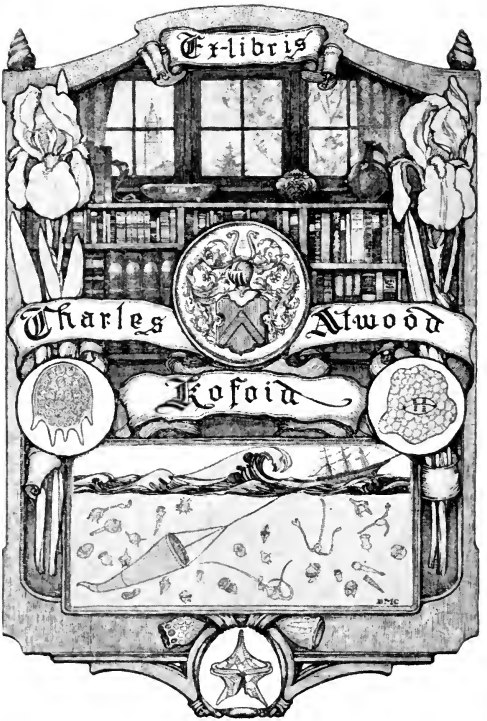
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OBSERVATIONS

ON THE

MINERAL WATERS

OF

Western Virginia.

BY

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Dedication.

To the Invalids visiting the Mineral Springs of Western Virginia, this little Work is especially Dedicated, with the ardent hope of the Author, that the advice and suggestions it contains may accrue to their lasting benefit; and that his future efforts in the cause of suffering humanity, under the guidance of an All-wise Providence, may be crowned with universal success, and finally end in the promotion of the health and happiness of his Fellow-Creatures throughout the whole civilized world.

Introduction.

It has been wisely observed by some great philosopher, that life is a fountain, fed by a thousand streams that perish if one be dried; or it is a silver chord twisted with a thousand strings, that part asunder if one be broken. What frail and thoughtless mortals are we thus constituted. We are constantly surrounded by innumerable dangers and difficulties, and every step we make we are encompassed with accidents ever ready to crush the mouldering tenements that we inhabit. The seeds of disease are planted in our constitutions by the hand of Nature. The earth and the atmosphere, whence we draw our life, are impregnated with death. Health is made to operate by its own destruction. The food that nourishes the body con-

tains the elements of its own decay. The soul that animates it, by the vivifying fire, tends to wear it out by its action, and death constantly lurks in ambush along our path and is ever ready to assail us. Let us, then, by way of illustration, endeavor to take a farther view of the various functions of the animal economy, and see how far we can comprehend the mysterious operations of Nature; and hence the following extracts about the formation of the human body are well calculated to excite our astonishment and reflect much light on these important and highly interesting subjects. We subjoin the following facts about the human body:

"It seems that there are about two hundred and forty-six bones in the human body. These bones are composed of animal and earthy materials, the former predominating in youth, and the latter in old age, rendering the bones brittle. The most important of the bones is the spine, which is composed of twenty-four small bones called the vertebræ, one on top of the other, curiously hooked

together, and fastened by elastic ligaments, forming a pillar, so to speak, by which the human frame is supported.

"The bones are moved by muscles, of which there are more than five hundred. The red meat of beef, the fat being excluded, is the muscular fabric of the ox. There are two sets of muscles, one to draw the bones one way and another to draw them back again. We cannot better describe the muscles, than by comparing them to fine elastic threads, bound up in their cases of skin. Many muscles terminate in tendons, which are stout chords, such as may be seen traversing the back of the hand, just within the skin, and which can be observed to move when the hand is opened or shut. Every motion we make, even the involuntary one of breathing, is performed through the agency of the muscles. In adults, there are about fifteen quarts of blood, each quart weighing about two pounds. This blood is of two kinds, the arterial and veinous. The first is the pure blood as it leaves the heart to nourish the frame, and is of

a bright vermillion color. The last is the blood, as it returns to the heart, loaded with the impurities of the body, to be there refined, and is of a purple hue. Every pulsation of the heart sends out about two ounces of arterial blood; and as there are from seventy to eighty beats in the minute, nearly a hogshead of blood passes through the heart every hour. In fever, the pulsations are accelerated; the waste of the body goes on faster than it can be recuperated; and, consequently, death ensues if the fever is not checked.

"The stomach is the boiler, if we may use such a figure, which drives the human engine. Two sets of muscles, crossing each other transversely, turn the food over and over, churning it up in the gastric juice, till it has been reduced to the consistency of thin paste. This process requires from two to four hours. Emerging from the stomach, the food enters the small intestines where it is mixed with bile and the pancreatic juice and converted into chyle. These small intestines are twenty-four feet long, closely packed of course,

and surrounded through their whole length, with small tubes, which act like suckers, and drawing off the chyle, empty it into a larger tube, named the thoracic duct, which runs up the back, and discharges its contents into the jugular vein, whence it passes into the heart, to assist in forming arterial blood.

"The lungs are two bags connected with the windpipe, which branches into innumerable small tubes, all over the inside of the lungs, each tube terminating in minute air cells. The other surface of these air cells, is full of capillaries, or infinitely small veins, a thin membrane only dividing the air from the blood. The impure portion of veinous blood is carbonic acid, which having a stronger affinity for air than for blood, passes through this thin membrane, in a gaseous state, combines with the air in the air cells, and is expelled with the next expiration. Meantime the oxygen of the air unites with the blood, and becomes purified; then passing into the heart, being

mixed with the chyle, it is forced through the body as life-giving and arterial blood.

"The skin serves an important purpose in carrying off impurities from the human system. It is traversed with capillaries, which contain more blood in the aggregate than all the other capillaries of the body. It is also perforated with countless perspirative tubes, the united length of which is supposed to amount to twenty-eight miles, and which drain away from three to four pounds of waste matter every twenty-four hours, or five-eighths of all the body discharges. The nerves are another curious feature of the animal economy. They are, however, but little understood. They act as feelers to tell the wants of the body, and also as conductors to will the muscles to act. They branch out from the brain and spine over the whole frame in infinitely fine fibres, like the branches and twigs of a tree."

I might go on with these discursive remarks still farther. I might call your attention to the

phenomenon of electricity which is constantly going on and generated in the human system; and let us turn which way we will, we see but little to console us. We see hardly anything but misery and dissolution around us, and with declining years we are yielding to that stern decree by which the family of man are doomed to bid farewell to this world.

OBSERVATIONS

ON THE

Mineral Waters of Western Virginia.

At the earnest and repeated solicitations of many of the visitors at the different Springs, I have at length reluctantly consented to publish a small Treatise on the Mineral Waters of Virginia; and permit me to assure the reader, in the language of sincerity, that in complying with this request, and assuming the great responsibility, I shall endeavor to abstain from every thing of a personal character, and from every thing calculated to wound the feelings of the most sensitive individual. But at the same time, while I profess to discuss these subjects upon scientific principles, I

shall consider it my duty to express myself freely, fully and candidly; and, with these prefatory remarks, I shall proceed at once to the accomplishment of the great objects which I now have in view.

There is no department of Medical Science, connected with the cure of diseases, of such paramount importance as the one we are about to consider; and our comparative success or failure must depend, in a measure, on the degree of knowledge which we may possess, together with the information acquired by perseverance and close and discriminating observation. It has been wisely observed by some great physician, that those principles which form the basis of successful practice are not wholly the results of scientific investigation, and that art or skill is equally necessary to make every thing available to our purpose. Being deeply impressed with these important facts, I commenced my Mineral Water researches more than twenty-five years ago. At the time I issued my prospectus for publishing a book, I little expected to have been engaged so long in this arduous under-

taking; nor did I expect to have met with so many appalling difficulties. I knew full well, that to acquire an experimental knowledge of all the different mineral waters in the mountains would require great sacrifice of time and labor, and to all this I have submitted without one murmur or complaint, as the task has been made comparatively easy by the kindness and liberality of the proprietors and visitors of the different Springs; and had I no other encouragement to brighten my hopes and cheer me on, the liberal encouragement which they have given me would be sufficient to call into action all my dormant powers and energies. And no matter whatever may be my future destiny, whether basking in the sunshine of popular favor, or passing down the rapid current of adversity, it will always afford me pleasure to reflect upon the many acts of kindness which I have received at their hands; and permit me to assure them, on this occasion, that I will long remember them with the most heart-felt gratitude.

I shall now pass on and endeavor, in a brief manner, to give you some general idea

of my mode of acquiring an experimental knowledge of mineral waters, both in health and disease. My first and great object was to make them subservient to the healing art, and in order to accomplish this, by the aid of pulse-glasses, I could ascertain pretty nearly what effect a certain quantity of water would have on the system, by examining the variations in the pulse. These glasses are so constructed, that by holding one in the hand, you may perceive the ebbing and flowing of the fluid it contains, occasioned by the pulsations and vibrations of the heart and arteries; and, by the aid of the sand-glass, you will be enabled at once to ascertain how many strokes the pulse beats in a minute. I knew full well, that the use of these agents had a salutary effect in stimulating the appetite and essentially aiding the digestive organs in extracting the nutriment of food, and that their judicious use had in many instances mitigated, if not wholly cured, some of the most dangerous maladies. But to explain the phenomenon, and to demonstrate more satisfactorily the operation of the different waters on

the human system, it became absolutely necessary that I should watch their effects more minutely on the skin, lungs, liver, bowels and kidneys; and this I have done every summer, for more than twenty-five years in succession, acting more in the capacity of an itinerant physician than a resident one; and having no pecuniary interest in any of the springs, my experiments and observations have been impartially made and extended to all of them, without partiality or favoritism. But do not understand me, in making these remarks, as wishing to detract in the slightest degree from the merits of resident physicians—far from it—for I have always entertained the highest respect for them, and believe, in many instances, they have done a great deal of good in the cause of suffering humanity. But I think traveling physicians, who have an experimental knowledge of all the different waters, and who were appointed by the government, would be a powerful auxiliary in correcting the abuses of these remedies, and in promoting the reputation of the waters and restoring the health of the invalid. Let us,

for example, see how this practice would operate on the different watering places.

A traveling physician arrives at the White Sulphur, and sends some cases to the Salt. He goes to the Salt, and sends some back to the White and some to the Sweet Springs. He visits the Sweet, and sends some to the Salt and White Sulphur. The physician, in taking the circuit, would be constantly classing the diseases, and sending them to their appropriate remedies. History teaches us, that Henry IV, who, during his youth, had frequented the springs of the Pyrenees, and witnessed the abuses in the employment of so useful a remedy, sought to correct them after his accession to the throne of France. He nominated, by edicts and letters patent, in 1603, superintendents and superintendent-generals, who were charged with the entire control over the use of mineral waters, baths and fountains of the kingdom. These edicts were confirmed by Louis XIV, Louis XV and Louis XVI. Most of the mineral springs and bathing establishments on the Continent of Europe are placed under a somewhat similar

superintendence, and a resident physician is also appointed by the government. The properties of mineral waters were now every where studied with great industry and zeal.

But to return from this digression. The account which I propose to give of mineral waters will differ very widely from some of those heretofore published. It is true we have several works already on these subjects, and some of them of great merit; but their authors are too candid not to acknowledge their want of personal experience, and had at last to resort to others to supply them with the materials and information, while others, more immediately interested, might have been led away from the truth by their prejudices and partialities. But I believe it will be admitted by all, that these remedies would be much more efficacious in the cure of diseases, if their virtues and properties were better understood; for I do contend, that, to be successful in the cure of diseases by mineral waters, we must be guided by principles. We must not only understand the effects of the different waters, but we must also have some

idea of the state of the system and the nature of the disease at the very time they are administered. It is this kind of knowledge which would enable us to understand more effectually when we had attained the desired end; or, when it became necessary, to advise the invalid to change his situation, and thereby avail himself of all the benefits which might be derived from the alternate use of the different waters.

There is also a great difference in the constitution of different persons; some will require a much larger dose to produce the same effect than others. This diversity of constitution is more or less under the influence of climate and mode of living. It would seem, that, from the remotest period of antiquity, the human species have been dispersed almost over the whole habitable globe, and that man has been seen living and thriving under circumstances and relations the most opposite and heterogeneous, when compared with each other. Thus you find him under the sunburnt regions of the equator, as well as on the icy fields of Greenland, in countries con-

tiguous to the north and south pole. Again, we find him spinning out his existence solitary and alone in some remote and sequestered valley, undisturbed during his journey from the cradle to the grave by the commotions which agitate the majority of mankind. We meet him toiling for a livelihood on the highest mountains, as well as in the bowels of the earth; enjoying his existence in the vicinity of pestilential swamps and morasses, along the sea-shore, and even on the ocean itself. Thus exposed, as it were, to these different latitudes and situations, the duration of human life is more or less shortened or protracted by adventitious or incidental causes; and, under such circumstances, we are sometimes compelled to abandon the most profitable employment, or to leave our native land, and go abroad in pursuit of a remedy to relieve us from the ravages of some loathsome disease.

To the invalids thus afflicted, the Mineral Waters of Virginia present the most powerful attractions. Throwing out of view the advantages to be derived from the restorative

and invigorating effects of the different waters, all in a short distance of each other, and forming a complete group, the invalids would frequently find themselves cheered and animated by natural curiosities, landscapes, and mountain scenery, surpassed by none in grandeur, beauty, and sublimity; and, in passing on, the ecstacy of the transition would be almost indescribable. They would behold a country blessed in many places with the richest soil, the most delicious climate, favored by the gentlest airs and warmed by the most genial suns, possessing all the elements of health, wealth and national greatness; and nothing is wanted but a liberal system of internal improvement to develop all these resources more effectually, and to make it the garden spot and El Dorado of Virginia. The bowels of the earth contain almost every species of minerals, while its surface exhibits every variety of geological and botanical productions: Plants of the richest hues and rarest virtues, which, like the mineral waters, if properly understood, and made subservient to the healing art, would constitute one of the

most important acquisitions to the materia medica of our country.

> "Full many a flower is born to blush unseen
> And waste its sweetness on the desert air."

There are few diseases that have so many certain cures, or popular remedies, as those we meet with at mineral waters, most of which are of a highly stimulating kind, and generally administered with a most liberal hand, no matter how improper or preposterous they may be. I have been often astonished at the credulity of invalids, to see how easily they are duped and diverted from the use of mineral waters, after having traveled thousands of miles to avail themselves of the benefits which might be derived from their long and uninterrupted use. Besides, many of the invalids who resort to these places have already undergone medical treatment at home, under the directions of the most scientific physicians, and they have failed to be cured: they have arrived at that point when no medicine is the best medicine. The system is worn down and exhausted, and seeks for repose in the mild

and unruffled bosom of Nature—and to be cured, we must come back to elementary principles, and substitute natural agents for artificial ones. We must measurably throw away the nauseous drugs of the apothecary, and substitute in their stead the mild and salubrious beverage of mineral waters. In this way I have seen some of the most inveterate diseases entirely eradicated and cured, after having baffled the skill of some of the most eminent of the profession; while, in other cases candor compels me to acknowledge, either from a misapplication or a want of knowledge, that I have not realized that success which I had so fondly anticipated.

There are evils, arising out of vulgar errors in the treatment of diseases by mineral waters, that loudly call for redress. I am certain I have seen them the cause of injury in more cases than one. The vulgar and illiterate should be taught to look upon every disease as one of much danger, and always requiring great nicety of management; and that the administration of a single improper remedy may convert a disease of comparative

simplicity into one of complication and eventual danger. For the truth of these remarks, that mineral waters do not cure all who use them as remedies, I need only point to the tombstones reared in yonder graveyard, which, catching the wandering glance of the passer's eye, will from generation to generation seize the attention, revive the recollection of the names they commemorate, and kindle the sentiment they are intended to inspire ten thousand times stronger than books or words could do. And they teach this important fact, that in respect to our mortality, no man is superior to another. The rich and the poor, the honorable and dishonorable, must all die. The stroke of death will break them as a potter's vessel—and the distinction between them is at an end; for the vessel of honor is as useless as the rest when it is broken. He, then, is the wisest and happiest, who, by constant attention of thought, discovers the greatest opportunities of doing good, and with ardent and animated resolution breaks through all opposition, that he may appreciate and improve those precious and golden opportunities.

Let us now attempt to explain more fully the reason why mineral waters have been found more efficacious in many diseases than other remedies. In most of the cases in which I have found these agents most beneficial, the patient was laboring under extreme debility—the pulse feeble and almost imperceptible; the bowels constipated; the pores of the skin entirely closed, and the functions of the liver and kidneys performed with great difficulty and embarrassment. Under such circumstances, I often found the use of mineral waters far preferable to artificial means; for in most cases they have a tendency to excite the action of the bowels, kidneys and skin, and at the same time impart new energy and vigor to the whole system, while the mildest cathartics, diuretics, or sudorifics which are generally given by physicians, would be followed by great prostration of strength, and attended with much danger and uncertainty.

In the treatment of diseases by mineral waters, we should never forget the following facts: That all we receive into the stomach, that does not go to the nourishment of the

body, passes off through the pores of the skin, kidneys and bowels, and when any one of these organs fails to perform its office, the fluids are retained in the system and the blood becomes contaminated and the whole system diseased. The pores of the skin evacuate more of this poisonous matter than all the other emunctories put together; hence its great importance in the economy of health. And although I have found the use of sulphur waters peculiarly beneficial in restoring these functions to their healthy action, yet in such cases I have frequently combined the use of the Hot and Warm Springs' baths with the happiest results. They seldom failed, when properly used, to impart vitality and nervous energy to the skin, and promote a copious flow of perspiration, and at the same time increase and buoy up the strength of the patient in the most remarkable manner. I shall not indulge at this time in any visionary theory as to the subtle and mysterious operations of these baths upon the human system; but when we come to analyze them, and find they contain pretty much the same gaseous and

saline ingredients which we find in the sulphurous and other mineral waters, we are still struck with astonishment, that artificial baths, made of the latter and raised to the temperature of the former, do not have the same beneficial effect—but such is the fact, however strange it may appear. It would seem that Nature is more perfect than Art, and that we cannot rival her. It is true, we have accomplished much; but a great deal remains to be done. Our knowledge is progressive;

"We think our forefathers fools, so wise we grow:
Our wiser sons, we know, will think us so."

I might go on and enlarge, and give a great many cases from my note-book, that I have seen cured from the use of the different mineral waters. I might dwell upon the peculiar efficacy of the White Sulphur, the Red Sulphur, the Salt Sulphur, the Blue Sulphur, and the magical effects of the Sweet and the Red Sweet Springs. But as this investigation might lead to a comparison of the relative merits of the different waters, and might be thought invidious by some, I shall therefore

dismiss these subjects for the present, and endeavor to illustrate more fully their salutary effects on the human system, by calling to my aid the lights and discoveries of modern Chemistry. From the analyses of these waters by Professor Rogers, it seems that the gaseous and saline properties are pretty much the same in all of them, differing, perhaps, in the relative ingredients which they hold in solution; and to be convinced of this fact we need only refer to the analyses themselves:

White Sulphur.

A wine gallon of the White Sulphur is said to contain as follows:

	Cubic Inches.
Sulphuretted hydrogen	2.5
Carbonic acid	2.0
Oxygen	1.448
Nitrogen	3.552
Total,	9.5

Solid contents in a pint:

	Grains.
Sulphate of magnesia	5.588
Sulphate of lime	7.744

Carbonate of lime	1.150
Muriate of lime -	0.204
Chloride of sodium	0.180
Oxide of iron, a trace,	
Loss -	0.410
Total, . .	15.276

Analysis of the Blue Sulphur.

Solid matter procured by evaporation from 100 cubic inches, weighed after being dried at 212°, 44.22 grains.

Quantity of each solid ingredient in 100 cubic inches, estimated as free from water:

	Grains.
Sulphate of lime	20.152
Sulphate of magnesia	2.760
Sulphate of soda	7.020
Carbonate of lime	2.185
Carbonate of magnesia . . .	0.407
Chloride of sodium	1.868
Chloride of calcium	0.005
Protoxide iron, received from prot. sulph.	0.015
An azotized organic matter, blended with surphur	3.000

Earthy phosphates, a trace—iodine, a trace.

Volume of each of the gases in a free state in 100 cubic inches:

	Grains.
Sulphuretted hydrogen	0.45 to 46
Nitrogen	3.25
Oxygen	0.56
Carbonic acid	2.75

Analysis of the Red Sweet Springs.

Quantity of solid ingredients in 100 cubic inches, weighing, after being gently dried, 40.76 grains:

Sulphate of lime	14.223
Sulphate of magnesia	3.107
Sulphate of soda	1.400
Carbonate of lime	9.411
Carbonate of magnesia	1.166
Chloride of sodium	0.037
Chloride of magnesium	0.680
Chloride of calcium	0.010
Liquor oxide of iron	0.320
Silica	0.180

Gas in 100 cubic inches of the water:

Carbonic acid	46 10
Nitrogen	2.75
Oxygen	0.20

Sulphuretted hydrogen, a trace.

Composition of 100 cubic inches of the mixed gases rising in bubbles:

Nitrogen	62.5
Carbonic acid	37.5

Sweet Springs.

Solid matter contained in 100 cubic inches of the water, 32.67 grains:

Sulphate of lime	5.703
Sulphate of magnesia	4.067
Sulphate of soda	2.740
Carbonate of lime	13.013
Carbonate of magnesia	0.357
Chloride of sodium	0.060
Chloride of magnesium	0.136
Chloride of calcium	0.065
Peroxide of iron	0.061
Silica	0.075

Earth phosphates, a trace,

Gas in the same quantity of water:

Carbonic acid	37.17
Nitrogen	1.87
Oxygen, Sulphuretted Hydrogen	traces.

Composition of 100 cubic inches of gases rising in the form of bubbles in the Spring:

Nitrogen	71.7
Carbonic acid	28.3

Analysis of the Hot Springs.

The free gas in the boiler contained in 100 cubic inches of the water is as follows:

Nitrogen	1.16
Oxygen	0.20

Hydrogen, a mere trace.

The saline ingredients in 64 cubic inches are as follows:

	Grains.
Carbonate of lime	4.82
Sulphate of lime	1.52
Sulphate of soda	0.92
Sulphate of magnesia	0.57
Silica	0.05
Oxide of iron, Muriate of magnesia, Muriate of lime	traces.

Red Sulphur Springs.

Temperature 54°.

Gases in one imperial gallon:

Sulphuretted hydrogen	4.54
Carbonic acid	8.75
Nitrogen	4.25

Solid contents in 32 cubic inches of water 1.25 grains, which contains, as follows:

Sulphate of soda, Sulphate of lime, Sulphate of magnesia, Carbonate of lime, Muriate of soda, and Glairine.

Gases contained in one gallon of the water:

Carbonic acid	5.750
Nitrogen	6.916
Oxygen	1.201
Hydrosulphuric acid	0.397
Total,	14.264

Solid contents in seven pints of water:

Sulphate of soda	3.55
Sulphate of lime	0.47
Carbonate of lime	4.51
Carbonate of magnesia	4.13
Silica and alumina	0.70
Oxide of iron, Iodine	traces.

Analysis of the Salt Sulphur.

Temperature variable from 49° to 56°.

Solid matter produced by evaporation, from 100 cubic inches, weighed after being dried at 212°, 81.41 grains.

Quantity of each solid ingredient in 100 cubic inches, as estimated, as perfectly free from water:

	Grains.
Sulphate of lime	36.755
Sulphate of magnesia	7.883
Sulphate of soda	9.682
Carbonate of lime	4.445
Carbonate of magnesia	1.434
Chloride of magnesium	0.116
Chloride of sodium	0.683
Chloride of calcium	0.025
Peroxide of iron, divided from protosulphate	0.042
An azotized organic matter blended with sulphur, about	0.004
Earthy phosphates, Iodine	traces.

Volume of each of the gases contained in a free state in 100 cubic inches:

	Cubic Inches.
Sulphuretted hydrogen	1.10 to 1.50
Nitrogen	2.05
Oxygen	0.27
Carbonic acid	5.75

Warm Springs.

The gas, which rises in the Bath, consists of nitrogen, with minute quantities of sulphuretted hydrogen and carbonic acid. Besides this gas, each gallon of water contains 4.5 cubic inches of gas, consisting of—

	Cubic Inches.
Nitrogen	3.25
Sulphuretted hydrogen	0.25
Carbonic acid	1.00

The saline contents of one gallon of the water are, as follows:

Muriate of lime	3.968
Sulphate of magnesia	9.984
Carbonate of lime	4.288
Sulphate of lime	5.466
And a trace of soda	0.000
Total,	23,706

From the foregoing analysis of the different waters, you will at once perceive the truth of the remarks which have been already made, that the chemical properties of these waters are pretty much the same, differing, perhaps, in the relative proportions of the same ingredients, which they hold in solution; and that this difference in their relative proportions is the principal cause of the modified action which they have over the various functions of the human system, both in health and disease.

The Red Sulphur Springs may, perhaps, form some exception to these general remarks. But when we take into consideration, that this water contains a pecular organic substance, called glairine, which mingles with the sulphur, and is no doubt dissolved in the water; and to this, together with its exemption and freedom from irritating saline matters—its low temperature—the quantity of sulphuretted hydrogen which it contains—we are not astonished at its peculiar efficacy in the cure of pulmonary diseases, and explains at once why this water should differ so widely from many

of the others. But, in some of these waters, the composition and relative proportions of the same ingredients are so nearly the same, that it would be hard to discriminate as to their different effects on the human system—

"What great effects from little causes spring—
What wealth does labor well directed bring."

A single stroke of an axe is of little consequence; yet, by the continual application of that small power properly directed, what amazing effects are produced! The sturdy oak and lofty pine do not simply own its power, but whole forests fall before it, and the wilderness becomes a garden. Let us, then, learn not to despise small things in the use of mineral waters—stone by stone is the edifice erected—drop by drop descends the fruitful showers that fructify the earth. A little thing may decide our destiny in this life; for life is made up of trifles, and we should heed those trifles if we wish to become wise and happy.

The chemical analyses of these waters pre-

sent another very curious and important fact, and may ultimately lead to the discovery of some new theory, and explain more satisfactorily the complex operation of these agents upon the human system. I allude to the fact, that many of their constituent elements are pretty much the same as those which enter into the formation of the human bones, the flesh and the blood, and by the unerring laws of Nature readily assimilate and contribute to the formation of the different parts of the human system. For the truth of these remarks, I need only refer to the analyses of Professor Liebeg, a German chemist of great celebrity. It would seem plausible, then, from these facts, that if these waters be reduced to their original elements, they are all composed pretty much of the same simple matter in different states of combination, and that their inherent powers do not cease with that of the objects into which they have combined, but endure throughout all time, and finally enter into the formation of different kinds of animate and inanimate beings. It would seem,

also, that when these elements assimilate, or combine by chemical affinity, they undergo a very great change in their former properties. It might, however, be supposed, that a compound so formed would possess qualities intermediate between those of its constituents. But this, however, is by no means the case; nor could we tell, *a priori* what kind of compounds they would form. For instance, by way of illustration; sulphur is yellow and copper is red, but the sulphuret of copper resulting from their union, is black. Again, the White Sulphur water is colorless and transparent and the sugar of lead is white; if you mix them together, a dark brown color is produced. Put together in a marble mortar equal quantities of the crystals of glauber salts and nitrate of ammonia, and the two salts will always become a liquid. Mix four drachms of sulphuric acid, oil of vitrol, with one drachm of cold water, suddenly in a cup, and the mixture will be nearly half as hot again as boiling water.

So far as the present life is concerned, the

Creator in his wisdom has seen fit indissolubly to connect the manifestations and operations of the mind with our material physical organs, and to make the former depend for its vigor, strength and fitness to perform its various functions upon the sound condition of the latter. To become acquainted with the laws by which the economy of our nature is adapted to the external circumstances which surround us, by virtue of which health and consequent enjoyment result from an observance of the condition affixed to our organic constitutions, and disease, debility, and consequent misery, from a violation of those conditions—we must familiarize ourselves with the instructive lessons of Physiology, as expounded theoretically and practically by those who possess the requisite capacity and experience in this important department of useful knowledge.

It would therefore seem, in many instances, that nothing more would be necessary to restore the system to its healthy action than to supply it again with the simple elements which

it had lost. And here pure air, mineral waters and proper food will do more good than all your specifics or boasted panaceas. In short, it has long since been established as an incontrovertible fact, that all diseases brought on by bad air, bad food, or bad water, are cured by the opposite: pure air, good food and good water are the remedies.

If we consult the Holy Bible, we will find the following sublime and beautiful theory of the origin of the great human family which has been so widely dispersed over the whole habitable globe: "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life: and man became a living soul. And the Lord God planted a garden eastward in Eden; and there he put the man whom he had formed. And out of the ground made the Lord God to grow every tree that is pleasant to the sight, and good for food; the tree of life also in the midst of the garden, and the tree of knowledge of good and evil." (Gen. ii. 7–9.)

But to keep up the phenomenon of life; to

impart vitality to the various organs of this human machine, and to promote the economy of health, it requires that all the blood in the body should be carried from the heart to the lungs, and this is done by means of the pulmonary artery, which divides and subdivides, and terminates in small capillary veins, which after coalescing become larger, and form the pulmonary veins, which convey the blood back again to the heart. Before it reaches the veins, however, an important change takes place. The blood proceeds from the heart in a black and impure state; it is returned reddened and purified. It is submitted, in its course to the action of the air in the air cells, not by actual contact, but through a membrane which forms the cells; and by this means the important change is effected.

The atmosphere, which from necessity we are all compelled to breathe, consists of unequal parts of two æriform fluids, viz: four-fifths of nitrogen or azote, and one-fifth of oxygen, in each one hundred parts; besides which it contains other heterogeneous matters,

such as odorous effluvia, aquæous exhalations, electric matter and carbonic acid gas. This small portion of the carbonic acid which the atmosphere contains, is not chemically, but mechanically mixed with it, and is evolved by fermentation and the decomposition of vegetable matter.

Oxygen is essential for the support of life and combustion, and is abundantly furnished by plants and shrubs, which constantly sustain the loss of it occasioned by the respiration of animals. It imparts the red color to the blood. It would seem, also, that our bones are composed of animal matter and earthy salts, in which, from chemical analysis, we find the phosphate of lime in considerable proportion, a less quantity of the carbonate of lime, and a small portion of other salts—and that oxygen, nitrogen, carbon and hydrogen are the main constituents of all animal matter, and that the system is supplied with them through the medium of the atmosphere, the water and the food which we take for the sustenance of life.

I shall not, on the present occasion, enlarge on the nature and operation of the different kinds of food in the promotion of health; but shall dismiss this part of my subject with a single remark, that it is sometimes in the form of exceedingly complex compounds that all these elements enter into the human system, and that some kinds of food which actually contain the elements necessary for the sustenance of animal life, are nevertheless hard of digestion, and are therefore not so suitable for food as others easier of digestion. For the truth of these remarks, permit me to refer you to the following table from a work published by Dr. Beaumont of the U. S. Army, entitled "Experiments and Observations on the Gastric Juice and the Physiology of Digestion." He gives the meantime required for the digestion of different articles of food by the action of the gastric juice in the stomach, and also the digestion of the same articles by the action of the gastric juice out of the stomach:

ARTICLES OF DIET.	MEAN TIME OF CHYMIFICATION.				
	In Stomach.			*In Vials.*	
	prep.	*h.*	*m.*	*prep.*	*h. m.*
Rice, ...	boiled,	1	00		
Sago, ...	do.	1	45	boiled,	3 15
Tapioca, . . .	do.	2	00	do.	3 20
Barley, . . .	do.	2	00		
Milk, ...	do.	2	00	do.	4 15
Do.	raw,	2	15	raw,	4 45
Gelatine, . . .	boiled,	2	30	boiled,	4 45
Pig's feet, soused, .	do.	1	00		
Tripe, do. . .	do.	1	00		
Brains, animal, . .	do.	1	45	do.	4 30
Venison, steak, . .	broiled,	1	35		
Spinal marrow, animal,	boiled,	2	40	do.	5 25
Turkey, domesticated,	roasted,	2	30		
Do. do. . .	boiled,	2	25		
Do. wild, . .	roasted,	2	18		
Goose, . do. . .	do.	2	30		
Pig, sucking, . .	do.	2	30		
Liver, beef's, fresh, .	broiled,	2	00	cut fine,	6 30
Lamb, fresh, . .	do.	2	30		
Chicken, full grown, .	fricas'd,	2	45		
Eggs, fresh, . .	h'rd b'ld,	3	30	hard b'ld,	8 00
Do. do. . . .	soft b'ld,	3	30	soft b'ld,	6 30
Do. do. . . .	fried,	3	30		
Do. do. . . .	roasted,	2	15		
Do. do. . . .	raw,	2	00	raw,	4 15
Do. whipped, . .	do.	1	30	whipped,	4 00
Custard, . . .	baked,	2	45	baked,	6 30
Codfish, cured dry, .	boiled,	2	00	boiled,	5 00
Trout, salmon, fresh, .	do.	1	30	do.	3 30
Do. do. do. .	fried,	1	30		
Bass, striped, do. .	broiled,	3	00		
Flounder, do. .	fried,	3	30		

ARTICLES OF DIET.	MEAN TIME OF CHYMIFICATION.			
	In Stomach.		*In Vials.*	
	prep.	*h. m.*	*prep.*	*h. m.*
Catfish, fresh, . .	fried,	3 30		
Salmon, salted, . .	boiled,	4 00	boiled,	7 45
Oysters, fresh, . .	raw,	2 55	raw, entir.	7 30
Do. do. . .	roasted,	3 15		
Do. do. . .	stewed,	3 30	stewed,	8 25
Beef, fresh, lean, rare,	roasted,	3 00	roasted,	7 45
Do. do. dry, .	do.	3 30	do.	8 15
Do. steak, . .	broiled,	3 00	mactic'd,	8 00
Do. do. . .	do.		cut fine,	8 15
Do. do. . .	raw,		do.	9 30
Do. with salt only, .	boiled,	3 36		
Do. with mustard, &c.	do.	3 10		
Do. fresh, lean, .	do.		mastic'd,	9 00
Do.	do.		entire p.	12 30
Do.	fried,	4 00		
Do. old, hard, salted,	boiled,	4 15		
Pork, steak, . .	broiled,	3 15		
Pork, fat and lean, .	roasted,	5 15		
Do. recently salted, .	boiled,	4 30	mastic'd,	6 30
Do. do. do. .	fried,	4 15		
Do. do. do. .	broiled,	3 15		
Do. do. do. .	raw,	3 00	raw,	8 30
Do. do. do. .	stewed,	3 00		
Mutton, fresh, . .	roasted,	3 15		
Do. do. . .	broiled,	3 00	mastic'd,	6 45
Do. do. . .	do.		unmas'd,	8 30
Do. do. . .	boiled,	3 00		
Veal, fresh, . .	broiled,	4 00		
Do. do. . . .	fried,	4 30		
Fowls, domestic, . .	boiled,	4 00	mastic'd,	6 30
Do. do. . .	roasted,	4 00		
Ducks, domesticated, .	do.	4 00		

ARTICLES OF DIET.	MEAN TIME OF CHYMIFICATION.			
	In Stomach.		*In Vials.*	
	prep.	*h. m.*	*prep.*	*h. m.*
Ducks, wild . .	roasted,	4 30		
Suet, beef, fresh, .	boiled,	5 30	entire p.	12 00
Suet, mutton, . .	do.	4 30	divided,	10 00
Butter, . . .	melted,	3 30		
Cream, . . .			raw,	25 30
Cheese, old, strong, .	raw,	3 30	mastic'd,	7 15
Do. do. . .			entire p.	18 00
Do. new, mild, .			divided,	8 30
Oil, olive, . . .			raw,	60 00
Soup, beef, veg. & bird,	boiled,	4 00		
Do. marrow-bones, .	do.	4 15		
Do. bean, . .	do.	3 00		
Do. barley, . .	do.	1 30		
Do. mutton, . .	do.	3 30		
Green corn and beans, .	do.	3 45		
Chicken soup, . .	do.	3 00		
Oyster soup, . .	do.	3 30		
Hash, meat and veg. .	warmed,	2 30		
Sausage, fresh, . .	broiled,	3 20		
Heart, animal, . .	fried,	4 00	entire p.	13 30
Tendon, . . .	boiled,	5 30	mastic'd,	12 45
Do.			entire p.	24 00
Cartilage, . . .	do.	4 15	mastic'd,	10 00
Do. . . .			divided,	12 00
Aponeurosis, . .	do.	3 00	boiled,	6 30
Bone, beef's, solid, .			entire p.	80 00
Do. hog's, do. .			do.	80 00
Beans, pod, . . .	do.	2 30		
Bread, wheat, fresh, .	baked,	3 30	mastic'd,	4 30
Do. corn, . .	do.	3 15		
Cake, corn, . . .	do.	3 00		
Do. sponge, . .	do.	2 30	broken,	6 15

ARTICLES OF DIET.	MEAN TIME OF CHYMIFICATION.			
	In Stomach.		*In Vials.*	
	prep.	*h. m.*	*prep.*	*h. m.*
Dumpling, apple, .	boiled,	3 00		
Apples, sour, hard, .	raw,	2 50	entire p.	18 00
Do. do. mellow, .	do.	2 00	mastic'd,	8 30
Do. sweet, do. .	do.	1 30	do.	6 45
Parsnips, . . .	boiled,	2 30	mashed,	6 45
Do. . . .	do.		entire p.	13 15
Do. . . .	raw,		do.	18 00
Carrot, orange, . .	boiled,	3 15	mashed,	6 15
Do. do. . .			entire p.	12 30
Do. . . .			raw, do.	17 15
Beets, . . .	do.	3 45		
Turnips, flat, . .	do.	3 30		
Potatoes, Irish, . .	do.	3 30	mashed,	8 50
Do. do. . .			entire p.	14 00
Do. do. . .	roasted,	2 30		
Do. do. . .	baked,	2 30		
Cabbage, head, . .	raw,	2 30	mastic'd,	12 30
Do. with vinegar,	do.	2 00	shaved,	10 15
Do. . . .	boiled,	4 30	boiled,	20 00
Peach, mellow, . .			cut sm'll,	10 00
Do. do. . .			mashed,	6 00

The foregoing table is formed from all the experiments made upon St. Martin, since 1825, taking the average from such as were generally performed under the naturally healthy condition of the stomach and ordinary exercise.

After having made these general remarks on the chemical character of the different mineral waters, and the nature of the different kinds of food, we are better prepared to make proper suggestions and to lay down certain rules to govern the invalid in the use of them as remedies; and as their medical and chemical properties are pretty much the same, rules that are applicable to one will apply to all—for I have always considered each of these Springs as links in one great chain of Nature's remedies, and by the alternate use of them more good would sometimes be effected, than by remaining at any one of them all the time. I am well aware that this opinion will be considered by some as too vague and speculative, and especially by those who contend that each of these waters possess specific virtues and are held up to the invalid and to the public as universal panaceas in the cure of all diseases. But when we come to advert to the facts, that the constituent elements of the different waters are pretty much the same, differing perhaps in the relative proportions of the same ingredients which they hold in solu-

tion, which could only produce a corresponding modified action on the human system; and when we take into consideration the catalogue of diseases cured by each of these waters, we are still more forcibly struck with the truth of the above remarks. The Red Sulphur Spring, as I have already stated, may form some exception to this general rule, as it is the only one which of late years is much used in pulmonary diseases; but long experience and close observation convinced me, that this water should be used like all the others; it should be taken in small quantities, so that it would gradually insinuate itself through the whole system, and act as an alterative on the different functions of the economy.

There are, however, certain conditions of the system that would render it improper to go on too rapidly with the use of these agents, without premising some active medicine adapted to the case. A strict regimen should also be advised and persevered in, until all these unfavorable symptons are subdued. The patient should then commence the use of

the water, by taking a small tumbler-full at about 6 o'clock in the morning, and repeating at intervals of every half-hour, until the invalid takes three or four tumblers before breakfast. At 12 o'clock commence again, and take another tumbler, and repeat at 1 o'clock, P. M.; drink a glass of water an hour before supper, and at 9 o'clock take the farewell quaff before retiring to rest. In this way I have kept up the use of these waters for weeks and months with the most salutary effects, without producing the slightest congestion of the liver, furred tongue, or even the headache; but should such symptoms supervene, the water should be immediately intermitted until they are removed. In most of such cases which occurred under my own observation, they were brought on by the abuse of the remedies. The patient had swallowed down the water in too large quantities, or had indulged too freely in the use of brandy and water and luxurious living.

In a large majority of cases, I have found the above rules for the use of these waters to answer every purpose; but in some cases,

owing to a peculiarity in the constitution or nature of the disease, I have advised the patient to commence with a much smaller quantity, and to be governed in its subsequent use entirely by the *pro renata* practice. For if there be any power in medicine or mineral waters over disease, it must be owing to their proper selection and their well-timed exhibition, and without this discriminating judgment the most efficient means would be unavailing and fail to accomplish any of the great objects which the physician might have in view.

There is, also, another very important question which you will be frequently called upon to decide: I mean how long it might be necessary for the invalid to use any one of these waters; or, in other words, how long he should stay at the White Sulphur before going to the Salt, Red, Hot or Sweet Springs? On this subject, like all others, there will be found to exist a great diversity of opinion—some say that 10 days or a fortnight is long enough to use any of these waters without changing at the expiration of that time and going to another spring; while others again, with equal

zeal and confidence, insist, that it is not necessary to change at all, but to remain stationary at one of them the whole of the time. It would be presumption in me to attempt to harmonize these conflicting opinions; but long experience and observation have convinced me that both these modes of using the waters are sometimes correct, and I believe that the patient would very often derive more benefit by spending all his time at any one spring that suits the case, than he would by visiting them all and frittering away his time in hazardous and useless experiments; while in others, again, it might be equally necessary to concentrate, or call into requisition all the combined powers of the different waters. But, says one, I have but a short time to stay, and am exceedingly anxious to get well, and I wish you to tell me candidly which is the best mineral water in the mountains. To answer this question, by saying that they are all good, when properly used, will not be satisfactory to the inquiring mind, or mineral water partisan, and to be successful, or popular with some, you must make a selection, or single out some one of

them as being better than all the rest, and to give into the too common delusion that it will cure all diseases. To these dogmas and mineral water heresies, I have invariably entered my solemn protest. For I would just as soon believe, that one hat or one pair of shoes would fit every person as to believe that any one of these waters would cure all diseases.

I have said in the preceding part of this address, that if we are cured at all by mineral waters, it must be by coming back to elementary principles—it must be by conforming to the simplicity of nature, reason and common sense. I was forcibly struck with the truth of these remarks by the observations of a very intelligent patient, who called on me some two or three years ago to get advice as to the use of the different mineral waters. I gave him the result of my long experience in similar cases, and endeavored to inspire him with fresh hopes of future success. When I had closed my prescription, he rose from his seat apparently laboring under great excitement: "Sir," (said he,) "during my painful and protracted illness I have consulted upwards

of twenty physicians besides you, and they have all told me pretty much the same thing. They seem to understand exactly the nature of my disease and the remedies which I should take in order to effect a cure; but when I come to apply them, they all failed to produce the desired effect, and I have now come to the conclusion that there is a great deal of uncertainty in the science of medicine; or, that physicians, like other people, sometimes pretend to know more than they really do, and in future I shall drop them all and rely upon my own resources, and take the chances of being cured by groping my way round to the different watering places and occasionally trying them all."

I endeavored to console him by telling him that there were some diseases which no physicians could cure, and that it was so ordained by an All-wise Creator—that there must be some outlet for nature as well as an inlet, and that the best of friends must part with a hope of meeting in another and a better world; that in the present advanced state of medical knowledge no one would be hardy enough to

doubt for a moment the great utility of the Healing Art. Passing by the triumphs of Surgery over many of the most formidable and desperate diseases, the small-pox has been disarmed of its mortality by vaccination; the tetanus and cancer have received a check in their ravages upon mankind. But Mineral Waters have done more: they have not only cured consumption and scrofula in their worst forms, but they have penetrated the dark and gloomy caverns of Death, and acquired fresh honors in his cold embraces.

I have thus, in a very hasty and imperfect manner, by way of illustration, glanced at some of the most prominent topics which I propose to discuss more in detail in a work which I am now preparing for the press. Many of the subjects are not only interesting to us, but are of the most vital importance to the whole human family, and to do justice to them would require talents and erudition of the highest order, and candor compels me to acknowledge my incompetency to perform the task. All that I shall do on the present occasion is, to acknowledge my many errors

and imperfections—*humanum est errare*: "To err is human, but to forgive is divine"—and also to add my feeble weight of testimony to that which has already been furnished by others of the great efficacy and success of the Virginia mineral waters, in the cure of many of the most formidable and desperate diseases; and I should take great pleasure in making this public communication of my own experience as to the different results of those remedies, if it were to have no other tendency than to induce others better qualified than myself to make a trial of them, under similar circumstances.

But I am not vain enough to think, for a moment, that by throwing out these humble suggestions, that I shall be so fortunate as to change the sentiments of a single individual. For so powerful is the influence of our prejudices, that it would seem, in many instances, that man, with all his boasted faculties, had rather forsake his reason and philosophy, and like the other portion of the animal creation, be contented to follow the guidance of nature and instinct; and instead of advancing in

knowledge and civilization, had much rather go back—had much rather retrograde—and like the wandering child of the forest be contented with those comforts and conveniences, which minister in the greatest degree to his physical enjoyments, perfectly undisturbed by the objects which surround him, and ignorant of the means by which he might render himself more prosperous and happy. In short, he seems to be contented with the present, regardless of the future, and he lives without even a knowledge of the mechanism of his own body, his faculties, or his diseases. I cannot express the sentiment which I feel, of the magnitude and importance of all these subjects, in more appropriate terms than to use the language of a celebrated philosopher, who had spent his whole life in the investigation of scientific subjects, without being able to satisfy his own mind as to the truth and utility of the great discoveries which he had made. In quitting this stage of action, he called around him some of his most intimate literary friends, and took leave of them in the following emphatic and beautiful language:

"I don't care what the world may think of me, I know that I have been engaged in a good cause; or, in other words, I feel like a child that has been playing upon the sea-shore, here and there picking up a shell, or pebble, while the great ocean of science still remains unexplored and undiscovered by me."

And now, my dear readers, permit me, before I close, to beg you to observe how the evil effects of all our errors and sins are tempered and softened down by the benevolence of the Deity: truly He pitieth us as a father pitieth his children. Much spiritual good may be and often is extracted from our bodily sufferings. In our sickness we may acquire fortitude, humility and thankfulness! In the sickness of others, we learn self-sacrifice, compassion and forbearance. But who doubts that health is not better than sickness? Let us, then, study the laws on which it depends, and try to obey them. Hitherto I have endeavored to impress you with the importance of all these truths. I have taken a rapid sketch of the mind and body of man in the various conditions of human life; I have

considered him in the garden of Eden—such as divines considered him before his fall—his bones filled with marrow, his muscles with blood, his whole frame in action, and endowed with gaiety and vivacity; but, alas! we are compelled to leave him in the hands of his Maker, pale, sickly, emaciated, and even in the jaws of Death. Not a mineral water—not a medicine that was ever discovered by the ingenuity of man—not an anchor that was ever cast into the current of time—could arrest for a moment the overflowing stream of Life.

BATHING.

"'In the fable of restoring Pelias to youth again, Medea, when she feigned to do it, propounded this way of accomplishing the same; that the old man's body should be cut into small pieces, and then boiled in a cauldron with other medicaments.' Lord Bacon, whose words these are, adds, 'There may, perhaps, some boiling be required to this matter, but the cutting to pieces is not needful.'

Personal cleanliness is at once so conducive to health, so essential to social comfort, and so naturally allied to purity of mind, that it deserves to be esteemed a physical virtue. The English are eminent for its practice, which has been, of late years, and is still be-

coming, diffused through humble and larger circles. A late amiable and excellent man, and useful member of society, and amusing humorist, seems, indeed, to have doubted its absolute necessity, and to have believed in the existence in the human body, not only of a capability of becoming soiled, but of an inter-ternal counter-acting self-purifying principle. The means by which Mr. Walker supposes that this principle may be brought into activity is, the observance of abstemiousness in diet, the cleansing effects of which in his own person are thus described by the author of 'The Original:'

'I felt a different being, light and vigorous, with all my senses sharpened. I enjoyed an almost glowing existence. I cannot help mentioning two or three instances in proof of my state, though I dare say, they will appear almost ridiculous, but they are nevertheless true. It seems that from the surface of an animal in perfect health, there is an active exhalation going on which repels impurity; for when I walked on the dustiest roads, not only my

feet, but my stockings, remained free from dust. *By way of experiment, I did not wash my face for a week, nor did any one see, nor I feel the difference.*'

I have not heard that Mr. Walker's spontaneous cleanliness doctrine has made proselytes. If such there are, it may be important to suggest to them that this effort of Nature to keep them clean, shows what her wishes are; and that it behooves them, as *Naturæ ministros et interpretes*, to follow out and second her intentions, by using those common means which the rest of the world find requisite for their own comfort and that of others. It may be safely presumed that the dirt-repelling principle is not weakened, but strengthened, by the adventitious means which are ordinarily employed to remove from the skin all obstructing impurities.

The virtue and blessing of cleanliness is within the reach of all whom fortune has raised above abject poverty. The elements are not costly; a large basin and a foot-tub, soap, water and towels, are all that is strictly essential.

The following are the rules for their use:

At night, warm water should be employed; in the morning, cold.

Some are in the habit of using cold water at night; this is a physiological error. The frame, after the exhaustion of the day, is in a state to be the better for the soothing influence of warm bathing. The whole person should, preparatory to retiring to rest, be laved with warm soap and water; and afterwards a moderate glow should be produced by gentle drying with towels. After a day of unusual fatigue, every one must remember the comfort he has derived from this process. Pleasurable bodily restoration, less in amount, no doubt, but the same in kind, follows the regular practice of warm ablutions. I have heard it alleged that cold water used at night has the advantage of preventing the feet from becoming tender. The reverse is the fact: tenderness of the feet, I know from observation, is much sooner and more surely remedied by the daily use of warm water than of cold. It is needless to remark, that the direct purpose of bathing is better obtained by warm

than by cold water. Nevertheless there are some who are compelled to use cold water for their feet at night: if they use warm water, there is no re-action: and their feet and ankles become painfully chilled and deficient in circulation.

But the morning is the proper season for the employment of cold water; the temperature of which, however, should bear a relation to the time of year and to the temperature of the weather, as well as to the strength of the person using it. Sometimes, therefore, it is better to use water in the morning tepid; just as at night it may happen, for various reasons, to be desirable to avoid the relaxing effects of water too warm. A person in health and strength is the better for having the entire person bathed with cold water in the morning, followed by sufficient friction to produce a general healthy glow.

In these simple directions, two effects are contemplated; one, niceness of the person,—the other, a stimulating or soothing influence on the nerves, or on the system generally. Both of these effects are capable of being at-

tained to a still greater extent by the use of baths, which form the subject next to be considered.

There are many kinds of baths, and varieties of bathing; but they may be conveniently arranged in three classes;—the first, air and vapour baths; the second, warm and hot water baths; the third, cold and shower baths. Of these, the first alone deserves consideration as a means of personal cleanliness; the second and third are inferior aids for this purpose to simple soap and water. Water by itself, warm or cold, is either not cleansing, or very imperfectly so. Warm, and cold baths likewise, may be said in fact to be employed almost exclusively medicinally, or with a view to their general influence upon the system, not for ablution. And even the vapor-bath, complete and perfect as it is as a means of purifying the surface, yet exerts so powerful an agency upon the system, as to be seriously injurious, when used as a habit of cleanliness, from its collateral influence upon the health.

The vapor-bath, where it is most used, combines the full effects of transpiration and com-

plete opening of the pores with ample lavation afterwards. The following is Mr. Willis' lively account of the process, as it is practised in Turkey, where it has a completeness and luxury unknown elsewhere:*

'Went ashore at Castle Europe, with one or two of the officers, to take a bath. An old Turk, sitting upon his hams at the entrance, pointed to the low door at his side, without looking at us, and we descended by a step or two into a vaulted hall, with a large circular ottoman in the centre, and a very broad divan all round. Two tall young Mussulmans, clad in turbans and waist-cloths only, assisted us to undress, and led us into a stone room, several degrees warmer than the first. We walked about here for a few minutes, and as we began to perspire, were taken into another, filled with hot vapor, and, for the first moment or two, almost intolerable. It was shaped like a dome, with twenty or thirty small windows at the top, several basins at the sides, into which

* Willis' Pencillings by the Way.

hot water was pouring, and a raised stone platform in the centre, upon which we were all requested, by gestures, to lie upon our backs. The perspiration at this time was pouring from us like rain. I lay down with the others, and a Turk, a dark-skinned, fine-looking fellow, drew on a mitten of rough grass-cloth, and laying one hand upon my breast to hold me steady, commenced rubbing me, without water, violently. The skin peeled off under the friction, and I thought he must have rubbed into the flesh repeatedly; nothing but curiosity to go through the regular operation of a Turkish bath prevented my crying out 'Enough!' He rubbed away, turning me from side to side, till the rough glove passed smoothly all over my body and limbs; and then, handing me a pair of wooden slippers, suffered me to rise. I walked about for a few minutes, looking with surprise at the rolls of skin he had taken off, and feeling almost transparent as the hot air blew upon me. In a few minutes my Mussulman beckoned me to follow him to a smaller room, where he seated me on a stone beside a font of hot-water. He then made some thick soap-

suds in a basin, and with a handful of fine flax soaped and rubbed me all over again, and a few dashes of the hot water from a wooden saucer completed the bath.

'The next room, which had seemed so warm on our entrance, was now quite chilly. We remained here until we were dry, and then returned to the hall in which our clothes were left, where beds were prepared on the divans, and we were covered in warm clothes, and left to our repose. The disposition to sleep was almost irresistible. We rose in a short time, and went to the coffee-house opposite, when a cup of strong coffee, and a hookah smoked through a highly-ornamented glass, bubbling with water, refreshed us deliciously.

'I have had ever since a feeling of suppleness and lightness, which is like wings growing at my feet. It is certainly a very great luxury, though, unquestionably, most enervating as a habit.'

An accomplished physician, my friend and colleague, Dr. Leighton, observed to me, that the most remarkable physical character of the Russians, among whom he resided, is their

early senility. Very soon after forty they become in appearance aged. This observation, however, applies to the lower and middling classes, not to the nobility. Dr. Leighton informed me that the impression which he formed, living at St. Petersburg, as to the cause of this peculiarity, was, that it proceeded from the habitual use of the vapor bath. The higher classes use the vapor-bath *occasionally* as a luxury; the lower classes use it as their exclusive mode of purification. The servant makes an item in his wages of the price of the weekly bath, which he takes winter and summer. The interior of the public baths in St. Petersburg is laid out in benches of different heights, and the steam is produced by water flowing over heated stones. The different elevation of the benches gives the bather a choice of temperature, the lower the cooler, the higher the more intense. After perspiring profusely, the bather resorts to another room, where water is poured upon him, hot, temperate, or cold, or each in succession, as he may prefer. Exposure to cold, and rolling in the snow after the bath, are used or

practised by few. The effect of this strong alternation is bracing and agreeable, but requires custom and good stamina to sustain it. Alternate exposure to heat and cold, produced either by successive immersions in baths of different temperatures, or by the affusion of cold water immediately upon quitting the hot-bath, was among the practice in use among the ancients. Hippocrates, when speaking of regimen in diseases, and even in acute disorders, adverts to the precautions which the affusion of cold water in coming out of the bath demanded, according to the different kinds of affections to which the body had been exposed; and Galen treats of the same subject.

Since writing the above, I have had more opportunities of looking into the subject of baths and their uses. Let me briefly state the conclusions at which I have arrived. I shall be flattered if the reader condemn me as a very superficial person in this instance; it will prove, at least, that I have been clear and intelligible.

In the first place, no one should take any bath

(neither should he run a match, nor set to work at business) on a full stomach. Two, three to five hours, should intervene between a meal and the bath.

Secondly, the advantage derived from a bath is not through its primary impression upon the system, but is to be traced to the secondary effect which follows this. In many instances this secondary and healing effect supervenes, however, during the use of the bath.

First, of warm baths.

The temperature of a warm bath ranges from 94° to 100° of Fahrenheit. The temperature which is required in different cases varies, and must be determined by the self-observation of the patient. In a warm bath the patient is to feel neither chilly nor hot, but comfortably and snugly warm. He should remain in the bath about half an hour. As little of his own heat is wasted by evaporation, he will soon begin to perspire on the face and head. The sensations when in the bath are simply agreeable,—the warmth, the pleasant support to the limbs, given by the buoyant

water. On coming out of the bath, the patient is to be well and carefully dried; then to dress quickly; or to go to bed and lie down, well covered up. At this time he is highly susceptible of cold. The pores are open. He feels refreshed, cooled, in a tranquil state of agreeable relaxation. Such a bath is eminently soothing after much fatigue; and may be well followed by a light repast; then rest in an easy chair, and a novel; and then a long night's sleep.

But for a course of such baths. Such a course is only to be taken in summer, and in good hot summer weather, as in a German summer, when the pores continue open the whole day afterwards, and the skin in constant action. Then many an overloaded system, through this immense efflux from the skin, is lightened and cleared, inward congestions are removed, and health is thus restored."

BATH OF THE WARM SPRING, VIRGINIA.

The following account of the effects of the Warm Spring bath is given by Mr. Otis, of Boston, as derived from the old bath-keeper, and extracted from his article in the "Southern Literary Messenger," of March, 1838:

"A young Indian, more than two centuries ago, was coming from the Western valley of the great Appalachian mountains, towards the waters of the East, that opened into the beautiful bay whose branches touch the strands of some of the mightiest marts of a nation that was not then in existence. He had never trodden that path before, and nothing but the pride of youth, which would not brook that his brethren of other tribes should triumph over him as their inferior in adventure, had sustained his manly heart so far; for he had come, since the rising sun first touched, that day, the mighty peaks of the Alleghanies, from the vales that lay at their feet on the west. He was going to carry the voice and vote of a powerful nation to the council-fire

that was kindling on the banks of the great water, and he felt shame at the recurrence of the idea that the place of the young Appalachian Leopard could be vacant. But the night winds beat coldly around him, and the way was dark. There had been rains, and the earth was damp and swampy; and no grass, or fern, or heather, was at hand with which to make a bed in the bosom of the valley where he stood. He had not strength to climb the near range of mountains that drew up their summits before, as if to shut out all hopes that he could accomplish his ardent desire. Weary, dispirited, and ready to despair, he came suddenly upon an open space among the low underwood that covered the valley where he was wandering, and upon looking narrowly he observed that it was filled with water. He could see the clear reflection of the bright evening star that was just declining to her rest, and that was peeping into the fountain—

'Like a bride full of blushes, just lingering to take
A last look in her mirror, at night, ere she goes.'

"By this translucent reflection, he could perceive that the water was clear, and its depth he could discern by the pebbles that glistened in the star-light from the bottom. He saw, too, that the water was continually flowing off, and supplying a stream that ran rippling away among the roots of the oaks that surrounded the spot; and as he stooped to taste the liquid element, he found it warm, as if inviting him to relax his chilled limbs by bathing in its tepid bosom.

"He laid aside his bow and quiver, unstrung his pouch from his brawny shoulder, took off his mocassins, and plunged in. A new life invigorated his wearied spirit, new strength seemed given to his almost rigid nerves; he swam, he dived, he lay prostrate upon the genial waves in a sort of dreaming ecstacy of delight; and when the first dawn of day broke over the rock-crowned hill, at the foot of which the Spring of Strength lay enshrined, the young Leopard came forth from his watery couch, and strode proudly up the mountain, 'where path there was none.' He was 'a young giant, rejoicing to run his

course.' Full of new fire and vigor, he manfully sped on his way; and upon the eve of that day, when the chiefs and the sons of chiefs were seated around the solemn council-fire, no one of them all was found more graceful in address, more commanding in manner, more pleasing in look and sagacious in policy, than the young *Appalachian Leopard*, who bathed in the *Spring of Strength.*"

Col. Perkins says: "The water is perfectly transparent, and almost as buoyant as the Dead Sea, as described by Stevens. Bubbles are constantly rising from the bottom; the fact that when empty it takes but fifteen minutes to fill it, shows the abundant supply of this Mountain Spring." All who have described this noble fountain, write with enthusiasm; nor is it, indeed, to be wondered at, for the world may well be challenged for its equal. Its temperature, buoyancy, refractive power, transparency—all invest it with indescribable luxury to the feelings and to the sight.

WINES.

"To those who are in perfect health, and do not exceed their strength, it is to be presumed that wine is not merely useless, but positively injurious. It excites the stomach and nervous system, and that excitement is followed by proportionate debility. Wine, then, is a poison; but, taken in moderation, it is a poison that operates extremely slowly. Like other poisons, when the system is in certain states of disorder, wine is administered beneficially.

There are those whose delicacy of constitution and weakness of digestion (persons, for example, of the strumous diathesis,) require the support of wine. In many who are recovering from exhausting illness, the restorative effects of wine are not less necessary, and are

more immediately appreciable. During health, again, the frame frequently falls below its proper strength, which admits of being beneficially raised by this means. The stomach, lowered in tone through mental anxiety, or bodily fatigue, may be unable to digest, and the appetite to relish food, unless its energies are recruited by wine. Some, again, there are, who are obliged, knowing at what price, to exert themselves, mentally or bodily, or both, beyond their strength; with the assistance of wine, they are rendered capable of making efforts, under which their frame would else give way.

As wines differ in their flavor, so likewise do they differ in their effects. Their different properties require to be studied both by those who have occasion to use them for their profit, or, drinking them as a luxury, would shun superfluous harm from their use. The principal, but by no means all the effects of wine, depend on the proportion of alcohol which it contains. But, independently of strength, one wine is astringent, another rich and cor-

dial, a third dry, while a fourth is remarkable for the prompt but evanescent excitement it produces.

All wine has a period at which it attains its finest flavor, and is most wholesome. This period differs with every wine, and with every growth of every wine. New wine is more heady, heating and liable to disturb digestion: wine too old, on the other hand, is acid.

I first subjoin Mr. Brande's analysis of wines in reference to the quantity of alcohol which they contain; and will afterwards comment upon other differences of particular wines:

TABLE of the quantity of ALCOHOL (specific gravity 8.25) at 60° Fahrenheit, in several kinds of Wine and other liquors.

	Per Cent. by Measure.
Port, average of three kinds, . . .	23.48
Ditto, highest, ...	25.83
Ditto, lowest, ...	21.40
Madeira, highest, ...	24.42
Ditto, lowest, ...	19.34
Sherry, average of four kinds, . . .	17.92

	Per Cent. by Measure.
Ditto, highest,	19.83
Ditto, lowest,	12.25
Claret, average of three kinds,	14.43
Calcavella,	18.10
Lisbon,	18.94
Malaga,	17.26
Bucellas,	18.49
Red Madeira,	18.40
Malmsey, do.,	16.40
Marsala,	25.87
Ditto,	17.26
Red Champagne,	11.30
White do.,	12.80
Burgundy,	11.55
Ditto,	11.95
White Hermitage,	17.43
Red do.,	12.32
Hock,	14.37
Hock,	8.88
Palm Wine,	4.70
Vin de Grave,	12.80
Frontignac,	12.72
Cote Roti,	12.32
Roussillon,	17.26
Cape Madeira,	18.11

	Per Cent. by Measure.
Ditto Muchat,	18.25
Constantia,	19.75
Tent,	13.20
Sheraz,	15.52
Syracuse,	15.28
Nice,	14.63
Tokay,	9.88
Raisin Wine,	25.77
Grape do.,	18.11
Currant do.,	20.25
Gooseberry Wine,	11.69
Elder Wine, Cider and Perry,	9.87
Stout,	6.80
Ale,	8.88
Brandy,	53.39
Rum,	53.68
Hollands,	51.60

The wines principally known in this country may be classed in the following manner:

1. *Strong and dry wines.* These are of two classes, the non-astringent and the astringent.

The non-astringent are Madeira, Sercial, which are the best; Marsala, Cape wine, the inferior descriptions.

Madeira and Sherry are the wines most generally wholesome in this climate for those who require wine. Taken thus, in a manner medicinally, they are better drunk after than during dinner. Three glasses are sufficient to recruit all ordinary exhaustion, or to ensure the digestion of any moderate repast. The same quantity is less heating when diluted with water. In persons of the gouty diathesis, to whom from want of stamina or a relaxed habit of body wine is necessary, these wines are invaluable. In such constitutions they sometimes require to be given in considerable quantities, a pint or more daily.

The finest and driest sherry is called Amontillado. The fineness of the wine results from an accidental perfectness of the fermentation. Out of forty butts collected from the same vineyards, not above two or three have this quality: they are reserved to flavor the inferior growths.

The astringent strong and dry wines are Port, Benecarlo, &c. Of these, Port alone is generally known in England.

Port, if new, is heady, and disturbs digestion, causing bile to flow into the stomach. All port does this with the bilious, and can seldom be drank by them on that account. There are others with whom port invariably produces heart-burn. Port, if bottled too soon, alters very slowly; and if a full wine, retains, with its color, its lusciousness and sweetness, for fifteen or twenty years, without material improvement; it retains at the same time much of the unwholesomeness of new wine. Port wine, kept too long in the wood, on the other hand, continues to change rapidly after bottling, becoming in a few years tawny, losing its astringency, and acquiring a slightly acid taste. In this state port wine is again unwholesome, having an increased tendency to produce gout. Port originally of a good quality, that has been kept in the wood a proper length of time, (which for the mixed wine as we receive it in this country varies, according to its quality, from two to five years,) and in

bottle from five to twenty, to those with whom it agrees, is extremely wholesome. There are many persons who suffer from gout with whom port does not disagree, and who continue to drink it in reduced quantities during the fit with advantage.

Port wine is doctored in the following manner. The finest growths are used to flavor, in different proportions, the inferior growths. Nothing is more capricious than the vintage. The favorable vintages in the present century have occurred in 1802, 1811, 1815, 1820, 1821, 1825, 1834. This is generally the same for all wines. The mixture sent from Oporto to the best houses in London commonly includes several vintages: it is brandied before being shipped. French brandy is only admitted into Portugal under a heavy duty; and the brandy which is there made is extremely bad: this deteriorates the wine. The quality of hardness, which is one of the worst that port wine can have, and the most unwholesome, is attributed to a mixture with particularly bad brandy. The mixtures, as the vintages, differ in fullness of body and lus-

ciousness. Time reduces those qualities, but never makes very sweet port good.

There is one criterion of fine and old port, which I never knew fail, although it may be an accident. The cork, when it has dried, that is to say an hour after it has been drawn, should be covered on its under surface and part of its cylindrical surface with crystals of tartar.

Benecarlo is a coarse-flavored astringent Spanish wine. Some extremely old benecarlo which I remember tasting, preserved the astringency, combined with a high and agreeable flavor.

Val de Peñas unites a slight astringency with the quality and flavor of the next class.

2. *Light and generous wines.* Under this head may be included claret and Champagne.

Fine claret, of which the best three growths are Lafitte, Chateau Margaux and Latour, the first of the most delicate flavor, the second fuller, and the third still more so, is one of the most perfect wines. In lightness, flavor, soundness, it exceeds most. It has, however, a gouty tendency. Almost all the clarets

drank in England have flavor and body given to them by a mixture with hermitage.

The best two kinds of Champagne are the not effervescing wines of Sillery and Ay. Sillery is dry, Ay sweet. No wines can be finer or purer, or more wholesome.

The *Mousseux* wine is either sparkling or creaming. The former contains the most carbonic acid. The sparkling and the creaming kinds are bottled before fermentation is completed, the sparkling sooner than the creaming.

The carbonic acid in Champagne *Mousseux* contributes to produce its exciting quality. This wine has a strong tendency to produce gout. Otherwise, setting aside that there are a few whose digestion and whose nerves it directly unsettles, it is extremely wholesome, more so than most wines; it exhilarates more, while it heats less than other wines.

Trial has been made of other wines with the *mousseux* character given to them by bottling before fermentation is completed. But these wines want the generous quality of Champagne; and, though agreeable to the palate, are not wholesome.

There is, however, one other, which is both pleasant and wholesome as an effervescing wine. This is St. Peray. It is a wine of considerable strength.

Rich and sweet wines. Of these the principal, and much beyond the rest, is Tokay. Its flavor for richness, delicacy, and duration upon the palate, exceeds that of every other wine: its flavor depends on no element that deranges the stomach or nerves.

The wines of this class that follow Tokay may be enumerated in the following order of excellence. Vin de Paille, Paxarete, Mountain, Spanish muscatelle, Rivesaltes, Constantia, Malmsey Madeira. All these are admirable cordials. Cyprus, when of the finest quality, which is as rarely met with as good Tokay, should stand high on the above list.

The highly-flavored wines of Frontignan, French muscatelle, &c., are lighter, less wholesome, having undergone an imperfect fermentation.

Aromatic wines. This term is hardly appropriate, but it is used to express the qualities peculiar to Burgundy. The perfume of

this wine is connected with something that acts powerfully on the system, so that two or three glasses, with many, disorder the stomach and the nerves to a remarkable degree. To a great many this impression, though perceived, is not enough to be disagreeable.

Acid wines. Johannisberg, hock, as well as the inferior species of this class, combine with little spirit a sensible acidity, and different degrees of body and flavor.

In some of the finest, the *bouquet* reminds you, by its powerful quality and influence on the nerves, of Burgundy. In ordinarily good hock or Rhenish wine, this is not perceptible.

Some of the lighter wines of this class, Moselle for example, are artificially flavored, and are an agreeable beverage in the summer. But, upon the whole, these light Rhenish wines, and the corresponding French wines, are greatly inferior to good table-beer, and are much less wholesome: they are commonly drank because they are wine, by those with whom stronger wines disagree.

One remark is always introduced when the effects of wine upon the system are noticed.

It is justly held that mixing wines renders them doubly noxious.

It deserves remark, perhaps, that bad wine seems to produce intoxication sooner than good wine, even when weaker than the good wine. This is owing to its effect on the stomach. Wine may make you tipsy either by disordering the stomach or the head. Good wine does the latter alone: bad wine both.

When wine is declared to be unwholesome from its stimulating properties, it is unnecessary to reprobate the use of ardent spirits. Their total exclusion from the diet of persons under training is their sufficient condemnation. Mr. Jackson says: "In training, spirits are never allowed on any consideration whatever." Their parching quality is not redeemed, or redeemable, by any means; they heat the stomach, derange the liver, and lead, as Dr. Bright has pointed out, to structural disease of the kidneys, crowning their deleterious agency by shattering and overthrowing the brain and nervous system. Yet they have their use, like night-shade, and hemlock, and tobacco. They

sometimes will recruit flagging vitality, when threatened with imminent extinction, and when all other means would be insufficient. And in cases where wine is required, and its use is found to produce acidity, cogniac with water often forms the required substitute.

EXERCISE.

"The living machines, which Nature frames, agree in this respect with engines of human construction; they are worn and consumed by use. But they differ in another—inaction is not less fatal to them. Use, which at every instant impairs and takes something from the steam-engine, for a long period invigorates the frame and sinews of a laborer. The same law pervades the whole organism: the mind, like the body, is strengthened by exertion. We have at present, however, only to do with the employment of the mechanical powers of the frame, the use of which is emphatically called EXERCISE.

To form an idea of the mechanism of voluntary motion, the reader is to suppose that the ends of the bones are accurately adjusted to

each other: some as plane surfaces, others as hinges, others as balls and sockets; and that they are so tied together by ligaments that they cannot fall asunder, or move but in those actions for which their surfaces are fittingly shaped. The motions of the body are the play of its different joints. That play is determined, or the joints are either moved to a succession of positions, or permanently fixed and maintained in one, by the action of the voluntary muscles. These extend from bone to bone, passing over the joints, which they move or fix, through their power of instantaneously shortening or becoming rigid, upon mere volition. The examination of a single joint will serve to explain the conditions belonging to the motions of all.

The elbow forms a perfect hinge. Of several muscles disposed about it, it will again be sufficient for my present purpose to consider two alone. One of these is situated in front, and bends the joint; the other behind, which extends it. Each of these is a thick band of flesh, which is attached to the arm-bone above, to a bone of the fore-arm below. It consists

of fine threads, which are disposed parallel to each other and lengthwise in reference to the arm-bone. These parallel threads, when in repose, describe straight lines. When we desire to exert them, the will transmitting an influence along the nerves, suddenly throws each of the threads into a zigzag line. But the ends of the same thread, bent into a zigzag, must be nearer than before; and as they are attached each to a point of a different bone, these points of the two bones must be approximated. So it follows that the action of the muscular threads on the fore-part of the arm bends the elbow, while that of the muscular threads disposed behind the arm-bone is the reverse. By a voluntary effort, we can maintain either of these sets of threads in zigzag lines, with angles more or less open, determining thus the duration and degree of the flexion or extension of the joint at our pleasure.

Every other position, gesture, action of the body, is similarly performed.

Now, if we keep the elbow bent at a right angle, we may sustain in the hand a consider-

able weight; the force which supports it is the strength of the muscular threads, acting vertically upon the bones of the fore-arm. Substitute, in idea, for these threads a skein of silk; it would equally serve, attached as the muscle is, and being of the same length, to support a moderate weight. But the threads would become frayed and strained by use, if often employed to support this weight; and one or other breaking, would diminish in number. The parallel threads of the muscle, on the contrary, not only appear individually to strengthen by use; but, what is more wonderful, they become more numerous; the whole muscle acquires an increase in volume through the increasing number of its constituent threads. It is, however, to be understood, that exercise, to be salutary, and to strengthen, must have its limits. Immoderate exercise will fatigue, exhaust and permanently weaken the same muscle, which moderate exercise would have developed, and which inexertion would have rendered powerless and useless; the extreme effects the same, the mean the best.

The temperate exercise of the muscles has other directly local effects, that are equally beneficial. The bones become larger and harder; the sinews about the joints stronger; the blood circulates with more vivacity; the contents of the veins are driven onwards to the heart by the pressure of the contracting muscles, and so room is made for a quicker supply of arterial blood, on which nourishment depends. Thus, it is well known, that in bleeding in the arm, if the blood does not flow briskly, the patient has only to open and shut the hand, in other words, to use the muscles of the fore-arm, and the stream is freer.

Nor does the enlargement and strengthening, consequent on exercise, include those parts alone which minister to locomotion. It is certain that the play of the chest, and its freer and more extensive motion, contribute to strengthen the lungs. The left side of the chest is habitually less exerted, whether from original inferiority of development, or otherwise, than the right; and of the whole left side, the upper part has the least play and

action. The upper part of the left lung, which has thus the *least* mechanical motion given to it, is likewise the part which consumption first attacks.

To exemplify the same law, another part of the respiratory apparatus may be used, to which exercise, given without thought, causes it to be developed, not beneficially, but to the prejudice of personal appearance. If a young man gives in to the habit of taking snuff, the aperture of the nostrils become sensibly longer, wider, and more vascular; the organ, enlarging with the mechanical exercise it takes, becomes, like the habit, preposterous.

Such are the effects of local exercise,—to develop the resources of growth, and to invigorate the circulation. Suppose the exercise not local, but general;—the entire frame expands and acquires vigor, the venous circulation is disembarrassed by the continual propulsion of the blood towards the heart, the heart's action is more free and strong, the animal temperature is raised, the breathing is improved, superfluous fat disappears, transpiration is promoted, the skin becomes fine and

clear, and the mind, partaking of the elasticity which the body acquires, is disposed to serenity and cheerfulness. An agent, which can produce in the frame effects so salutary, must well be deserving of careful study.

The rules of exercise may be considered under four heads, as they apply to the sports of boys, the education of girls, the habits of adults, and the wants of age.

It may be well, however, preliminarily to explain, that there are certain conditions, without which exercise does not carry with it the full share of benefit it is calculated to produce.

In the first place, Air and Exercise should go together. The same bodily exertion in a close room does not refresh and invigorate as when taken in the open air; in a street, as in the fields; for there are many degrees, of which, however, the lowest is still a good. A walk in the streets of a metropolis is better than sitting at home, although not equal, in the renovation it affords, to a walk or ride in the country; an hour's fencing at Angelo's or Hamon's is far better than an hour passed at

a chess-club, although not equal to a match of cricket at Lord's.

Secondly, Exercise to be thoroughly beneficial requires a mind at ease. Exercise taken in the performance of professional duties hardly tells restoratively,—it fatigues without strengthening. Even a walk or a ride, alone, taken for the sake of exercise, is wonderfully unrefreshing. The mind must be cheerful and amused, that exercise may do its salutary office.

Thirdly, Exercise must bear a proportion to the other calls upon the strength. It is itself exhausting; but when the system can bear it, the re-action which follows is a source of strength. So care must be taken not to exhaust the entire capital from which nature recruits herself. The capabilities of the frame may be drawn upon in many different ways, but all contribute to the same exhaustion. Every one rises in the morning with a certain quantity of disposable force, or, to use a common expression, of nervous energy. This may be consumed in bodily exercise, in study, in mental anxiety, even in digestion; the stu-

dent, who has been busily employed at his desk all the morning, in the afternoon rises from his chair with tired legs; he has as yet taken no exercise, but in another way his strength has been drawn upon, and the long walk, which otherwise would invigorate, would now exhaust only and fatigue.

The following is a paradoxical instance of exhaustion produced on the principle which has been explained, when the opposite effect would have been anticipated:

Captain Franklin, speaking of an occasion when his party, worn with cold, fatigue and famine, had the fortune to kill a cow out of a herd of musk oxen, observes, 'This was the sixth day since we had a good meal; the *tripe de roche*, even where we got enough, only serving to allay the pangs of hunger for a short time.' 'We were detained *all next day* by a strong southerly wind and snow. We restricted ourselves to one meal this day, as we were at rest, and there was only meat remaining sufficient for the morrow.' The consequence, however, of this temperate indulgence in fresh and nourishing food was,

that, on recommencing their toils, 'the whole party complained more of faintness and weakness than they had done before; *their strength seemed to have been impaired by the recent supply of animal food.*' It is evident that the nutriment which the worn party had received from their two days' good meals, had not made up for the direct exhaustion produced by the call upon their digestive forces to chymify so much animal food. Their stomachs had consequently tired their legs and arms.

Exercise of Boys.—Young animals have a natural disposition towards bodily exertion; they frisk and bound in a thousand gamesome ways, finding a reason in every thing for indulging their sportive humor. It is enough that they have life and are young, to lead them to perpetual motion. It is the same with children, whose noisy play springs from their exuberant spirits, which are beneficently given them for their enjoyment: but not for that alone, but to supply motives for the requisite practice and strengthening of their limbs, their body, their lungs.

The games of boys are well adapted to their physical condition, and the first lessons they have to learn. Their frame is light as yet; they have to learn to carry it about, and transport it from place to place; to exercise their legs, rendering them by use secure and ready implements of locomotion. The perpetual falls of children (for their protection against which the ends of their bones are as yet a soft cartilage only) show that they are but learners how to walk, run, jump. The appropriate games of their age are games of running, the hoop, prisoners' bars, and the like.

To these the military exercise is a good adjunct, which completes their knowledge of walking, else liable to be careless and slovenly, giving their carriage uprightness, firmness; to their step precision; the frame raised to its full height, perpendicular; the shoulders well thrown back, the head erect; in motion, the limb advanced straight, the toe pointed outward, the whole limb inclined inward to keep the line of progression straight, the body poised for an appreciable period in the mea-

sured step upon the opposite limb—a physical lesson of great use, but from prescription over-rated. We admire it in its results—the extended line of soldiery, its exactness, its pliancy, the precision of its simultaneous movements, nothing inharmonious, out of place, or interfering. But we forget that the character of the whole does not belong of necessity or likelihood to its individual parts: a sword-blade is flexible, elastic; but cut it into a dozen pieces, each would be hard, square, rigid. The line of soldiery is a machine, and the soldiers are its constituent parts. The training of each is for the co-operation of the whole, not to promote individual variety of strength and action, not to bring out in each all the resources of his frame. Contrast the single soldier, detached from the line, with an Indian warrior; in the gestures and crouching and supple walk of the latter—the body playing upon its bent joints as upon springs, each posture elastic, prepared to throw out on the instant all the energies of the frame, promising the agile bound of the panther, it is evident that for every purpose of attack or eva-

sion the Indian is individually the best fitted, as he so much the more completely commands the resources of his muscular frame. There is nothing in what is called the military exercise which brings out these qualities. They have to be learned in some other school. This school is not exactly what are called gymnastics; the exercises which pass under that name are inappropriate to young children; to the strongest, indeed, they do no harm, or may not; but children not the strongest are liable to be strained by them, and to have the seeds of permanent structural weakness sown by their influence. The same objection does not apply to systems of exercises, in which the frame is thrown into a succession of attitudes, with gestures of more or less rapidity or force. Any quantity of exercise may be thus obtained; and there is this safety in such exercises, that we may be sure Nature has not overweighted the body; and this advantage, that by means of an organized system of exercises, every class of muscles, every region of the trunk, each weaker or neglected part, may in its turn be submitted to strengthening discipline.

As boys advance in age, their frame fashions itself to a new character, and new elements of strength are put forth. The chest expands, the arms become firm and muscular. The sports of young men are correspondingly altered; cricket now, and rowing, single-stick, fencing, tennis, well fitted to draw out the resources of the frame, appropriately take their turn.

In the practice of such exercises, it is desirable to recollect that nature has made the left side of the person the feeblest, and that the customs of society discourage its use on any thing like an equality with the right. The occasion, therefore, is not to be neglected, which such sports afford of strengthening the weaker part; so in these exercises, in fencing, single-stick, tennis, the left hand should be frequently used in alternation with the right. I have already given the best reason for strengthening the left side of the body; but that applies to delicate frames alone. To the strong it has this advantage, that their physical powers are positively increased; which is desirable while their frames are perfect—and

still more so when, as it may occasionally happen, the right arm is temporarily disabled.

Dancing can hardly be recommended as an exercise; although, as a source of social amusement, it has a high value. As a means of forming the carriage of the body it is also excellent. Locke himself recommends that children be taught to dance as soon as they are capable of learning it, for this purpose,—and because it gives children manly thoughts. Certain it is that the carriage of a child cannot be improved without its character profiting.

Physical Education of Girls.—Girls, as children, are healthier than boys. This fact, which, if it has not been any where remarked, is indisputable, may be accounted for in the following manner: Girls, as young children, are nearer in mind and body what they are to be permanently, than boys. Their shape has less to alter, (the pelvis being already in early childhood proportionately larger,) their voice, complexion, delicacy of skin, have hardly to be modified. It is presumable that their caste of temperament, thus early decided, not tem-

porary, unsettled, or intended for further material change, has a strength in its anticipated maturity which the childhood of the opposite sex does not possess.

There is but one disease to which female children are liable, and that is Education; as soon as the age arrives at which they are to be artificially trained to femininenes of mind and manners and accomplishment, their strength and health are endangered. While boys are encouraged to pursue sports of increasing exertion, their sisters, whose bodily strength not keeping pace with theirs, nevertheless *requires exercise equal in proportion* for its maintenance, are forbidden all that they need. The consequence is, that they are liable to become fragile and delicate. How their health is progressively impaired, this is not the place to teach. It is my present object only to point out in what its alterations originate, and how they may be prevented. But there is one alteration which follows so immediately and mechanically from neglect of exercise, and which tends so completely to counteract the objects for which the system of artificial culture is

pursued, that I may not pass it unnoticed. This is weakness of the back, followed by curvature of the spine.

I enter, indeed, upon this subject the more readily, that it has not been adequately explained even by the latest writers. Every one is, indeed, aware that general weakness of the entire structure of the back is the consequence of the neglect of exercise; but how it happens that that weakness produces lateral curvature, I think has not as yet been shown. All, again, are aware that vertical pressure is insufficient to produce the effect observed; this might cause the bones to become broader and flatter, but could not bend the back laterally. The difficulty has been to get at the origin of lateral curvature, or to bring the back into that kind of sinuous flexure, in which common pressure would cause the weakened column to become serpentine.

The first feature in the inquiry, which presents itself, is the almost uniform elevation and fullness of the *right shoulder, and right side of the chest*, which accompanies curvature of the spine. Why this feature is not univer-

sal will be subsequently explained. But for the present let us attend to the fact of its remarkable frequency.

The principle to which this will be traced is thus expressed by Donald Walker: "*The one-sidedness with which almost all the acts of life are performed, is the general cause of the greatest and most universal deformity*, and its prevention requires an equal and similar use of the other side." Hitherto, however, the connection between the general fact and the common feature of spinal curvature has not been shown.

Mr. Coulson, in a recent work upon this subject, animadverts upon the views propounded by the late Mr. Shaw:

"In consequence," says Mr. Shaw, "of the alteration in the state of the shoulders being the first symptom of deformity observed, it is generally but erroneously supposed that the dorsal part of the spine is the first distorted. Indeed, those who have lately written on this subject have fallen into this error, and have described the curve at the loins as the last which is formed.

"In cases of diseased vertebræ there may be a curve only between the shoulders, but it invariably happens in the common lateral curvature, that where one shoulder is protruded, there is also a curve at the loins; and I h ve shown by diagrams in the preceding volume that this curve is not only first formed, but that those in the upper part of the spine are consequent upon it."

Mr. Coulson observes upon these passages, that those who describe the curvature in the loins as the last which is formed, "are right, though they did not clearly see the cause," and adds, that Mr. Shaw's practical observations tend, "in spite of his hypothesis, to prove that the first curve is formed at the right shoulder."

It is evident, therefore, that while Mr. Shaw attributed the initial curve *to the loins*, Mr. Coulson is disposed to look for it *in the back and shoulder*. The latter writer however puts forward, with a full general conception of its importance, the principle already quoted—the general influence of the right-sidedness of our habits upon curvature of the back.

But neither Mr. Shaw's nor Mr. Coulson's ideas are strictly just. *The two curvatures are not successive, but necessarily simultaneous;* neither has priority; in health and strength both of these curvatures, producing serpentine flexure of the spine, continually occur, and disappear with the next change of posture. In the weak, they become permanent, and are progressively aggravated.

To trace the mischief in its progress:

The steps by which the spine ordinarily gives way are these: The child, kept at its music-stool, or books, or drawing, has a weakened and aching back. The muscles of the spine have not been invigorated by the sportive exertions, and the various changes of attitude, which Nature dictates. Wearied by its task, the next change is to stand listlessly beside its governess, or in a drawing-room. What is the posture which it assumes? It is of course that which gives greatest ease to the languid muscles. The child stands with its weight supported upon one leg, the body swayed to that side, the knee of the other side bent, and the hip lowered. The limb

which it uses on this occasion for support is almost always the *right* limb; for this simple reason, that it is the strongest. And the child assumes the position at all times, because it is one of change from its former more rigid position, and because, in addition, the fascial structure of the limb takes off, in that posture, some of the strain from the muscles.

Let me, in passing, observe, that what has been already said, sufficiently indicates the source of one minor kind of displacement that is not unfrequent. The right ankle constantly rested on *grows* inwards—that is to say, the joint *gives* inwards, its ligaments being elongated by the perpetual strain. In like manner, or from the same cause, the knee will give inwards—one limb becoming in-kneed.

The child, thus weakened by its habitual inexertion, and tired by the discipline of the morning, is standing supported on its right leg. To judge of what is happening to its back at the same time, place before you a healthy child, and having instructed it to rest its weight alternately on both its legs, and, as in the position supposed, upon one only, ob-

serve its back when the alternation to the latter takes place. You may distinctly see that the straight line of its back becomes, in the second case, a serpentine flexure, *the ordinary flexure of curvature.* The mechanical elements of the change are equally obvious. At the time that the weight of the frame is transferred to the right limb, the left side of the pelvis is seen to sink; but the spinal column is attached at right angles to the middle of the pelvis; if the whole length of the column continued vertical to its base, the child would have fallen towards the unsupported side; the column, to avoid this consequence, is instinctively bent at the upper part of the loins to the right, to throw the weight well over to the right side; but the degree of flexion required for this purpose would carry the neck considerably out of the perpendicular; another contrary bend is therefore requisite, which begins in the middle of the back, and terminates at the root of the neck. These are the elements of the simultaneous changes which ensue—the inclination of the pelvis to the left, the flexure of the lower part of the spine to the right, of

the upper part towards the left. They may be thus experimentally produced in the flexuous spine of the healthiest child, as quickly redressed, and the spine restored to straightness. *They are thus likewise inseparable, not successive, but simultaneous parts of one action.*

Let us now apply the preceding observations to children with backs weakened in bone, sinew, muscle. This position of rest, this standing-at-ease, to which they are more prone than other children, and which becomes habitual, brings the spinal column into the following relation to the weight of the body, arms, and head. It is no longer a straight pillar of support; but, so long as the posture is maintained, a flexuous one. That would matter little, if all the elements of the column were strong and rigid. But they are weak, debilitated, disposed to yield, and they give accordingly; and the flexures become, not the temporary yieldings of elastic joints, but permanent givings and yieldings of weakened textures. Once begun, the change can but progress, and the greater the obliquity at each

part, the greater the mechanical inability of the spine to resist the growing evil.

The only difficulty that remained in the theory of spinal curvatures, was that which I have attempted to explain. When a curvature of the spine in the back is *convex* towards the right side, it necessarily follows that the right shoulder will be elevated, that the right side of the chest will be fuller, that the left shoulder will drop, the left breast be flat.

It is easy, again, to understand how the case may be exactly reversed; how the habitual inclination may be to rest on the left leg, with a parallel train of consequences.

Again, it is evident that the serpentine curvature, the *common* origin of which I have explained, may be favored by, or even entirely proceed from other causes; how an invalid in bed may be bent with a convexity towards the side on which she lies; how the spine may be twisted slightly on its axis by one or other habitual motion; how the posture employed in writing or drawing may give rest and pressure to one side and shoulder, expansion and elevation to the other; how the trivial circumstance

of the dress of children hanging on their shoulders, and so contrived as to be always ready to fall off, will almost necessitate the practice of perpetually hitching up one shoulder to support the dress, and of letting the other drop within it.

The description of the steps by which weakness of the back leads to curvature, explains at the same time the means of preventing the latter, or of remedying its early threatenings.

1. In the first place, a child should be broken of the habit of standing on one leg in preference to the other. It should be made to stand on both alternately. Mr. Jenkins, whose ingenious instructions have been of so much use to the youth of the last five-and-twenty years, observed to me that there was one sure receipt for producing crookedness: "For this purpose," he remarked, "a child should bolt its food, and habitually stand on one leg;" the evils proceeding from the mischievous combination of bad digestion with faulty habits of posture are well conveyed in this apothegm.

2. All other postures are to be avoided which tend to give the predominance to one side, or to incline it always to the same side.

3. Exercises which promote the strength of the back should be systematically employed; exercises, however, in which the limbs are not weighted, but which consist in the assumption of a succession of attitudes. Much natural grace, and ease of posture and gesture, are collaterally obtained by such practices when judiciously selected. To mention one that is highly useful: suppose the child to stand with its feet together, and with its face turned against the low end of a sofa, the level of which reaches some way above its knees; let it then raise its hands to meet above its head, and bring them down to the horizontal line of its face: and then let it bend the body forward till the hands touch the sofa, and rise again, and repeat the exercise several times in succession.

4. The dress of a girl should not bind her chest, but should be, in fact, as light and incompressive as that of a boy, and as much indulgence in play and sportive amusement

allowed as may be consistent with the habits it is right to encourage.

5. In sitting, when already tired, the child should rest well back on her chair, the spine resting against the back of the chair, thoroughly supported by it, and the seat of the chair reaching to the bend of the knees. Her feet should be equally supported.

Such are the precautions necessary to be observed against spinal curvature; and they are sufficient to prevent it. To remove it entirely, when it exists to any great extent, is impossible; to remedy it in part, during growth, always practicable; to obliterate it at its commencement, not less so. The partial introduction, however, of other principles of treatment becomes necessary where curvature has begun.

In a note to an excellent article on physical education by Dr. Barlow, of Bath, in the Cyclopædia of Practical Medicine, Dr. Forbes adds, of his own observation, that, in a school which he had inspected, not one female child that had resided there two years had a straight spine!—a serious comment on the text—not to

exclude from the education of girls that enjoyment of air and exercise which nature claims for them.

II. *Of the Exercise Proper for Adults.*

"The wise for health on exercise depend,
God never made his works for man to mend."

Cicero is described by Plutarch as being, at one period of his life, extremely lean and slender, and having such a weakness in his stomach that he could eat but little, and that not till late in the evening. He traveled to Athens, however, for the recovery of his health, where his body was so strengthened by gymnastic exercises as to become firm and robust; and his voice, which had been harsh, was thoroughly formed, and rendered sweet, full and sonorous. Of Julius Cæsar, the same author informs us that he was originally of a slender habit of body, had a soft and white skin, was troubled with pains in his head, and subject to epilepsy; but by continual marches, coarse diet, and frequent lodging in the fields, he struggled against these diseases, and used

war, and the exercises and hardships therewith connected, as the best medicine against these indispositions.

Sydenham exemplifies the utillity of exercise, by the case of a learned prelate (Dr. Seth Ward, bishop of Salisbury,) who having applied himself intensely to his studies for a long time, was at length seized with a hypochondriac disorder, which, by its long standing, depraved all the ferments of the body, and destroyed the digestion. After having tried all sorts of medicines in vain, he was at last persuaded by Sydenham to try riding on horse-back, beginning with short journeys, as being best suited to the weak condition to which he was reduced, but gradually lengthening them as he gained strength, and not to mind either meat or drink or the weather, but to take up such accommodations as are to be met with upon the road, like a common traveler. In short, he continued this method, till at length he rode twenty or thirty miles a-day, and finding himself much mended in a few days, he was encouraged by this wonderful success to continue this course for several

months, in which space of time he had rode many thousand miles; so that at length he was not only free from his disorder, but became strong and brisk.

Mr. Holcroft, in his answers to Sir John Sinclair upon the subject of training, observes: 'The experiments which I have made upon myself, though they never have been followed with perseverance and consistency, tend to prove that exercise, at every period of life, is greatly advantageous, *provided it be not taken to excess;* it seems as if it might be gradually increased to what would be thought a wonderful degree, even in old age; and that with its increase the faculties strengthen, and an approach to youth returns.'

It is a common impression that the effects of high training are attained at an expense of constitution; and that the frame which is raised by constant exercise to its utmost strength wears out the sooner for it. This appears to be erroneous. Sir John Sinclair says, 'It is remarked that running horses when trained do not wear out sooner than other horses; on the contrary, they bear fa-

tigue much better. Nor does training game-cocks shorten their lives; on the contrary, they live longer than common poultry.'

The reader may be curious to know what amount and kind of exercise constitutes high training.

The principal objects for which, in this country, persons have submitted to this preparation, are feats of pedestrianism and pugilism; the training for both is nearly the same; its purpose, one which is technically called to improve the *wind*, that is to say, the power of sustaining continued exertion.

The pedestrian, who may be supposed already in tolerable condition, enters upon his course of training with a regular course of physic, which consists of three doses (Glauber's salts are generally preferred, and from one to two ounces are taken each time, with an interval of four days.) Having gone through this course of physic, he commences his regular exercise, which is gradually increased as he proceeds in training. When the object in view is the accomplishment of a pedestrian match, his regular exercise must be

from twenty to twenty-five miles a-day. He must rise at five in the morning, run half a mile at the top of his speed up-hill, and then walk six miles at a moderate pace, coming in at about seven to his breakfast. After breakfast, he must again walk six miles at a moderate pace, and at twelve lie down in bed without his clothes for half an hour. On getting up he must walk four miles, and return by four to dinner. Immediately after dinner he must resume his exercises by running half a mile at the top of his speed, and walking six miles at a moderate pace after it. He should go to bed about eight.

After three or four weeks the exercise is still more severe. But besides his regular exercise, a person under training ought to occupy himself during the intervals in every kind of exertion which tends to activity; cricket, bowls and the like, in order that during the whole day the mind and body may be occupied.

The sensible effects produced by training, independently of the increased facility of muscular exertion, are, the loss of fat, the in-

creased size and hardness of the muscles, the skin becoming clearer, smooth, well-colored and elastic. He can draw a deeper inspiration, and hold his breath longer than before; he feels himself light and *corky;* his mind is clearer, his attention ready, his senses acute.

Such are the well-attested and certain advantages attainable by any one not advanced in life and of good constitution, through the judicious and systematic adoption of rules of bodily exercise. The condition of the body may be raised to a high tone of health and vigor, and the mind may be rendered clear, unclouded, cheerful. Unfortunately, this animal perfection can only be obtained at its price, (much time and leisure, namely,) which places it practically out of general reach. But there are some to whose occupations it is congenial; and it is interesting to observe, how highly it has been prized and fostered, and what a beneficial influence, in an earlier stage of society, was obtained by the cultivation of that bodily superiority, which seems under favoring circumstances naturally to ally itself with mental excellence.

Sully recommends in the strongest manner to military youth those sports and exercises which form a graceful carriage, and give strength to the limbs: 'I was,' says he, 'always of the same opinion as Henry IV. concerning these exercises. He often asserted that they were the most solid foundation, not only of discipline and other military virtues, but also of those noble sentiments, and that elevation of mind, which give one nature superiority over another.'

It is related by Herodotus, that when Xerxes invaded Greece, he found the Grecians employed in celebrating the Olympic festival, and that the prize for which they contended was no more than a chaplet of wild olive. Tigranes, the son of Artabanus, exclaimed, 'Alas, Mardonius! against what kind of men have you led us to fight? men who engage in a combat with each other, not for gold or silver, but only for superiority of virtue and glory.'

The Olympic games, re instituted by Iphitus, 776 years B. C., were celebrated every five years. Ten months of preparatory training

were requisite; of which one was devoted to exercise in the stadium, in the presence of the judges, in order to qualify the competitor for the arduous trial. Free citizens only, whose characters were irreproachable, and who in other respects had complied with the rules of the institution, were permitted to contend. So important was the prize of victory, that none but men of spotless reputation were allowed to enter the lists, which were carefully guarded against the intrusion of unworthy or improper persons.

'To conquer at Olympia,' says Cicero, 'was greater and more glorious than to receive the honor of a Roman triumph.'

There was scarcely a town of any consideration in Greece and in her colonies settled along the coasts of Asia and Africa,—in the Ionian and Ægean islands,—in Sicily and in Italy, in which there was not a gymnasium, or school of exercise, maintained at the public expense.

The gymnasia were spacious buildings of a square or oblong form, surrounded on the outside with piazzas, and containing a large area,

where the exercises were performed. Places for training in bad weather,—porticoes, baths, chambers for oil and sand, with groves of trees, and seats or benches, encompassed the stalia. The internal structure of these edifices was adapted to the convenience of those who frequented them either for exercise or pleasure; and they were the resort of rhetoricians, philosophers, and men of learning, who here read their lectures, held their disputations, and recited their several productions.

The contests at the Olympic games were in running, leaping, wrestling, throwing the discus, boxing: the foot-race held the foremost rank. These are humble elements of national greatness. But in an enervating climate the disposition to indulgence is natural and powerful; and in the superstition of the Greeks there was little check to licentiousness. The games, diffused by multiplied institutions through the whole people, and deriving a sacred character from their junction with religious ceremonies, exerted a separate and direct and important moral influence. In those who prepared to contend in them, they

compelled the observance of temperance and sobriety. A natural association, or the skill of a lawgiver, had determined that an essential part of the preparatory training should be a blameless life and character. Sculpture, which had her studio in the gymnasium, gave deathless existence to the victor. Architecture raised her column and portico, which echoed to lofty philosophy, and from whence ascending, the music of the golden harp, celebrating the triumphs of heroes, floated around Olympian Jove.

The real, stripped of the associated, utility of athletic exercises still remains.

The extent, however, to which they should be pursued, even by those who can command time, is endlessly various; so much depending upon temperament, habit, diathesis; so much on the powers of digestion; so much on the natural development of the muscular frame; so much on the fortuitous customs of early youth; so much on the period when age, with its stealthy pace, first overtakes us: there is no doubt that many, forgetting that after forty their forces are declining, impair and exhaust

them by taxing their digestive and athletic powers to the same extent that in youth they were used to do without detriment. Looking to the whole human race, it is certain that the average exercise used is excessive, and more harmful than beneficial. It has often to be discouraged. Yet is there no perfect health without a due proportion of this ingredient. When it is mingled with amusement it is most salutary.

By those who have leisure, cricket, the chase, shooting, and the higher branches of angling, are capable of being used to contribute, not to recreation alone, but to health of body and mind. These sports have their seasons, a circumstance in itself most advantageous. Part of the year spent in graver occupation with lesser exercise; another in which active bodily exertion is united with a mind unbent, present the wholesomest alternation.

Of the two common forms of exercise, walking is best adapted to the strongest; riding to the more delicate. The alternation of the two is best. Exercise on horse-back is peculiarly

fitted for women, who else hardly learn what is meant by exercise. The glow of health, and brilliancy of complexion, which a gallop produces, nothing else imparts to a lady's cheek. * * * *

Exercise of the Aged.—Habits of bodily exercise should be carried as far as possible into old age. The circulation is becoming more languid, the hands and feet are generally cold, and a growing torpor spreads over the system. Walking is then the best exercise; it is safer than riding, and warms the feet more. Being driven, in a carriage not too easy, is appropriate exercise for the aged, the feet being protected from the cold. In this exercise the body is passive, but not the less benefited by it. It is the same with friction, whether applied by the hand, or flannel, or a rough towel, or a flesh-brush. Friction produces a glow upon the skin, and gives local briskness to the circulation, and warmth. Age may be called a general palsy; and nothing serves so well to restore vigor after partial palsy as friction.

Of the different modes of applying friction,

that by the hand is best, for it extends below the surface. Any thing rough cannot be used with much pressure, or it will irritate and inflame the skin. Whereas the palm of the hand, which is smooth and soft, may be safely rubbed upon the limbs with a force which penetrates and gives motion to the muscles and internal parts, and excites the circulation in them.

Perhaps the application of oils to the skin in health has been too much neglected. It is probable that this practice, conjoined with friction, might give suppleness and warmth to the joints and limbs of the aged."

APPENDIX.

ROCKBRIDGE ALUM SPRINGS.

These waters were analyzed by Dr. Aug. A. Hayes, of Boston, in 1852, with the following results:

Rockbridge, No. 1.

A standard gallon at 60° F. contains:

		Grains.
Of bases:	Sodium and soda . .	0.250
	Potash, traces.	
	Ammonia . . .	0.471
	Lime	0.594
	Magnesia . . .	0.368
	Alumina . . .	4.420
	Protoxide of iron . .	1.748
Of acids:	Sulphuric acid . .	32.626
	Carbonic acid . .	2.623
	Organic acid . .	0.930
	Silicic . . .	2.460
	Chlorine . . .	0.257

The changes which take place in these waters by boiling, the action of sulphydric

acid and salts of silver, indicate that these proximate constituents are combined to form the following salts:

	Grains.
Sulphate of lime	1.439
Sulphate of magnesia . . .	1.081
Protoxide of iron	3.683
Alumina	14.764
Chloride of sodium . . .	0.423
Silicate of soda	2.544
Crenate of ammonia . . .	1.401
Free sulphuric acid . . .	18.789
Free carbonic acid . . .	2.623
	46.747
Pure water	58325.253
	58372.000

Sample of Rockbridge Alum, No. 2.

One gallon of this sample, measured at 60° F., contains the following substances:

As bases:	Potash . . .	0.954
	Sodium . . .	0.401
	Ammonia . . .	0.300
	Lime . . .	1.346
	Magnesia . . .	0.600
	Protoxide of iron . .	2.304
	Alumina . . .	5.360

As acids:	Sulphuric acid . .	34.219
	Carbonic acid . .	7.356
	Crenic acid . . .	0.400
	Silicic acid . . .	2.840
	Chlorine acid . .	0.607

The acids unite to the bases, forming salts of the following weights:

Sulphate of potash . . .	1.765
Sulphate of lime . . .	3.263
Sulphate of magnesia . . .	1.763
Protoxide of iron . . .	4.813
Alumina	17.905
Crenate of ammonia . . .	0.700
Chloride of sodium . . .	1.008
Silicic acid	2.840
Free sulphuric acid	15.224
Carbonic acid	7.356
	56.687
Pure water	58315.313
	58372.000

Sample of Rockbridge Alum, No. 4.

One gallon of this sample afforded—

As bases:	Potash, traces.	
	Sodium . . .	0.173
	Ammonia . . .	0.360
	Lime . . .	1.346

As bases:	Magnesia . . .	1.503
	Protoxide of iron .	2.223
	Alumina . . .	7.210
	Organic matter . .	1.020
Of acids:	Sulphuric acid . .	29.686
	Carbonic acid . .	4.203
	Chlorine acid . .	0.266
	Silicic acid . .	1.710
	Crenic acid . .	0.860

Those substances combined, as salts, give the following constituents:

Chloride of sodium . . .	0.439
Sulphate of lime . . .	3.261
Sulphate of magnesia, . . .	4.418
Protoxide of iron . . .	4.693
Alumina	24.085
Crenate of ammonia . . .	1.220
Free sulphuric acid . . .	5.511
Free carbonic acid . . .	4.203
Free silicic acid	1.710
Organic matter	1.020
	50.560
Pure water	58321.440
	58372.000

HEALING SPRINGS.

For a description of this healing fountain, see "A Notice of the Healing Springs of

Bath County, Virginia, by William N. Patton, M. D."

DIBRELL'S SPRING.

The following is a list of the ingredients in the water, as ascertained by Prof. RODGERS:

Solid ingredients: Carbonate of soda, Sulphate of soda, Chloride of sodium, Carbonate of magnesia, Peroxide of iron, Silica dissolved.

Organic matter, containing chloride of potassium, nitrogen, carbonate of iron, and carbonate of ammonia.

Gaseous ingredients: Carbonic acid, Oxygen, Sulphuretted Hydrogen, Nitrogen.

MONTGOMERY WHITE SULPHUR SPRINGS.

These Springs apparently from great depths, issue from a much convulsed limestone formation—the eastern terminus, at this point, of the great Apalachian coalfields. Tneir temperatures are respectively 54° and 60° Fah. In every respect they are palatable.

There are, also, two CHALYBEATE Springs, near the Sulphur, equal, perhaps, to any in the State. One of these is doubtless commingled with a small quantity of sulphuretted hydrogen. The other, far as opportunities for

examining it have been permitted us, is purely chalybeate.—(*Dr E. W. Peck's Pamphlet.*)

SHANNONDALE SPRING.

The late Dr. De Butts, of Baltimore, analyzed the Shannondale water in 1821.

One hundred grains of the solid contents of the water of the principal fountain afforded the following results:

	Grains.
Sulphate of lime	63.0
Carbonate of lime	10.5
Sulphate of magnesia	23.5
Muriate of magnesia	1.0
Muriate of soda	1.0
Sulphate of iron	0.3
Carbonate of iron	0.7

Gaseous contents: Sulph. hydrogen, quantity not ascertained; Carbonic acid, quantity not ascertained.

CAPON SPRINGS.

The Capon waters have been analyzed by Dr. Charles Carter, of Philadelphia, and their principal medical ingredients ascertained to be: Silicic acid, Magnesia, Soda, Bromine, Iodine, Carbonic acid gas.

GRAYSON SULPHUR SPRINGS.

These waters have been analyzed by Professor RODGERS, of the University of Virginia, and Dr. AIKEN, of Baltimore. The result of the analysis shows, that in a given quantity of their solid contents, there is found—

Soda	4
Carbonate of magnesia	3
Carbonate of lime	8
Sulphate of lime	2
Sulphate of magnesia	3
Chloride of sodium	2
Chloride of calcium	3
Chloride of magnesium	1¾
Sulphate of soda	4½

Sulphuretted hydrogen and carbonic acid gases abound in the water.

ALLEGHANY SPRINGS.

Dr. CHARLES COCKE, of Nelson, has written the most reliable account of the medicinal virtues of these waters. We have no means of making any extract from his description.

The following analyses of the waters of Saratoga and Ballston are extracted from the

work of Dr. JOHN H. STEEL, President of the Saratoga Medical Society, etc.:

CONGRESS SPRING, N. Y.

The following are the actual contents of one gallon, or 231 cubic inches, of the water:

	Grains.
Muriate of soda . . .	471.500
Carbonate of lime . . .	178.476
Carbonate of soda . . .	16.500
Carbonate of magnesia . .	3.356
Carbonate of iron . . .	6.168
Total,	676.000

Carbonic acid gas, 343 cubic inches.

BALLSTON SPRINGS, N. Y.

Temperature, 50°.

One gallon, or 231 cubic inches, from a careful analysis, yielded the following result:

	Grains.
Muriate of soda	159.0
Carbonate of soda . . .	9.0
Carbonate of lime . . .	75.5
Carbonate of magnesia . . .	2.5
Carbonate of iron . . .	7.0
Total,	253.0

Carbonic acid gas, 210 cubic inches.

BEDFORD SPRINGS IN PENNSYLVANIA.

Analysis by Dr. Church.—One quart of water, evaporated to dryness, gave *thirty-one* grains of a residuum. The same quantity of water, treated agreeably to the rule laid down by Westrumb, contained eighteen and a half cubic inches of carbonic acid gas. The residuum, treated according to the rules given by Dr. Henry, in his system of chemistry, gave the following result:

	Grains.
Sulphate of magnesia, or Epsom salts	20
Sulphate of lime	$3\frac{3}{4}$
Muriate of soda	$2\frac{1}{2}$
Muriate of lime	$\frac{3}{4}$
Carbonate of iron	$1\frac{1}{4}$
Carbonate of lime	2
Loss	$\frac{3}{4}$
	31

To which must be added $18\frac{1}{2}$ cubic inches of carbonic acid gas.