existence, consists of fluids, and perhaps the greatest change which takes place in the body during the later periods of its existence, is owing to the consolidation and condensation of its tissues. A grasp of this truth enables us to perceive how impossible it is for us to expect, except in very special instances, the same vigour and elasticity of gait or keenness of vision in the aged, as we witness in those less advanced in years.

Many of the so-called diseases of advanced life, such as impairment of vision, are really owing to natural changes, the eye commonly losing somewhat of its convexity, from the absorption of a small portion of its aqueous humour, the sight consequently needing assistance, to enable it to discern objects as clearly as previously. One hint on this subject may be given, viz., that when sight begins to fail, it is as a rule wise to make use of properly selected glasses; and if on employing the eyes at night, we find the power of vision impaired, it would be well at once to cease from the occupation we are engaged in.

Water, as a remedial agent, has been used with excellent effect in the treatment of many diseases in the form of simple water, ice, or vapour.

It is impossible for me to describe the properties or therapeutical uses of chalybeate and other mineral waters in this lecture.

Hydropathic establishments have been specially arranged for the treatment of certain diseases by the agency of water; in many instances with decided benefit, though perhaps the simplicity of diet, early hours, and abstinence from alcoholic stimulants, may have powerfully contributed to the successful termination of the disease.

I cannot conclude my remarks on water, without mentioning some circumstances in connection with bathing, which deserve attention.

In these days, however deficient the accommodation for bathing may be in private dwellings, baths at a trifling cost may easily be obtained by all classes of the community. We must, however, never forget, that although it is absolutely necessary to keep the skin clean, for the purpose of enabling it to allow the perspiration

to pass (as much as two pounds of fluid evaporating from its surface during the twenty-four hours, under certain conditions of the atmosphere), still the skin may by too great ablution, especially if this be assisted by certain kinds of soap, be rendered so irritable as to cause disease. Friction with a good rough towel or flesh brush, in many instances, will act as well or better than a bath in keeping the skin in a state of health. If, however, a cold bath is employed, the skin should be rapidly dried by means of a good rough towel, and the clothes quickly put on. Aged people should be very careful to keep the skin clean, but not allow it to be chilled.

In continuation of our subject our next remarks must be on other articles of food, and these will be made chiefly with reference to those articles of diet, commonly met with on our tables. To enter into a detailed account of the means by which the purity of each article can be guaranteed, would far exceed the limits of this lecture: suffice it to say, that since the passing of the Act of Parliament with reference to the adulteration of food, our tea, coffee, bread, sugar, butter, milk, etc., are much less likely to be tampered with than formerly, though even now besides the special tests used by Analytical Chemists for investigating the purity of our food supply, the eye, the nose, and the tongue are the best agents in aiding the good housekeeper in the proper selection of food. We ought not in fairness, however, to forget that from ourselves probably in a great degree has arisen the temptation to the tradesman for selling adulterated articles, from the wish we all, more or less, have of purchasing cheaply, and from the custom of lengthened credit, although in other instances no doubt the desire of an exorbitant profit influences the tradesman in selling an adulterated instead of the genuine article.

The above remarks have been recently verified from the results known to have arisen from the competition excited by endeavouring to secure Workhouse Contracts at a price far below the market value of the genuine goods tendered for. Thus tea has been supplied at a very low figure, which, on microscopic examination, was found to have been previously used; in other words, spent tea had been purchased. Perhaps one

of the greatest uses of the Adulteration Act will be to educate people as to the proper value of the various articles of food they purchase. As articles of diet, both tea and coffee are in my opinion very wholesome, and although people are said to be doing wrong when they have an afternoon cup of tea, I do not see the force of the observation, and I have yet to learn that any harm can result from such a practice. Of course if taken in excess, these articles of diet, may, in people of certain constitutions, lead to disease, many persons suffering very severely from nervousness producing inability to sleep by taking tea late at night. As regards bread, meat, butter, etc., I shall say but little, except that the bread may be too white from the inner portion of the outer covering of the wheat having been taken away, rendering the bread whiter, but less nutritious from the absence of the phosphates. Alum, the presence of which in bread has given rise to so much discussion in the public press lately, is added to bread for the purpose of passing off an inferior quality of flour for one of superior value, the alum increasing the whiteness of the bread. For health, bread which does not present too white an appearance is as good if not better than bread made from the whitest flour.

Milk alone, of all the various articles of our diet, serves for the healthy nutrition of our bodies at all periods of their existence; containing as it does "caseine" (a body having nearly the same composition as flesh) fats, and milk sugar; together with those inorganic salts, especially the alkaline chlorides and calcium phosphates, needed, as Roscoe tells us, for the formation of bone. The specific gravity of milk should be 1030. The quantity of cream about 13 per cent.

With reference to meat the great point to be attended to is that it should be thoroughly cooked, destroying all living organisms that may possibly be in its tissue. This remark applies more particularly to pork, many diseases having resulted from eating it when underdone. As an instance of this, I will make an extract from the "Times" of the 4th of March, 1874. "At the town of Forst, in Germany, twenty-two people have been attacked with Trichinosis through eating the flesh of a pig killed by an hotel keeper. The cook and the hotel keeper

have both died, the body of the former was found full of living Trichinæ. Several other people were, on February 24th, dangerously ill, and new cases were under notice."

Certain kinds of meat and fish are known to exert poisonous effects on particular individuals. I need only mention the rash or sickness produced from eating shell-fish.

There has been a great deal written lately about wine, its varieties, adulterations, and upon the advantage or disadvantage resulting from its use.

I need not say a long treatise might be written on this subject, and of course I cannot in the space of time allotted to these lectures do more than express my own views with respect to the importance of taking or abstaining from alcoholic beverage.

We read in the Bible that wine was given to cheer the heart of man. Herodotus in his book (Euterpe ii. 77), states that the Egyptians used wine made from barley (*οἴνῳ δ' ἐκ κριθέων πεποιημένῳ διαχρέωνται*). Larcher in a note on this passage says, "As wine was scarce in Egypt, at least in that part allotted to the culture of grain, the people substituted for it a drink made from barley, and which for this reason I have called beer.

"The hop plant being unknown in that country, the Egyptians added portions of the chervil, and the lupin, which gave it a bitterness, besides other roots, etc.

"Diodorus Siculus also informs us that the Egyptians made from barley a drink which was called zythus, the agreeable odour of which was little inferior to wine. Æschylus has alluded to the same beverage in his tragedy entitled Supplices, as well as Hecatœus of Miletus, both of them anterior to Herodotus."

The following Extracts from Tacitus (Germania c. 22, 23) allude to beer, and prove the antiquity of this beverage, and the propensity for it which has always been found wherever the conditions of climate permit of its being produced.

1. "Diem noctemque continuare potando nulli probrum."

2. "Potui humor ex hordeo aut frumento in quandam similitudinem vini corruptus."

3. "Adversus sitim non eadem temperantia. Si indulseris ebrietati, suggerendo quantum concupiscunt, haud minus facile quam armis vincentur."

This refers to the Germans. The second extract proves the antiquity of beer, whilst the first and the third will shew that the propensity for it has always been found along with it, no matter in what country.

We have every reason to believe that stimulants have been used in our own country under one form or another from time immemorial. In the middle ages our forefathers were noted for their good living, and in my opinion, if they had not done so, the death-rate would have been very largely increased from the great ignorance and neglect of sanitary laws which must then have existed.

In "Notes and Queries," quite recently, a story is told of Dr. Fuller, who preaching about the year 1652, advocated moderation in fasting in these terms: "A noble lady, whose religious life is lately printed, a few hours before her death, being in perfect mind and memory, called for a cup of wine, and spoke to her kinswoman, 'If God,' said she, 'restore me to my health again, I will never macerate my body so much to disable it as I have done by my fasting.'"

A somewhat similar story is told by Robert Grosseteste the great Bishop of Lincoln, who died in 1253. To a friar troubled with melancholy he enjoined as a penance to drink a cup full of the best wine, and when it had been drunk very unwillingly, he said to him, "Dearest brother, if you frequently had such a penance, you would have a much better regulated conscience." This is quoted from Eccleston, in the preface to Grosseteste's Letters by Mr. Luard.

Many instances of individuals who from their earliest years have refrained from taking wine, owing to their dislike to stimulants, are of course known to all of us. In a state of health, in our own climate, speaking broadly, I think the moderate use of beer, or a small quantity of wine assists the digestion, promotes the circulation, and stimulates to healthful exercise all the various functions of the body.

In stating the above, I am aware I differ in opinion from some very eminent medical men, who consider that wine lowers the temperature of the body. There may be some truth in this as regards wines under certain conditions of temperature, though

I think the experience of the mass of mankind would be against the fact.

Although it is an interesting and curious fact that in several whaling expeditions crews have abstained entirely from alcoholic drinks, still, stimulants of varying alcoholic strength are used by civilized populations, according to the temperature of the countries inhabited, instead of eating a large quantity of fatty and oily food. In Northern climates, such as Scotland, Norway, Sweden, and Russia, strong alcoholic beverages are used. In more temperate climates, drinks of a less alcoholic strength are preferred by the people; whilst in the hot climates of the South, wines of less potency, and containing a greater proportion of acid, are sought for.

In the hot countries of Asia, the water drinking habits of the people have been of very long standing, and are upheld by their religion.

At the present time my conviction is, that a certain amount of discredit undeservedly attaches to good port and sherry, from the idea that they contain a larger percentage of alcohol than is absolutely necessary.

The following remarks on the preparation of these wines have been kindly forwarded to me by Mr. Coates, Jun., of Baker-street:—

Pure wine is the fermented juice of the grape. But for the production of fine wine possessing keeping qualities, and likely to improve as it grows older, many things are necessary. In wine-growing countries, where of course wine is the usual beverage of even the working people, many wines are produced, which are only fit to be drunk on the spot and shortly after they are made. The longer the wines are kept the worse they become, and as they will not travel, it is impossible to export them to other countries. The reason of this is that they contain an excess of albuminous matter, of water, and of acidity. The grapes from which they have been made were deficient in sugar, and sugar is the source of alcohol in wine. The seasons are constantly varying; and as in our own country we do not every year have an abundant and good harvest, so in the wine countries, they do not always have a fine vintage. It is an old saying, that drought

never caused dearth in England; our harvests are chiefly dependent upon fine weather and plenty of sun light; so it is with wine, a fine vintage is produced by fine weather and plenty of sun light to ripen the grapes. So dependent, indeed, are the vine growers for the production of good wine upon all the heat they can get to ripen the grapes, that in the countries where vineyards are treated in a scientific way, and the greatest amount of knowledge is brought to bear upon grape growing, the vines are always trained low, so that the grapes may derive all the heat that radiation can produce. In many countries, especially where white wines are made, the grapes are allowed to hang upon the vines until they are ready to decay and look like raisins; this also is done to increase the saccharine matter of the grape, and in fermentation the consequent increased alcoholicity of the wine. The ripeness of the grape, and its greatest sugar-producing power being the most important feature in the production of a fine wine. We may now pass on to the other constituents of the grape. The weather may be too dry, and the grapes will not swell unless there is sufficient moisture, the skins will be thick, and the grapes undeveloped. A sufficiency of rain to cause the grapes to grow to their full size is essentially necessary, but this is wanted before the grapes have quite arrived at maturity. During the vintage rain is always dreaded, as it makes the wine watery and cold, and reduces the strength of the wine. Cold weather and a long continued absence of sun will prevent the grapes from ripening; this will cause unripeness, and unripe grapes will only make sour wine, the grape then containing too much malic acid and too little tartaric acid, the latter only *being found in ripe grapes*, only a trace of malic acid existing in wine which has been made from perfectly ripe grapes. A cold summer will also cause a late vintage, for the vineyard proprietor finding his grapes not yet ripe will delay gathering them, and thus the vintage is more likely to be made in bad weather. Genial weather, an absence of late spring frosts when the vines are budding, plenty of sun light, a moderate supply of rain at the right times, and a hot summer, are necessary to produce fine grapes, and to give hopes of a good vintage.

But now the wine makers' work commences, and a successful

fermentation has to be brought about, and this is a process which has to be watched and due precautions have to be taken.

First of all what is fermentation?

"Fermentation is a term used to express that chemical change, taking place in an organic substance which is capable of being transferred to another organic body, from which various products, some of them in the form of gases can arise."

In addition to water acids and sugar, the grapes contain albuminous matter and vegetable gluten, which being exposed by pressing to the action of the atmosphere become the active forces of fermentation; and the sugar of the grape by these forces is transferred into alcohol.

Shortly after pressing the liquid appears to be in motion and little air bubbles rise to the surface; fermentation has begun; the juice not quite clear at first becomes more turbid, the motion of the liquor increases, and froth is formed on the surface: the gas bubbles become larger, the consistency of the liquid decreases, as do also its saccharine contents. In place of these, more and more alcohol is engendered, and the liquid, originally watery, and now enriched with alcohol to a greater or less degree, can no longer retain in a state of perfect solution various matters which it previously held in that condition. Fermentation reaches its highest point with greater or less rapidity, according to the temperature, in a moderate climate it generally occurs in from three to four days.

After some days the whole mass reaches its highest point of effervescence, and at this it remains for three or four days more, it then begins to diminish, and by forming a precipitate at the bottom allows the wine to become gradually clearer.

The wine is now removed into another vessel, the sediment being left behind. Fermentation continues, but more quietly, and this is called after-fermentation. Sugar is constantly being converted into alcohol and carbonic acid, and a fresh precipitate is continually forming and depositing itself at the bottom.

After the wine has undergone this after-fermentation for several months (and the fermentation generally increases again during the next spring at the time when the vine blossoms, that is, when the warmth of the air excites fermentation again) and

has been drawn off from time to time into other vessels, in order to free it from the sediment which has been continually forming, it is transferred into casks in which it can be exported. We see, therefore, that the conditions necessary to the fermentation of wine are the presence of water, sugar, and an albuminous matter in an actual state of change, acted on by atmospheric air, at a temperature moderately high.

The production of a fine vintage of the ripest and richest grapes having thus been turned into wine by the process of fermentation contains within itself the germs of corruption; in fact, if during and after fermentation these germs had not been carefully watched by the wine maker, and their growth prevented, the wine would never have been brought to a high pitch of excellence, but would have worn itself out in the process of making. The action of the air at a high temperature is constantly tending to convert alcohol into acetic acid. Tannic acid which is also an ingredient of the grape is an agent which retards this process. In all wine it is almost impossible to exclude unripe grapes, and the malic acid is a strong destroyer of wine. *Fermentation is stopped in strong wines by the amount of alcohol produced, before all the sugar contained in the grapes is turned into alcohol.* No fermentation, however lengthened, can alter this sugar when the liquid has become too rich in alcohol, so that the fermenting matters coagulate and become insoluble, and therefore inert. Experience teaches us that if the amount of alcohol has during fermentation fully reached to 20 per cent. by volume, this may be considered as a maximum, after which fermentation is impossible. All sugar which is left remains undecomposed since the albuminous matter has lost the power of exacting fermentation in the strong alcoholic liquid.

But notwithstanding the albuminous matter has lost its power of turning this excess of sugar into alcohol, it does not follow that it has ceased to exist, and as long as albumen is to be found in wine it is constantly exerting fermentation at changes of temperature, and setting up the principle of decay. Wine in this condition left to itself runs into vinegar, and the wine maker regarding this as his arch enemy has to resort to measures to keep his wine from turning sour.

It must never be forgotten that wine is not spirit. It is the presence of these contending natural products each warring as it were against the other, which if kept in proper subjection grow and mature into wine, possessing strength, flavour, and bouquet. These changes are constantly going on, and out of these changes are developed the ethers, which give the distinctive character and aroma to fine old wine. But if during the first few years after the vintage the fermented grape juice was left to itself, it would develop none of these fine qualities. The wine would become diseased in many ways, either by the conversion of alcohol into acetic acid by oxidation; or by the development of mould plants on the surface of the wine; or by the decomposition of tartar by which the tartaric acid is changed into carbonic acid; and decomposition of tannin acid ensues, which if not stopped causes putrid fermentation to set in. There are two ways of treating the fermented grape juice to prevent these diseases from developing. One is the exposing the wine to the fumes of sulphur, the other is by addition of spirit. The sulphur process is applied to wines grown in comparatively cold climates as the French wines of the districts of Champagne, Burgundy, and Bordeaux, the wines of Germany, Hock and Moselle, and the wines of Austria and Hungary. These wines are rich in acids, tannin, and all the properties of the grape for the production of high flavour, but from the deficiency of sun power they contain but little sugar, and therefore in the course of fermentation the sugar has all or nearly all been converted into alcohol. But in warmer climates where the sun has greater power and the grapes are richer in sugar, fermentation ceases without all the sugar being converted into alcohol, and in this case the treatment by sulphur fumes is not efficacious in preventing putrid fermentation. *Spirit which ought only to be grape spirit distilled from wine* must be added to prevent the excess of sugar from constantly setting up a deleterious after-fermentation. These are the two methods which for ages have been used in the countries to which they are respectively adapted. The sulphur treatment when the wine abounds in acids and is deficient in sugar. The spirit treatment where the energy of the sun light has produced grapes abounding in sugar. In Europe the countries where this treatment is

adopted, are Spain, Portugal, Italy, Sicily, and the South of France, bordering on the Pyrenees, and in this way fine Madeiras have always been prepared. These may be considered as the two scientific methods of preventing putrid fermentation.

In some countries other methods are resorted to, but they are never entirely successful, and give bad flavours to the wines. Greek wines spoil easily because they are prepared badly. In order to prevent them from becoming acid, which they do very easily, pitch and gypsum are added to them and hence they are often called pitch wines. The pitch is used because the combustible oil (creosote) hinders chemical decomposition.

It is to counteract the action of the albuminous substance which remains in all wines, and which is constantly renewing its action at every change of temperature that these different methods are necessary, and the experience of ages has proved them to be beneficial.

But it may be said, it would in the case of the strong wines of the South be equally efficacious to neutralize their excess of sugar by the addition of water, and by so doing carry on the fermentation until all the sugar has been turned into alcohol. This is quite true, but this is virtually reducing a fine vintage to the level of a vintage of an inferior character. The wine so prepared might keep. The wine maker would vastly increase the quantity of his wine, but the quality would become deteriorated, and the wine would never develop in a high degree those ethers, upon which depend the beauty of the wine when developed by age, produced from the grapes of the most noted vines, grown under the most favourable circumstances as regards position, climate, soil, and sunshine.

But all years are not great years such as we have described, and in bad years the harmony in the constituents of the grape is not preserved. The grapes may have been gathered without getting ripe, and their acidity has to be neutralized. In Germany where the cold is always great, and from the absence of sun during the time which elapses from the flowering of the vine to the vintage many of the years are failures; sugar and water are added to the must to neutralize the acidity, and this being done at the time of fermentation, the sugar is converted into alcohol,

and the keeping power of the wine is increased. The quantity is also largely increased, but the quality is very inferior. This may perhaps be regarded as the most innocent form of adulteration, if adulteration in any form can be called innocent. This certainly cannot be called pure wine, if pure wine is only the fermented juice of the grape.

This brings me to the subject of manufactured wines, and the countries where the greater part of the spurious wines are produced, are France and Germany. Cette is the emporium for the manufacture of these wines in France, and Hamburg in Germany.

Cette is a seaport on the Southern Coast of France, facing the Mediterranean; it is situated on the borders of the light wine districts of France, and the strong wine districts of the extreme South of France and the North of Spain.

The Herault produces a vast quantity of wine of inferior quality, which easily turns into acetic acid, and by itself will not travel. A great deal of this wine is burnt for brandy, and Bezier, a large town in the Herault, is a great brandy centre; but by mixing these Herault wines with the stronger wines of the South, and by using chemical means to neutralize their acidity, a flat liquid is produced at a very low price, which is largely used for adulteration, and often finds its way even to Bordeaux, to enable the cutting merchant to export claret (so called) at a lower price than that at which the genuine production of the Gironde can possibly be sold.

The manufacturers of spurious wines at Hamburgh, chiefly restrain their activity to the production of so-called Hamburgh port and sherry. These wines are made by mixing spirit produced from the distillation of potatoes, Elbe water, and very inferior German and Hungarian wines, with different flavouring essences. They can be sold at exceeding low prices, and are largely used in England for mixing with real port, sherry, and Marsala, and causing a great reduction in their cost; they can be sold at a low price, and at the same time afford a fabulous profit. This is adulteration of the worst form.

To sum up the purport of my remarks on wine as an article of food I would only say, that the addition of anything to

pure wine, the fermented juice of the grape, to increase its quantity and reduce its quality, is a very different thing to resorting to methods of treatment which are necessary for the preservation of the wine itself, and which have been the methods used in the different wine producing countries from very ancient times, and have been used only because they have been found to be efficacious and necessary. In the one instance the production is an article which all gourmets can appreciate, which has a high market value all over the world, which gives health to the invalid and increased vigour and power to the strong man; in the other instance an article is produced for the purpose only of deception, which is avoided by the connoisseur with dread, and is not only disappointing in the effect produced on the invalid, but is deleterious in its very nature.

Clarets are generally pure, speaking from a medical point of view, very good, and excellent wines; their alcoholic strength, however, varies considerably, being greatest in the best years. We have another somewhat expensive though very delicious and useful wine in champagne. After fatigue a few glasses of this wine at dinner speedily takes off the feeling of lassitude which otherwise would exist.

Notwithstanding the feeling raised at the present time against the use of wine, beer, and other alcoholic liquors, by a well-meaning portion of the community, and however one may deplore the abuse of stimulants, and regret the evil results of excess, still in my opinion the use in moderation of beer, wine, and spirits is absolutely needed in this variable climate by the poorer classes, and must be so whilst they reside in such miserable homes, are so scantily clothed, imperfectly nourished from ill-dressed food, and suffer so much from exposure and the anxieties and cares of life.

The good effects of stimulants have been so frequently seen by the profession in the treatment of disease that I cannot in justice allow this opportunity to pass without expressing my conviction that a great deal of the present outcry against stimulants is owing to the adulteration of beer supplied to the poor, and the hasty way in which cheap new wine has

been drunk by the middle classes, before it has had time to mature.

The chief points to be attended to in diet are to take a sufficient supply of nutriment for the requirements of the body, without allowing the quantity taken to oppress and render it incapable of fulfilling its duties.

The next subject I must touch upon is warmth. The body in a state of health has a certain fixed temperature of 98° Fahrenheit, and this temperature is maintained whether an individual be at the Arctic or at the Torrid zone. Animal heat is produced chiefly if not altogether by the chemical changes effected in the blood by respiration, and by the transformation of the food into the various tissues of the body. It is for the purpose of keeping the temperature of the body at its normal standard, that so much and such varied food is required. Much larger quantities of heat-producing food in the form of fat and other oleaginous substances are necessary in cold climates. It is from the inability on the part of the poor to purchase extra food, fuel, and clothing during the winter season (when an extra call is made upon their systems by the lowering of the temperature) that so much suffering and distress arises. In infancy and old age it is of the very greatest importance to keep up the temperature of the body, in the former case from the very rapid changes going on in the system, in the latter from the lessened activity in the circulation, respiration, and other functions of the body. With respect to clothing it is most important to remember that in a state of health the body is to a greater or less extent constantly giving off moisture. It is from a recognition of this fact that flannel garments are now so constantly worn both in the winter and summer seasons, flannel being a non-conductor of heat,—preventing the surface of the body from being chilled by sudden alterations in the temperature of the atmosphere. The dress of people should be such as befits the climate they live in and their respective duties. All articles of clothing preventing the escape of vapour, such as India rubber goloshes, waterproof overcoats, etc., are, I think, unhealthy and injurious. If you are in the habit of wearing waterproof overcoats, you will frequently find them quite moist inside from the retained per-

spiration of the body, and this I think may frequently cause rheumatism. All close fitting garments of these descriptions are therefore to be avoided, but the policeman's cape is useful because it throws off the rain, and allows much air to get underneath it. Boots made of porpoise hide, with strong soles, will keep out almost any amount of wet. If on getting damp we at once change our clothes on our return home, taking care to warm the feet, no great harm will result. Ladies should carefully avoid wearing the high heeled boots just now so fashionable. Such boots if worn will certainly prove a source of great annoyance and discomfort, from the pressure to which the fore part of the foot under such conditions is subject. Our ancestors wisely discarded them. In my opinion elastic sides to the boots are a source of inconvenience, from too tightly pressing upon the ancle, retarding the circulation of the blood, and keeping the feet cold.

No pressure from any article of clothing should be allowed around the waist, as any pressure there must interfere with the functions of circulation, respiration, and digestion. In the ancient Grecian statuary the waist of the female figure is not contracted. All coloured articles of dress, unless proved to be free from mineral poisons, should be carefully avoided.

Mental and bodily exertion.—The first of these topics at the present time is not likely to be allowed to slumber; and as we in England are very apt to run from one extreme to another, our very negligence in past years on the subject of education is just at present likely to lead us to the opposite extreme.

There is, however, very much to be said in praise of the great efforts now being made to atone for past deficiencies in the education of the young of both sexes, and if the present system of instruction were carried out with some modification of the existing laws and regulations, much more good would in all probability be effected. Religion ought certainly not to be a voluntary part of the education of the young, it ought to be regularly taught, and no masters ought to be engaged but such as are well qualified, not only by their intelligence to occupy the position, but also by their persistent and high moral character, to improve and greatly influence the character of the young committed to their charge.

Is it not the case at present that pupils in schools who ought to be well instructed in the bible and religious knowledge, know less of them than of the three "Rs.," and does not this depend upon the circumstance that a knowledge of the latter is rewarded by the government Inspector with an increased grant to the school, whilst no pecuniary reward is attached to the former.

People ought no doubt to cultivate the intellect, but the intellect should be kept in subordination to those higher Christian virtues, without which the highest intellect may become a source of danger to its possessor.

Is it not from this cause that we find it so difficult now to get good domestic servants?

I am not at all sure, that in the present day, the very keen intellectual competition which exists amongst people of all classes, does not tend in many cases to break down the minds and nervous systems of young people, who would otherwise have been useful in their generation. It is not possible to be thrown into any society without at once recognising a marked difference in the brain-power of the various persons with whom we come in contact. To attempt to raise every mind to a certain standard, and obtain courage, determination, and self-denial from mathematics, classics, and modern languages, is an impossibility.

Exercise.—The most healthy exercise is walking. If however an individual not very strong suffers from delicacy of chest, and has pecuniary means, horse exercise is of all other kinds the best, and especially so for elderly and corpulent people. Railway travelling may be beneficial as a means of varying the thoughts and changing the scene, though I consider it prejudicial to health, unless plenty of time be allowed for catching the train, and that refreshment and rest are not interfered with by the journey. A sea voyage is most healthful in certain disorders of the system.

In reflecting on the circumstances relating to hygiene of which we have been speaking (viz., the condition of the atmosphere, light, the purity and impurity of water, and various other topics), let us always remember that the laws of health have been founded and are based upon facts proved by patient

investigation, long experience, and increased knowledge. Dr. Lyon Playfair says: "Health is the state of normal obedience to the law; disease the penalty of its infringement. In consequence of this disobedience our kingdom has ruthlessly sacrificed 110,000 lives every year, whilst 220,000 people are needlessly sick all the year round. And why? Because neither our rulers nor our people will become acquainted with and obey simple sanitary laws. No epidemic can resist thorough cleanliness and ventilation."

Do not let us ignore the higher part of man—the soul, for what can the best sanitary enactments achieve towards keeping the body in a state of health if the soul allows the body to drag it down by gluttony and excess of every kind to a state lower than even that of the brute creation, instead of ruling and keeping the body in a state of subjection to the laws of order and health.

In concluding these lectures on hygiene, do not let one word I have said deter you from making the use of those faculties with which you have been endowed, to attain that amount of knowledge which in after life will be of the greatest use to you; as Horace says, "Carpe diem." Seize the present opportunity, observe, learn, and try and retain the knowledge you have gained, from having grasped the subject at which you have been labouring. It is not so much the amount of knowledge you may have had given you by others that will be serviceable to you in after life as that which by patient study you have made your own.

You will by these means have improved your faculties of observation, memory, etc., and have obtained such a power of application as will enable you to grapple with those difficulties which are sure to meet you more or less in your future career through life.

From my own observation, I feel satisfied that happiness is very evenly balanced even in this present world, and as a rule it may be said with truth, if only we will be humble, obedient, loving, patient, moderate in our appetites, contented with our condition, and satisfied to do the work which the Almighty has been pleased to call us to, we shall be blessed with health of mind and body.

The medical profession are now quite alive to the necessity and importance of preventing disease as well as of attempting to cure it; and rarely can the remark made in the Cyropœdia of Xenophon be applied to medical men of the present day, that "Physicians who only treat the sick are compared to menders of old clothes, while the preservation of health is declared a noble work worthy of Cyrus himself."

The true Physician takes now for his rule of conduct the words of Lord Bacon, "And this we hope might redound to a general good, if Physicians would but exert themselves and raise their minds above the sordid considerations of cure; not deriving their honours from the necessities of mankind but becoming ministers of the Divine power and goodness both in prolonging and restoring the life of many, especially as this may be effected by safe, commodious, and not illiberal means; though heretofore unattempted, and certainly it would be an earnest of Divine favour if while we are journeying to the land of promise, our garments, those frail bodies of ours, were not greatly to wear out in the wilderness of this world."