

A descriptive, historical, chemical and therapeutical analysis of the Avon sulphur springs, Livingston County, N.Y : with directions for their use / by Samuel Salisbury.

Contributors

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Publication/Creation

Rochester [N.Y.] : D.M. Dewey, 1845.

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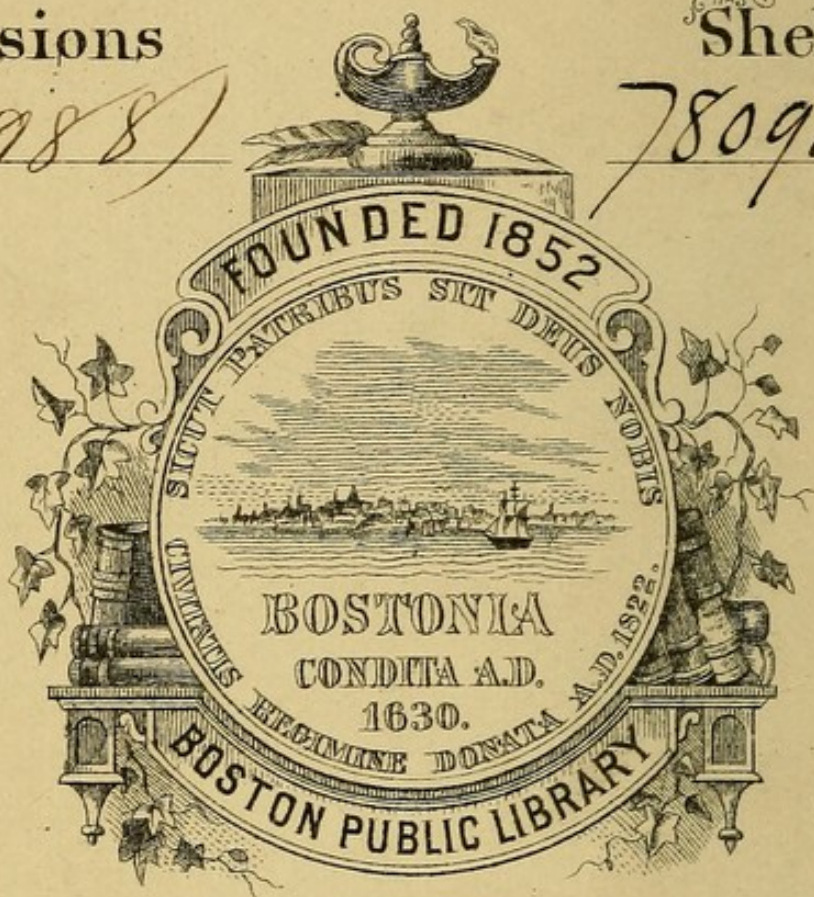
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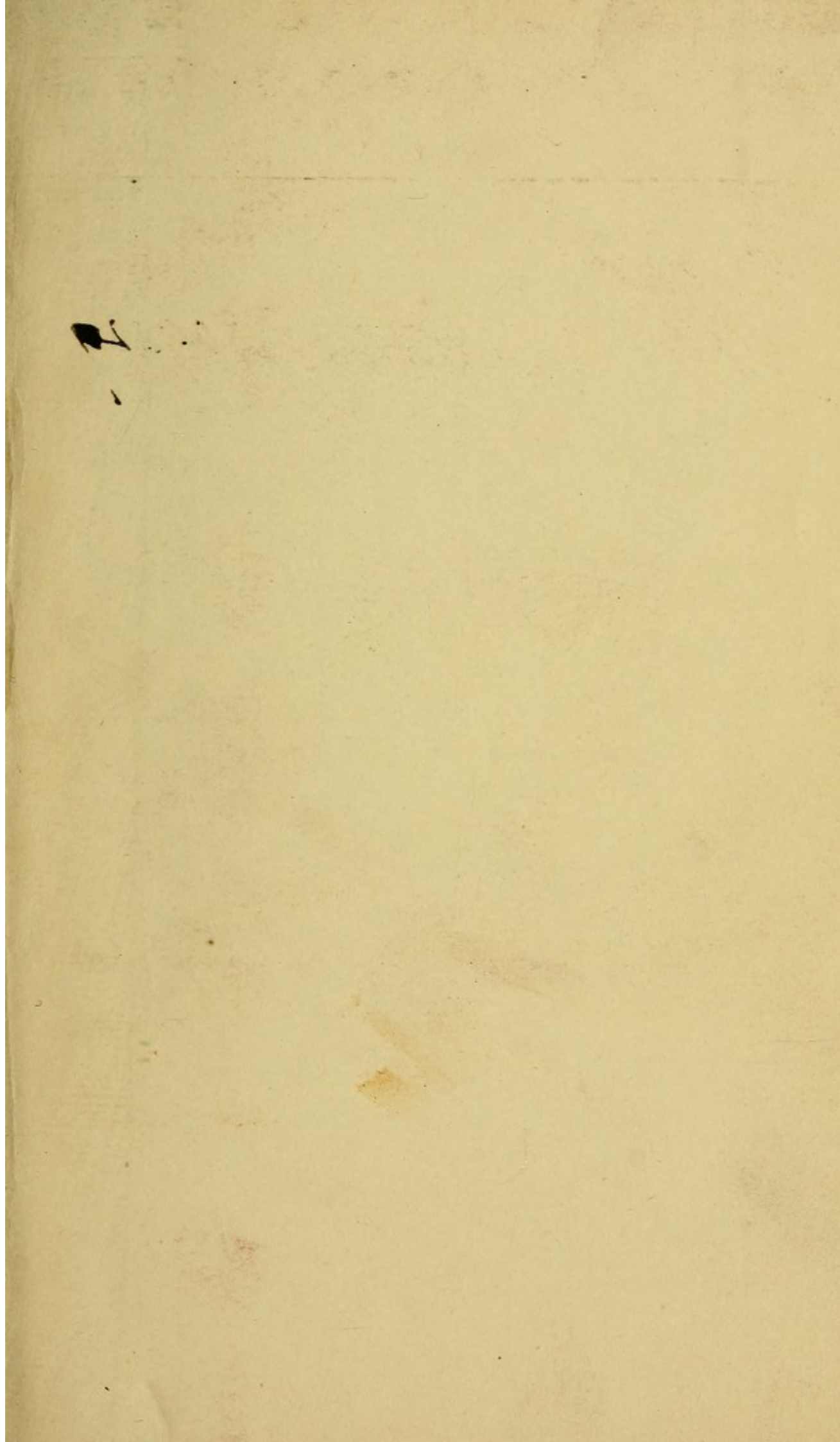
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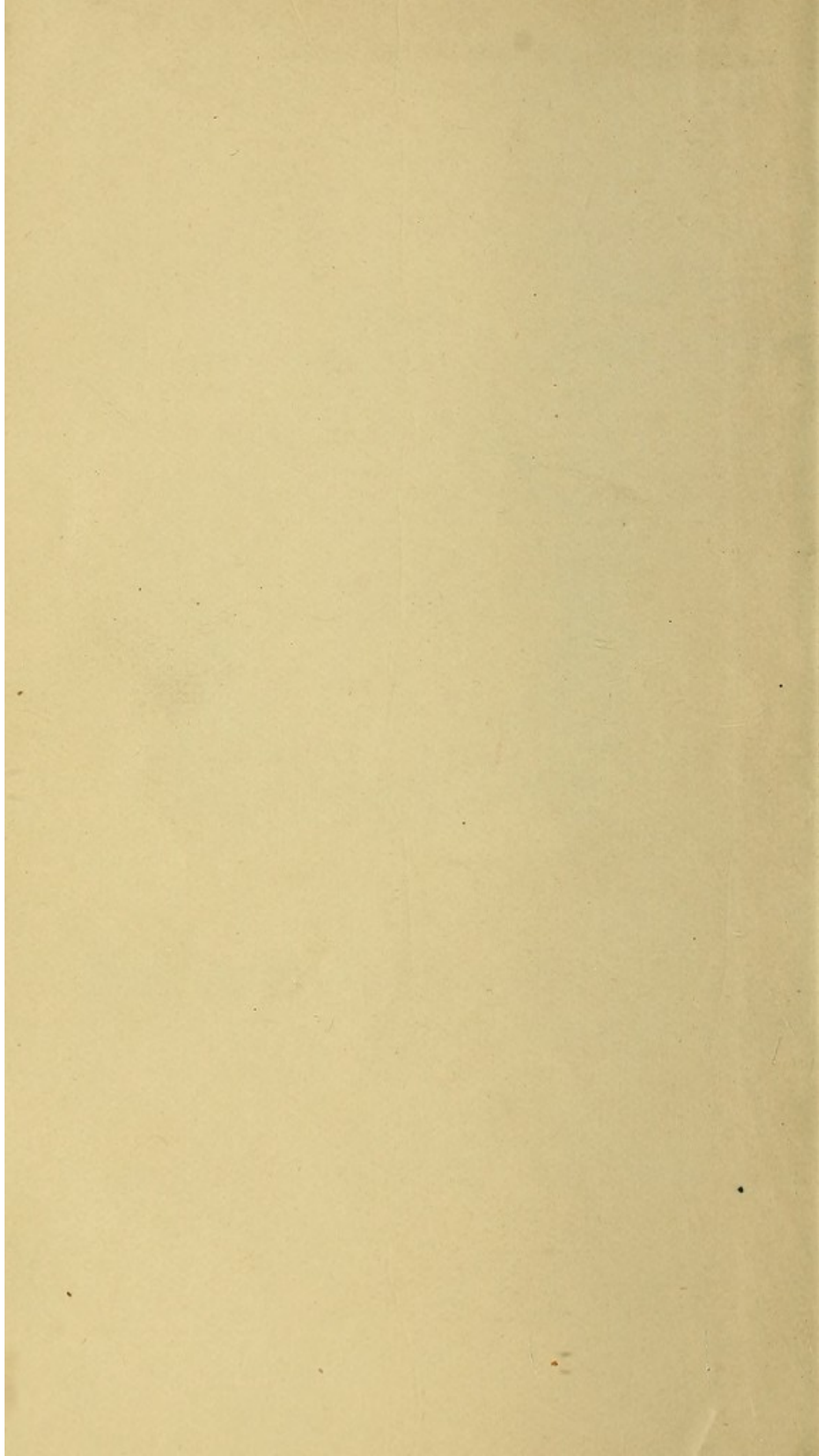


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A
DESCRIPTIVE
HISTORICAL, CHEMICAL
AND
THERAPEUTICAL
ANALYSIS

OF THE
AVON SULPHUR SPRINGS,
LIVINGSTON COUNTY, N. Y.

With directions for their use.

BY SAMUEL SALISBURY, Jr. M. D.

ROCHESTER:
D. M. DEWEY, No. 2 ARCADE HALL.
1845.

Or in Boards, Three Shillings,

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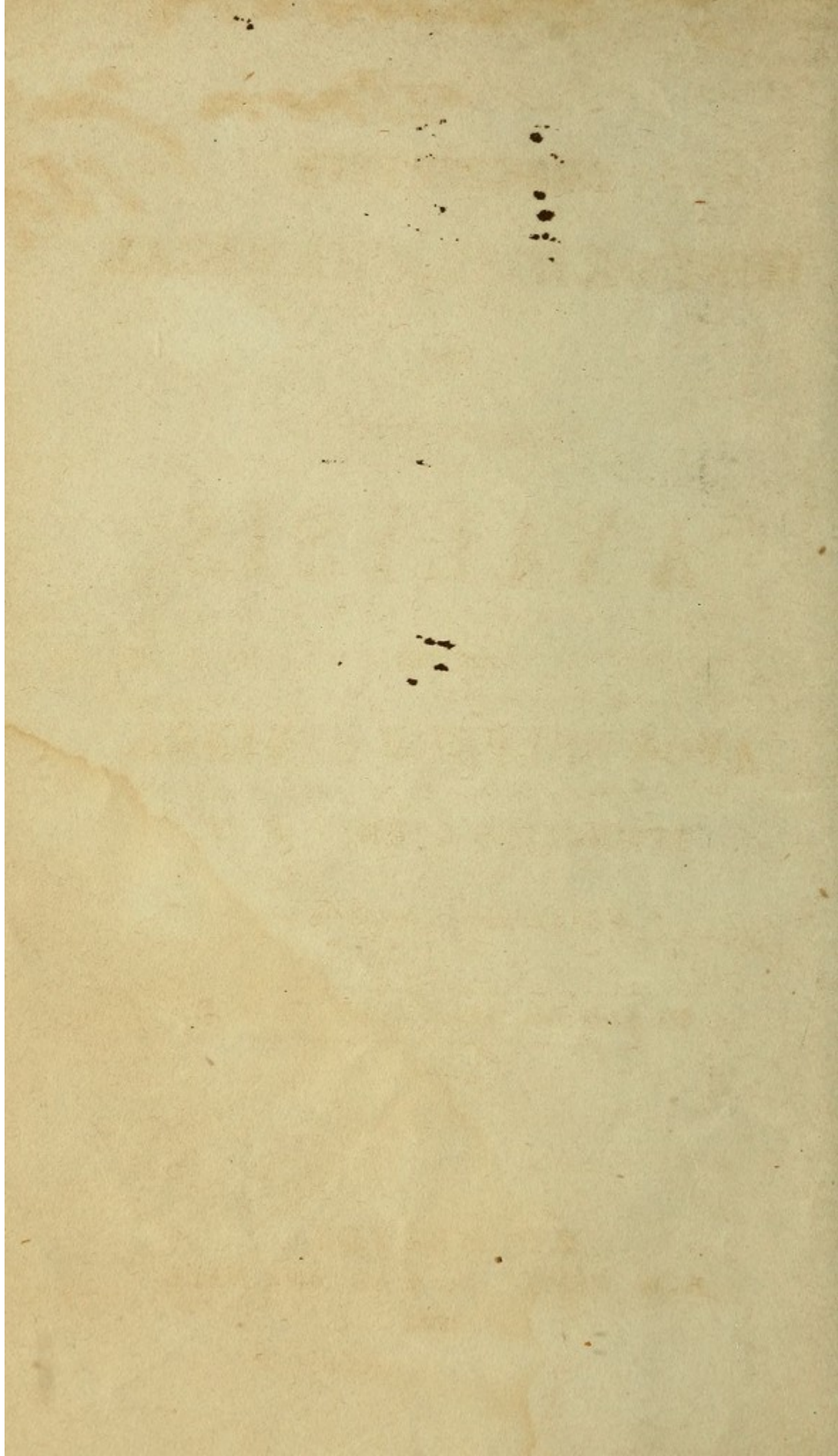
BY DR. H. L. S. SPRING

WASHINGTON, D. C.

1911

U. S. GOVERNMENT PRINTING OFFICE

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A *Avon Jan 1845*
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CHAPTER IV.

Method of using the Waters. Several Springs
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INTRODUCTORY CHAPTER.

THE following pages require only a brief introduction. The increasing celebrity of the waters of Avon, and the great number of invalids who annually resort to them, imperiously called for a treatise elucidating their sanative properties, and incidentally descriptive of the beautiful region in which they are situate. Many valuable springs, powerfully impregnated with remedial ingredients, and affording a very large supply of water, gush forth from the interior of the earth within a short distance of each other ; the curative qualities of which have been abundantly tested by the cure of many hundreds of afflicted patients. Others, owing to their unfortunate geographical position, have been visited by the *curious* alone.

Locality is an important feature in a watering place. Experience has proved that cleanliness and pleasant associations are

important auxiliaries in promoting the convalescence of patients, and that, apart from the healing virtues of mineral waters, a salubrious atmosphere and charming scenery, are potential aids in restoring the valetudinarian to health and strength. Agents derived from the mineral and vegetable kingdoms lose their effect and are often vainly used in combating disease while the brain is excited by the din of a populous city—by the agitation and cares consequent upon an extended mercantile business—by the mental toil and responsibility of professional practice, or by the artificial stimuli afforded by a life of luxurious indulgence or fashionable dissipation.

“The sultry heat of summer,” says the admired author of *Outre Mer*, “always brings to the idler and the man of leisure, a longing for the leafy shade and green luxuriance of the country. It is pleasant to interchange the din of the city, the movement of the crowd, and the gossip of society, for the silence of the hamlet, the quiet seclusion of the grove, and the gossip of a woodland brook.” Sylvan sights and rural sounds, a pure and elastic atmosphere, greensward beneath the feet, with birds and brooks and rustling leaves for music, contribute in a wonderful degree to calm a brain that has been overtaken, to strengthen a frame sha-

ken by lingering illness, and tune a heart to regular pulsations that has been unstrung by sorrow or disease. The enfeebled sufferers from the nervous derangement and continual lassitude produced by care, risk, responsibility and over excitement of the functions of the brain, in the confined air of a counting-room or office, whose only promenades are streets, the atmosphere of which is heated by a scorching sun, and too often infected by a thousand sources of impurity, and darkened by high walls of brick and mortar; can realize the elastic vigor and tone imparted to the animal system, and the superlative, mental and physical enjoyment afforded by an escape from such imprisonment to the pure air and genial sunshine of the country.

While yet you breathe, away ; the rural wilds
Invite ; the mountains call you, and the vales ;
The woods, the streams, and each ambrosial breeze
That fans the ever undulating sky ;
A kindly sky ! whose fostering power regales
Man, beast, and all the vegetable reign.

Exclude fresh air and light from the plant and it becomes blanched and sickly, the coloring material no longer circulating through its minute and delicate vessels. So it is with the inhabitants of cities ; they undergo a process very similar to the *etiolation* of the plant, the blood which is borne by appropriate vessels to every part of their bodies be-

ing deficient in the material from which it derives its bright red color. Expose blood to the direct rays of the sun, and the *red globules*, as they are called, which form a constituent part of it, are seen by the aid of a microscope to be in rapid motion. Some physiologists believe that the blood itself, which courses with such velocity through those tiny hair-like tubes which penetrate every region of the human body, is endued with a vital power of motion or self-propulsion. It may yet be established that the circulation of the fluids by which our bodies are sustained and nourished is mainly dependant upon this effect of light in exciting them to motion. Certain it is that light is a life-giving and a life-preserving principle.

The atmosphere of densely populated towns, is highly charged with vegetable and animal matter—fruitful sources of disease. The proper facilities for dispersing this by currents of fresh air, and decomposing it by sunshine, are there wanting,—in the open country these pestilential effluvia, are decomposed by the overspreading vegetation, largely diluted or dissipated by the freshening winds, and oxidized by the sun.

The history of mineral waters is that of many of “heavens best gifts to man.” Many of the blessings which an all-wise Creator has spread around us, designing them for

our use and benefit ; we disparage, misapply or cast aside as worthless, from ignorance of their value and properties.

Thus it has been with natural medicinal waters. At a very early period they were considered both a medicinal and hygienic remedy,—their history may be traced up until it is lost in the Pagan superstitions of Greece and Rome. The medicated fountains of Greece were held in superstitious veneration, and each of them regarded as the special benefaction of some particular deity. To this presiding and tutelar divinity, a temple of worship was piously erected. Esculapius, the God of Medicine, was often-er than any other, viewed as the patron to whose kindness they were especially indebted for their formation. By the Romans they were prized even more highly than by the Grecians. It is said there is not one mineral spring now distinguished for its healing qualities in the country possessed by these two nations, that is not marked by some monuments of their munificence.

During the earlier periods of christianity, by a singular fatality, an unjust prejudice was fostered against mineral waters, and they were unnoticed, or regarded as of little value. The images and shrines, the nymphs and naiads which the Pagans had erected at these fountains, were viewed with abhor-

rence by the first christians. The custom of promiscuous bathing, too, which prevailed among the Romans, created disgust in the minds of the followers of a purer and less sensual faith.

“The christians, we are informed by Bordeu, considered these objects as worldly, and, thinking that they appertained to the extravagances of Paganism, they deemed it wrong to preserve them. Their women devoted themselves to their households, giving little attention to the cleanliness and health of their bodies; they thought only of the welfare of their souls. They found too much effeminacy in the children of an age which placed so high a value upon health. The sick went to bury their infirmities in the religious houses, which were then the principal objects of regard. They concealed their maladies instead of making them public. They mortified themselves by repressing their griefs; even their sufferings were dear to them.”

Thus, the dread and disgust with which these pioneers of the cross viewed the religion and religious rites of the Romans, and the miraculous cures which their healing deities were alleged to have wrought at mineral fountains, in the shade of antique forests, and in the hollow of rocks from whence they bubbled forth, only produced

in the minds of christian nations, a suspicion and doubt as to their efficacy, and led them to a disregard of those means which the experience of ages had proved to be necessary for the health and purity of the body. Even Aix la Chapelle, so highly prized by the Romans for its thermal sulphurous waters, fell into disrepute, such was the fear of every relic of Paganism in those days. Aix in Provence, Bourbonne les Bains, and other mineral waters of a similar kind, no longer were resorted to, by the invalid for health and amusement.

Another circumstance exerted a powerful influence, and operated to the disadvantage of mineral waters in the early and middle ages. In this twilight of human reason, medicine was not a distinct profession among christians, but was practiced by monks and ecclesiastics. The monks attracted the sick to monasteries, convents and hospitals, which they founded, in which they officiated both as physicians and priests. Even until the fourteenth century there were no men of science who devoted themselves exclusively to the healing art. Grisant was physician and Pope; Hugh of Eversham physician and Cardinal; Nicholas de Fernham was Bishop of Durham. These ecclesiastical physicians, employed moral rather than physical means for the restoration of the invalid.

For relief of the sufferers from chronic disease, a pilgrimage was prescribed, as uniting with bodily exercise, the cultivation of a religious spirit.

Priests and pretenders to deep and mysterious knowledge in these times of sorcery, magic, astrology and witchcraft, impressed upon the minds of the people, a belief that mineral springs were the haunts of fairies, witches and sorcerers. The early chemists too, converted their discoveries of the secrets of nature into instruments for acting upon the excited imaginations of the unlearned and superstitious. They affected to undervalue natural waters in order to lead the people to use only their artificial solutions, elixirs and quintessences ;—so that these healing fountains which the creator of the universe designed for the benefit of man, became for a time almost deserted.

Such are some of the causes which have conspired to produce a decline of mineral waters in popular favor, and divert the attention of physicians from their employment. These still operate in some degree, and to the disgrace of an enlightened age and liberal profession; a powerful therapeutic agent has to struggle with prejudices as ancient as the religion we profess. From this historical sketch, however, may be deduced the fact, that before untoward circumstances

brought mineral waters into disrepute, sulphurous waters were esteemed among the most precious resources for the preservation of health and cure of disease.

A new epoch in their history has commenced ;—the present generation begins to view them with the highest consideration, and to assign them their proper rank among medicinal agents. We have no doubt that ere long, the present vague and empirical mode of prescribing them will give place to a system of administration better adapted to relieve those intractable diseases to which they are applicable. Already are the sulphur springs of Virginia thronged with visitors. May we not, in the beautiful valley of the Genesee, with as great a variety of highly impregnated sulphur-waters as can be found in any region of the habitable globe—combinations which experience has shown to be almost unparalleled in medicinal efficacy, hope to receive a due share of public attention.

CHAPTER I.

DESCRIPTIVE, HISTORICAL & GEOLOGICAL ACCOUNT OF THE SPRINGS.

The town of Avon is one of the most beautiful, as well as productive in the State of New York. It is on the eastern bank of the Genesee River, in Livingston county, eighteen miles from Rochester, and twenty-four miles from Canandaigua. As you enter it from the east, the Valley of the Genesee is spread out before you in all its richness. Immense forest trees with their exuberant foliage, fresh and verdant meadows and waving fields of grain are presented to your view, forming an almost unsurpassed scene of opulence and luxuriance. The name of Gen-i-shaw, or Pleasant Valley, was given it by the aborigines who inhabited the country before it was occupied by a white population. The village of Avon is eligibly situated, about one mile from the river, having an elevated position

upon the table land, and commanding a prospect of the flats, for an extent of many miles. The mineral springs are between the village and the river, in the valley below. The axe of the husbandman has not yet doomed to destruction all the magnificent forest trees in the vicinity ; the invalid may therefore here find a cool retreat from the summer's sun.

The mineral springs were long known to the Indians, who resorted to them for the cure of diseases of the skin. A portion of the Seneca tribe inhabited a village on the opposite bank of the river, (land which is now the property of T. H. Newbold, Esq.) which they called Cana-wagus. Captain Parish informed me, that this term signified lively-water ; and was applied to the settlement, in consequence of the great number of clear and limpid fountains of water in its vicinity. "The far-famed chief, Red Jacket," as Dr. Francis informs us,* enumerated them among his remedial measures for the cure of disorders of the skin ; and wasting disorders, as they were termed, were supposed capable of being removed by their use, even when applied externally. Doubtless this term included many physical infirmities, whose pathognomic features greatly differed, and many other different sorts of pulmo-

*United States Medical and Surgical Journal.

nary disorganization. I have myself seen several cases of pulmonary consumption, among the Indians. One whom I visited in 1835, seemed perfectly aware of the inutility of remedies in his case ; and, when I asked him if he did not use the mineral waters, pointing to the purulent sputa, which he had preserved, with a melancholy look he said, "not now, it is too late." Great numbers of deer were in the habit of resorting to these springs and drinking the water ; this made them desirable hunting grounds for the aborigines ; and their predilection for hunting and fishing, led them to select their neighborhood for a residence. The outlet of the Conesus, a creek which empties into the Genesee River, near the lower spring, is a spot distinguished for the abundance of excellent fish, which are caught there in early spring. Even to this day, we annually find some of these sons of the forest, the scattered remnants of a once large and powerful nation, encamped in the remaining woodland, and busily engaged in making baskets for which they find a ready sale, to the inhabitants of the neighboring villages.

A few of these unfortunate people still linger around their ancient homes, visiting every summer, those of their woodland haunts which the axe and the plough have left undisturbed.

Many historic legends of this ill-starred race are in the possession of my friend and neighbor, W. H. C. Hosmer, Esq. whose muse has shed a classic halo over the former "realm of the Senecas." The place where their former habitations stood, is unmarked by any traces of their existence.

"Where browsed the Elk in other days,
Fat herds in thymy meadows graze—
Where the fanged cougar, hating day,
Crouched by the *deer-lick* for his prey.
Heard is the tinkling bell of flocks,
And Ceres binds her wheaten shocks.
From waves, once clear as mountain rill,
Where pike and bass the red man speared,
And home his bark by torchlight steered,
The finny tribe have disappeared,
Scared by the clacking mill "

Comfortable accommodations, or good hotels are very important appendages to a watering place. In this respect, Avon is not behind other American Spas. Its hotels are not, it is true, on the enlarged plan of the "United States Hotel," at Saratoga, but their rooms are not deficient in size, and are suitably furnished—the tables spread with as many of the luxuries of the season, and the landlords as attentive as can be found elsewhere.

There are three hotels in the immediate neighborhood of the springs—Houghton's, Knickerbocker Hall and the Pavilion.

Comstock's "Eagle," and the "Hosmer

House," are at the village, but a short distance from them. That modern invention, the Omnibus is in constant use by that considerate host, Comstock, for the conveyance of his guests to and from the springs. Carriages are always in readiness for the accommodation of those who board at the village.

In the year 1792, one of the inhabitants used the waters, with perfect success in the cure of a disease of the skin, consequent upon intermittent fever. In 1795, a case of Rheumatism of long standing, which had resisted the treatment of a number of intelligent physicians, was speedily and entirely cured by their use. It was at this time, generally believed by those who were acquainted with the springs, that any disease of the skin, would readily yield to the external and internal application of the waters. Persons afflicted with the itch, were cured speedily by bathing two or three times. In 1821, a small building was erected at the lower spring, with a *showering box*, as it was then very properly called. This was the first improvement in the condition of these springs, made by their former proprietor, Mr. Richard Wadsworth. This building was enlarged and a bathing-house erected in 1823, and some efforts made to supply visitors with the accommodations requisite

for the external use of the waters. In 1828, the building which now remains at the upper spring was erected. During the last fifteen years, five public houses have been erected, and accommodations appropriate to the wants of visitors, gradually prepared. The demand for them is now increasing rapidly, and they will probably be enlarged and improved in a ratio corresponding with this demand.

In 1835, the new bath spring was discovered, and a boarding and bathing-house erected there. This spring is east of the others and nearer the village, and from the large impregnation with sulphurated hydrogen has been found very efficacious in some diseases of the skin.

In 1836, the present proprietor, A. Nowlen, Esq. purchased the land on which are two of these springs, called for the purpose of distinction, *Upper* and *Lower*, and has since come in possession of the new Bath Spring. With a laudable spirit of enterprise and zeal for the gratification of visitors, this gentleman erected at the lower spring, a large and commodious bathing establishment. The large supply of water afforded by this spring, and its accommodations are such as will, we think, satisfy the most fastidious. He has selected this spring for improvement, because for *general* use it merits

a decided preference, and by experience it has been shown to be sufficiently active, to cure the most obstinate diseases to which these waters are applicable. The large quantity of water discharged, affords an almost inexhaustible supply for external use.

The soil in the vicinity of these springs, is of the richest and most productive quality, yielding the cultivator an abundant reward for his labor ; that of the river's bank consists almost entirely of alluvial deposit, while the table land presents all the varieties of calcareous and argillaceous mould. To the botanist, an almost inexhaustible field of amusement and instruction, is here displayed, in the great variety of plants with which this part of the Genesee Valley abounds.

The two springs which have been most used, are situate, the one an hundred and the other an hundred and fifty rods from the river, in a rich alluvion of black loam, near which a considerable stream of water, formed by the union of two smaller streams, called the "Great" and "Little Conesus," empties itself into the river. The vallies of these united streams are narrow, with steep and precipitous banks, a short distance from the springs, and present to the geologist, bituminous shale, superincumbent upon transition limestone. Upon the higher

ground, at a distance from the river, boulders of every variety of size are strewn, and vegetable remains have been found from fifty to an hundred feet below the surface, showing evident indications of diluvial action. The banks of these two streams are, in many places, from one to two hundred feet in height. The "Great Conesus," is from eight to nine miles in length, and takes its rise from the Conesus Lake, which is nine miles long and from a mile to a mile and a half wide.

The following extract from the Geological survey of the State in 1838, will furnish an accurate and full account of the geology of the Genesee River :

"From the mouth of the river to Carthage, three miles below Rochester, the red sandstone and indurated marl are the only rock. The upper stratum of the red sandstone disappears beneath the river at the lower falls. Immediately above these rocks are the green shales, alternating with which are stratas of limestone, and a single stratum of iron ore. Next in order of superposition, are the calcareous shales, alternating with this strata of limestone, extending to the upper falls, and underlaying the geodiferous and bituminous limestone. The lower layers of the limestone constitute the bed of the river at the upper falls. Near

the feeder dam, scattered about upon the surface, are large angular fragments of the rocks in the vicinity.

Succeeding the limestone are the gypseous slates and marls, extending as far south as Wheatland. A single view of a bed of gypsum is given in Wheatland on Allen's Creek.

Upon the gypseous rock's lies the mountain limestone, commencing at Caledonia and near West Mendon, and extending as far south as Avon. Fragments of this rock are profusely scattered over the surface near Caledonia. Next in order succeed the limestone shales, extending south as far as Moscow. These shales are characterized by the vast quantity and beauty of the fossils found in them.

In the west branch of Beard's creek, the septaria appear. An extensive section of the rocky strata at the entrance of the gorge near Mt. Morris dam is given, embracing two layers of septaria. A few miles above the dam the alternations with the grits or thin strata of sandstone, first occur. The strata of sandstone are but few feet in thickness, and the predominance of the shales is manifest for a considerable distance up the river. The location of the Gardow slide is given, which took place about twelve years since. Above the slide the occurrence of

the shale is less frequent, though the predominance of sandstone is not apparent below the lower falls of Portage.

The falls at Portage are 96 feet in height. The river, except in times of high water, is confined to the lower narrow channel. Between the lower and middle falls the perpendicular elevation of the rocky strata, in the highest point, is 351 feet. The middle falls which are more generally visited, are 110 feet in height. The olive sandstone in the vicinity of the upper falls, is noted. Height of the upper falls 66 feet.

At Portage, the river enters the gorge, from which after passing three successive falls, and for most of the distance descending with great rapidity, it passes into the Genesee Valley near Mt. Morris. It will be noticed that boulders are scattered about upon the surface with a degree of profusion below Mt. Morris. Above this point their occurrence is less frequent.

From Moscow, along the river to Rochester, very little ever-green timber is found, while in going south a small distance, as the subsoil is more and more composed of disintegrated sandstone, the pines and hemlocks with their associates are less frequent.

The scenery of the Genesee River possesses much sublimity and grandeur, as well as luxuriance. Professor Eaton, the learned

and eloquent Lecturer on the natural sciences, in a communication for the Genesee Farmer, speaks of it in terms of unqualified praise and admiration. "Were my business concerns in a situation to admit of migration, the banks of the Genesee would be my home, until the roar of falling waters should give to my ears the last of natures echoes."

The upper falls of this river, at Nunda, Alleghany county, which are about thirty miles above on the river, are surrounded by scenery of almost unsurpassed grandeur. They are thus described by Daniel Wadsworth, Esq. of Connecticut, in a letter to Professor Silliman. "There are three distinct falls, included in a distance of three miles. They differ as much as possible from each other, having their own peculiar beauties, and each a different and laborious approach, they are respectively sixty, ninety, and one hundred and ten feet high; to see them all, is now no light undertaking, but will soon, I think, be rendered a very easy one. The cascades themselves would any where else, be objects of great admiration, and are fully deserving of a particular description; but they are almost forgotten in the feelings of wonder and even of fear, with which the sublime perpendicular walls of the river inspire you. They may truly be called walls, for they do not like the

beautiful rocks at Trenton, recede as they approach the top ; but are, for a great distance perfectly upright or impending ; and almost as regular, for a great part of three miles, as a work of art ; and rising, as the inhabitants around tell you, from two to five hundred feet, and so they appear ; but probably four hundred is not beyond the truth. To this depth the river seems to have worn its circuitous passage in the rock, in turns almost as short, and bends nearly as graceful as if winding through the softest meadows. I never have witnessed, in nature, a scene of more savage grandeur and loveliness than the view from these fearful walls, when looking into the gulf from one of their highest fronts, to the very edge of which, by trusting to the boughs of the thick shrubbery, you can approach without apparent danger."

There is a beautiful and clear lake, called the Conesus, about six miles from the springs. Three miles from its outlet is a cape of forest land extending far out in the lake, which has been for some years past a favorite resort for parties of pleasure. The lovers of romantic scenery will pass a day here with delight. To use the language of a native poet, "the blue hills in the distance, partly clothed with the primitive forest—the waters kissing the shore with an undertone of

melody—the plunge of fish and flap of water-fowl—the pleasant murmur of the wind-swept trees, mingling with the carol of sinless birds, are ministers of repose and pleasure to a mind that has been wounded by the “briars of this work-day world.” It is a bright sequestered spot, and the fabling fancy of Greece, peopled haunts less picturesque with happy spirits—a green retreat where the retired poet could wear out life, and which the wayfarer passes by with reluctance, through fear that his eye will never rest again on sights so beautiful.”

To the lovers of angling, the disciples of Isaac Walton, the stream of Caledonia, seven miles west of Avon, offers trout in almost unequalled profusion. Those who have a relish for the sport may find an opportunity in this prolific rivulet.

With the well imitated fly to hook
The eager trout, and with the slender line
And yielding rod so icit to the shore
The struggling, panting prey.

The genuine *piscator* will find advantage in passing the night here, the evening being the best time for fishing. Those who prize not the glory of the angler in returning with a basket full of the speckled game, may procure a trout supper at one of the hotels in the village which the most fastidious epicure would acknowledge to be a sterling luxury.

CHAPTER II.

CHEMICAL CONSTITUTION OF THE
SPRINGS.

The ingredients which a mineral water contain, as foreign to pure water, will, in every case, be found to be such as serve to explain its curative effects in disease. There is no need of resorting to hypothesis or fancy ; for as is the case with all medical compounds, the medical character of a mineral water must depend on the properties of its constituents. All other modes of appreciating the virtues of mineral waters, and of establishing the proper indications for their use, must necessarily be imperfect. It will not be denied however, that a successful empiricism and a comparison with other waters, the effects of which are known, and which are supposed to be similar, will serve to suggest some diseases and symptoms of disease which may be remedied by their use.

A different opinion on this subject has ma-

ny and strong advocates. It is believed that the medicinal effect of natural mineral waters does not bear an exact relation to what we know of their constituents, and that in this respect they differ from pharmaceutical preparations. The use of mineral waters is almost exclusively confined to chronic diseases, to which active purgation is generally inapplicable. It is not difficult to show that the same general principles apply to them as to many medicinal preparations. Take mercury for instance, in larger doses, it is purgative in its effects. By lessening the dose and giving it more frequently, we increase its alterative, but diminish its purgative effects. The same general principle will apply to our sulphurous waters. But they cannot be taken, without inconvenience from the quantity of water which holds them in solution, in doses proportionate to purgative doses of mercury. From a half of a grain to two grains of mercury would be alterative doses, and from ten to thirty grains. Thirty half pint glasses or seven quarts and one pint of sulphurous water administered within six or twelve hours, could hardly be retained by the stomach.

Again, like mercury, sulphurous waters have a local and a general operation, an operation upon the part to which they are applied, and sympathetically, or by absorption upon others and distant organs.

In regard to both, the effect is, in a greater or less degree, that of a stimulant ; for we find, that as directed by the mode of administration, or other circumstances, to different organs, they both alike excite these organs to an increased performance of their functions. The natural secretions are increased, which is commonly followed by a diminution of inflammatory action. When this increase of natural secretion is not produced, or but imperfectly effected,—when some peculiar state or condition of the system, or of the alimentary canal, or any other cause, prevents this effect from following their use, they are both alike productive of injurious consequences.

Sulphurous waters have been found in many parts of the United States—some of which possess valuable medicinal properties. The appellation sulphurous, has been given to those waters which contain sulphur united either with hydrogen, or with a salifiable base. Sulphur and hydrogen when uncombined, produce a comparatively slight effect on the human system. Sulphur has been used as a purgative by physicians, in doses of from one to three drachms. Hydrogen, although not adapted to the long continued support of animal life, may be respired, in large quantities, with perfect impunity. One hundred cubic inches of sulphureted

hydrogen contain only thirty grains of sulphur. Dupeytren and Thenard, made some experiments in order to ascertain its action on the animal economy, and found that the presence of 1.1500 of it in air, was instantly fatal to a small bird; 1.800 killed a dog, and 1.250 a horse.

The chemical constitution of sulphurous waters is very various; but it is believed that they all contain sulphureted hydrogen, either in free state or in combination. Their classification by European writers has been wholly founded on the difference in the mode of existence of the sulphurous ingredients. They are generally divided into three orders. The first includes all those sulphurous waters which contain free and uncombined sulphureted hydrogen, (or hydro-sulphuric acid, as it is sometimes called,) without any excess of sulphur; that is, no more sulphur than is found combined with hydrogen in the form of an acid gas, or with oxygen, forming sulphuric acid, which is one of the constituents of those salts called sulphates, with which these waters are often impregnated.

To this order belong most of the sulphur springs in this country, which have been made the subject of analysis. Their effect upon the human system finds an explanation in the known action of sulphureted hydro-

gen on the mucous membranes, aided, as it is, by the saline purgatives and diuretics which they contain. Their purgative operation is probably not increased, and in some states of the alimentary canal, is diminished by the sulphureted hydrogen. This is shown by the fact, that the Avon water, when deprived of a portion of its gaseous contents by boiling, is commonly rendered a more brisk, though a less thorough and efficient purgative; and this conclusion is further established by the well attested observation in regard to the white sulphur water, viz: that although it contains less sulphureted hydrogen and a smaller amount of active saline materials than the Avon, yet it operates as a purgative much sooner, with perhaps, however, a less extended and general influence. The action of the former, like that of the neutral salts, is supposed to be upon the stomach and small intestines more especially, while the large intestines and all the mucous membranes receive a powerful excitation from the latter, unattended, sometimes, with an immediate purgative operation.

The second order of sulphurous waters comprise those in which the sulphureted hydrogen is only found in combination, forming with bases existing in the waters, what are called hydro-sulphurets. These contain

no free hydro-sulphuric acid, (sulphureted hydrogen,) and no excess of sulphur. As an example of this order, the analysis of the waters of Barregees, in the upper Pyrenees in France, made by M. Longchamps, shows that they contain carbonate of soda, hydro-sulphuret of soda, sub-carbonates of lime and magnesia, silex, azote, but no free sulphureted hydrogen, (see Manual of Materia Medica, by Edwards and Vavasseur.) European waters of the first order are considered doubtful remedies in pulmonary cases, and great caution is thought requisite in their use ; whereas those of Barregees and of the Oriental Pyrenees such as Escaldes, Vertut, and Arles, belonging to the second order, are viewed as peculiarly applicable to such cases, and have for a long period, sustained a high reputation for their cure. This fact may be of much practical importance, and should lead to a thorough examination of those of the United States, the odour of which does not indicate the presence of a large quantity of sulphureted hydrogen. From a recent analysis by Dr. James R. Chilton, the water of a sulphur spring at Sharon is found to contain hydro-sulphurets ; in consequence of the large quantity of free sulphureted hydrogen which it also contains, it belongs to the first order and may not, therefore, be adapted to pul-

monary cases. The Red Sulphur Springs of Virginia, contain a sulphurous compound, which Mr. Hayes, their analyst, has not named, but they contain four cubic inches of sulphureted hydrogen in a wine gallon; they are therefore from the first order

The third order includes those sulphurous waters which contain an excess of sulphur. Whether this substance supersaturates the *free* or the *combined* sulphureted hydrogen, or how it exists in the water, I have never seen fully and satisfactorily explained. Those called the Clifton Springs, in the town of Phelps, Ontario county, N. Y. are probably examples of this order; for the stone, leaves and branches of the trees, over which they pass, are found incrustated with sulphur in a pulverulent form. Immediately after it issues from the earth, this water becomes changed and of a yellowish color. At Aix-la-Chapelle, the dome of the vault which encloses the spring which supplies the "Emperors" bath is said to be incrustated with a fine pulverulent, sublimated sulphur. This is opened at times, and the sulphur brushed off, which is sold under the name of "Aix Sulphur." The hydrogen, which flies off in a gaseous form from this water, is supposed to be supersaturated with sulphur; and hence the excess of this substance is deposited very soon after it becomes æriform.

It is certain that the activity of sulphur waters as therapeutic agents, cannot be very much increased by this excess of sulphur. We should rather infer, that were this substance acidified by union with hydrogen, (of which there appears to be a deficiency,) and sulphureted hydrogen formed, their effects on the human system would be more potent.

In order to explain with more clearness and precision, the distinctive characteristics of the two last orders, Anglada, a French writer on the thermal waters of the Oriental Pyranees, makes the following illustration: "Sometimes the union of an atom of hydrogen and an atom of sulphur, forms an acid, which susceptible of the gaseous form, can be separated from its saline combinations without parting with its sulphur; we then have what are called *hydro-sulphurets*. At other times, this compound of an atom of sulphur acquires, especially when in combination with a base, the property of retaining larger proportions of sulphur, so that when we destroy these combinations by means of a stronger acid, we separate on the one hand, this excess of sulphur in a concrete form, which is precipitated, and on the other sulphureted hydrogen in a gaseous state."

From this view of the chemical constitution of sulphur waters, it appears that they are all mineralized, either by sulphur in com-

bination with hydrogen and a salifiable base, constituting what is called a hydro-sulphuret. An excess of sulphur may exist, as is supposed, either in the sulphureted hydrogen, or in the hydro-sulphuret, forming a third order.

*“The combinations of sulphur, which, by their solution in water, give to water the character generally admitted to be sulphurous, are sulphureted hydrogen, or hydro-sulphuric acid gas—the hydro-sulphates or hydro-sulphurets—and the hydro-sulphated sulphurets or hydro-sulphureted hydro-sulphates. Thus, the characteristic distinction of those mineral waters called sulphurous, is in the solution of the above compounds in the water.”

In thus classifying waters which are evidently sulphurous, the reader will not, it is hoped, forget that we are only reviewing the most important agent contained in those sulphurous waters which have enjoyed the highest reputation. There is another prominent distinction among sulphurous waters which should not be overlooked. The White Sulphur, the Harrowgate, (English,) and the springs most frequented at Avon, are to be distinguished from other waters of the sulphurous class, by the large quantities of purgative salts which they contain.

*Historique sur les eaux minerales par J. L. Alibert, Paris, 1826.

LOWER SPRING.

This spring, in its original state, formed a large pool of perhaps fifty feet in diameter; in this the early inhabitants were in the habit of bathing. It was the one first made use of, and either from its less disagreeable taste or less nauseating qualities, it has always been more resorted to than the rest, and has been generally more effective. Dr. Francis, who has for many years recommended these waters, gives a decided preference to this spring. It seems to me, however, better to use those which appear best adapted to the disease which it is proposed to treat, and to the age, sex, constitution and habits of the patient; in most cases the lower spring is undoubtedly superior. In the other springs, the hydro-sulphuric acid is too abundant for most persons, and oftentimes occasions a distressing nausea and vertigo. The water of this spring seldom produces any nausea or vertigo. Nor is it common for any unpleasant sensation of the stomach, to follow its use even in large quantities. It rises from a fissure in a rock, thirty-six feet below the surface of the ground, about one hundred rods from the Genesee river, and about thirty rods from the Conesus creek. The volume of water discharged from this spring, is the same at

all seasons of the year, and does not appear to depend in the least upon atmospheric influence ; as nearly as can be ascertained, under existing circumstances, it is fifty-four gallons in a minute. The temperature of the water is from 45 to 47 degrees Far. Its specific gravity is 10.018. Its taste resembles that of a solution of hydro-sulphuric acid, but is more bitter and saline ; it has a strong odour of this acid. As it issues from the fountain, it is limpid, transparent, and somewhat sparkling. Examined by the aid of reagents, it contains as foreign to pure water, hydro-sulphuric, carbonic and sulphuric acids, chlorine, carbonate of lime, lime, magnesia, and soda. By delicate experiments, the less obvious ingredients of mineral waters are not indicated. Dr. Francis observes, that an analysis of these waters, which he caused to be made in 1842, did not afford satisfactory evidence of their containing Iodine. Nevertheless, a strong probability is that both Iodine and Bromine enter their composition. It should also here, be mentioned, that an analysis of the hydro-sulphurous waters of Caldas da Raynha, whose chemical constitution is similar to that of the Avon waters, was published in the London Philosophical Magazine, for Sept. 1834, and shows that both Iodine and Bromine enter into the composition of those

waters. Dr. J. R. Chilton of New York, in 1842 discovered Iodide of Sodium in the waters of the Sylvan spring.

Analysis of Lower Spring—In a wine gallon, gaseous contents—			
Sulphated Hydrogen,	10.02 cub. in.	Carbonic Acid,	3.92 cub. in.
Nitrogen,	5.42 do	Oxygen,	.56 do.
Solid Contents—			
Carbonate of Lime,	29.33 grains.	Sulphate of Magnesia,	49.61 grains.
Chloride of Calcium,	8.41 do.	Sulphate of Soda,	13.73 do.
Sulphate of Lime,	57.44 do.		
Total,			158.52 do.

UPPER SPRING.

This spring has been in use since 1827. It has been proved by the cures which it has effected, to possess similar medicinal qualities to the lower, and is by some, even more highly prized. In sensible properties, it bears a close resemblance to it ; but there is a peculiar sweetness of taste which distinguishes it. The deposit around it is mostly of a dark blue color, while that of the Lower is white. It rises about sixty rods east of the other, and is at an elevation considerably above it. The bed of sand through which I am informed this water oozes, is about twenty feet, and the rock about thirty feet below the surface of the ground. One gallon from this spring, according to Professor Hadley, of the Institution of Fairfield, Herkimer county, was found to contain the following substances, and nearly in the following proportions, viz :

In a wine gallon, gaseous contents—
 Sulphureted hydrogen, 12 cubic inches.
 Carbonic acid, 56 “ “

Solid contents—

Sulphate of magnesia,	10. grains.
Sulphate of lime,	84. “
Sulphate of soda,	16. “
Carbonate of lime,	8. “
Muriate of soda,	18.4 “
	<hr/>
	136.4 grains.

NEW BATH SPRING.

This spring was discovered in 1835, and has been in use since that time. Dr. Lewis C. Beck made an analysis of some of the water from it in 1838, which has been published in the Geological survey of the State. Its depth is about thirty six feet, and the formation through which the water rises is the calciferous slate similar to that found at Rochester. The temperature of this spring is 50° F. The specific gravity of the water 1.00356. When heated it assumes a beautiful green color, the cause of which has never as yet been satisfactorily ascertained. The solution of arsenious acid is but slightly altered by it until after the addition of an acid; from which it is inferred

by Dr. Beck, that a portion of the sulphureted hydrogen is in a state of combination with some basis.

Analysis by Lewis C. Beck, M. D. in a wine gallon, gaseous contents—

Sulphureted hydrogen, 31.28 cubic inches.

Solid contents—

Sulphate of magnesia,	8.08	grains.
Sulphate of lime,	3.52	“
Sulphate of soda,	38.72	“
Chloride of sodium,	5.68	“
Carbonate of lime,	26.96	“
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Total,	82.96	grains.

The three springs which have been called for the purpose of distinction, the Lower, Upper, and New Bath, are the property of A. Nowlen, Esq. a gentleman who is a resident of Avon. Accommodations for bathing have been in a state of progression to meet the gradual increase of the number of visitors, since he became their proprietor. We have no doubt that the public wants in this respect will not only be readily met, but anticipated. From his accustomed hospitality and kind attentions to the strangers who visit Avon and form an acquaintance with him, we entertain hopes most propitious to the future improved condition of these mineral fountains. The water of the Lower

Spring having become an object of transportation to different parts of the country, the question how this may be most safely effected, is of some practical importance. These waters are all clear and transparent, until their temperature is raised, when they are decomposed partially and become turbid and milky. The bottles containing them should be placed in iced water for some time before the corks are drawn. This refrigeration has the effect, by restoring them to their original temperature, forty-five degrees Fahrenheit, of redissolving their saline ingredients; and will render them again limpid. Mr. Nowlen attends all orders for the water promptly, and bottles them with much nicety and care.

IODINE OR SYLVAN SPRINGS.

About two miles south of the lower, there are three springs, one of which only has been analyzed. They are situate in a circular dell, in the midst of the forest. All of them are distinguishable from others in this vicinity by their saltish taste. The only one of these which has been analysed, contains a very large proportion of the chloride of sodium, and it is probable they all have a large impregnation of this salt.

One of them is evidently very little sulphurous, the taste being similar to that of the Saratoga waters after exposure to the air. The other has sensible qualities which lead me to infer that it contains a very large quantity of the chloride of sodium, and therefore Iodine ; for Iodine has only been found in those waters which contain this salt in abundance.

Copy of a letter to the late JAMES WADSWORTH, Esq., of Geneseo, with an analysis.

NEW-YORK, May 23, 1842.

JAMES WADSWORTH, Esq.,

Dear Sir—I have just completed the analysis of the sulphur water of the Sylvan Spring at Avon. The result which is given below shows that it is a valuable medicinal water. There is a large proportion of sulphur in it, and it contains among other important ingredients, Iodine in combination with sodium. You will observe that I have not stated the quantity of iodide of sodium, for to enable me to do so with any degree of accuracy, I would require a greater quantity of the water, at least two or three gallons. If you will send me a sufficient quantity, I will at any time ascertain the proportion.

According to my analysis, one gallon of the water contains as follows :

	GRAINS.
Chloride of Magnesium,	62.400
Chloride of Sodium,	97.440
Sulphate of Lime,	80.426
Sulphate of Magnesia,	12.960
Carbonate of Lime,	26.800
Carbonate of Magnesia,	15.974
Vegetable Matter,	.240
Iodide of Sodium,	
	<hr/>
	296.24

Sulphureted Hydrogen,	20.684
Carbonic Acid,	4.992
	<hr/>

Cubic Inches, 25.676

The great attention which has of late years been given to the use of the sulphureted mineral waters of this country by those laboring under various obstinate chronic complaints, has been attended with the happiest results. Their internal and external use forms a very successful means of treating those intractable cases which sometimes resist all ordinary treatment. Much of this beneficial effect is unquestionably due to the sulphur existing in the water in the form of sulphureted hydrogen. The water of the Sylvan Spring, at Avon, is highly charged with this gas, and contains also a large pro-

portion of important saline ingredients, which renders it gently aperient, and eminently well calculated for the treatment of the diseases indicated. Signed

JAMES R. CHILTON, M. D.,
Practical Chemist.

CHAPTER III.

THE THERAPEUTIC PROPERTIES OF THE
AVON SPRINGS, DEDUCED FROM A
KNOWLEDGE OF THEIR INGREDIENTS,
AND FROM EXPERIENCE.

A beneficent providence has prepared many combinations to mitigate the sufferings of humanity and remedy the diseases to which it is incident ; but ignorance of the proper manner of using them, and, too often prejudice, which is the natural consequence of this ignorance, defeat her purposes. When therefore the chemical constituents of such waters as are distinguished by their sensible properties and medicinal effects from others, which from their purity, were evidently designed to be used as a common beverage ; when the chemical history of these medicated fountains is perfectly understood, it remains for physicians to investigate their application to the cure of diseases and the best mode of administering them ; in short, it becomes their duty to make them-

selves familiar with their whole medical history. Alibert has very truly observed, "*la science des eaux minerales est a refaire,*" for however advanced their chemical history may be, their medical history has not received the attention which it evidently deserves. The chemical constitution of many of the mineral waters of the United States has been made the study of distinguished chemists. The researches of Chilton, Hayes, Beck and Chas. T. Jackson, have made us familiar with the ingredients of our principle mineral fountains; but, if we except the Treatises of Drs. Steel and Allen on the Saratoga waters—that of Dr. J. W. Francis on those of Avon, and some communications of Dr. J. J. Moorman, which have appeared in the Boston Medical and Surgical Journal, on the White Sulphur Springs in Virginia, very little progress has been made in the elucidation of their medicinal properties and application to the cure of diseases. There is certainly a manifest inconsistency in neglecting to acquire a practical knowledge of the medicinal effects of compounds of sulphur, soda, magnesia, iodine, bromine, iron, &c. which have been prepared in nature's laboratory, with a chemistry of unequalled subtlety, while we daily prescribe for our patients, combinations of the same substances, which are mere imitations, and of

much less efficiency. Yet physicians unblushingly avow themselves unacquainted with the *modus operandi* of our most celebrated mineral waters, who would be very unwilling to acknowledge their ignorance of the nature and effects of any other medicinal compound or therapeutic agent in the whole range of the *materia medica*. Dr. Granville, in his remarks on the prevailing ignorance of English physicians in regard to foreign mineral waters relates several examples which have occurred in his experience. He had advised a patient to resort to a very celebrated Spa as the only likely means of strengthening the system and fortifying it against future attacks of a disease to which he had been subject. A practitioner in London, of the first respectability, who acted in consultation at the time, did not actually deride, but seemed to hold very cheap, the alleged efficacy of foreign mineral springs. Upon being questioned however, as to his knowledge of their peculiar properties, he candidly confessed his entire ignorance.

“To know the composition of a mineral water,” says Bergman, “is to precede in some degree our experience.” A medicinal compound is presented for our consideration: if it be composed of substances, the medicinal efficacy of which is known and appre-

ciated, a knowledge of the laws of the animal economy will serve to instruct us what its action on the human system will be. In regard to some mineral waters there is, it is true, an apparent discrepancy between the deductions of experience, and those of analysis. This may be accounted for however, by considering the rapid changes which the science of chemistry has undergone since the earlier writers published the results of their investigations, and the difficulties attending the discovery of the truth.

An intimate acquaintance with the effects of the constituents of any compound, separately considered, is of great importance, in order to enable us correctly to appreciate the share of influence which each of them has in its general effect. Viewing, in this manner, the sulphurous-saline waters of Avon, we find them distinguished for the large quantity of free hydro-sulphuric acid, (sulphureted hydrogen) which they contain, a compound, as its name implies, of sulphur and hydrogen. This acid-gas was discovered by Scheele in 1727; and being found to be a compound of sulphur and hydrogen, received the name of sulphureted hydrogen. It being afterwards discovered that it possessed the properties of an acid, it received the name of hydro-sulphuric acid. Liebig,

in his treatise on Animal Chemistry, has suggested an analogy between the effects of sulphureted hydrogen and prussic acid. He considers it clearly proved by the remarkable change of color and of coagulability in the blood of animals which have been destroyed by prussic acid, that it acts chemically upon this fluid, forming a compound of iron which is incapable of absorbing oxygen; thus, as he supposes, both of these substances produce such a change in the blood-corpuscles that they lose the power of absorbing and supplying oxygen to the tissues, and of transmitting carbonic acid from them. Sulphureted hydrogen, the effect of which is equally powerful, he supposes to act in a similar manner upon the blood-corpuscles. As however the science of chemistry, in its present state, cannot afford us a perfect elucidation of the effects of this agent on the animal economy, some other authority than that of the "philosopher of Giessen" must be invoked. If our observation of the *modus operandi* of medicines were confined to the chemical changes which they produce, other and equally important alterations of structure and of functions would be likely to be overlooked or not duly estimated.

The distinguished physician, John Armstrong, of London, in a treatise which he published on "chronic diseases and sulphur-

ous waters" in 1818, says, that as far back as the year 1807 it was customary for him to send patients afflicted with chronic diseases which resisted the application of all ordinary means to Harrowgate, recommending them to drink the sulphurous water there. For some time he solely attributed the efficacy of the water to its purgative property, together with the peculiarity that its long continued exhibition caused no debility. But cases of chronic disease fell under his observation at various times, in which the sulphurous water was decidedly beneficial, and that too when the bowels had been but scantily moved ; and as the effect in these cases could by no means be purely attributed to its action on the intestines, he was led to inquire whether it might not have some other agency which had escaped his observation. He came to the conclusion afterwards that the chief efficacy of sulphurous waters *depended on the sulphureted hydrogen gas which they contained*, and that this gas resembled mercury in its operation, having an advantage over mercury in not as much exhausting the energies of the system. From an attentive observation of the operation of the different springs at Avon, I am led to concur with Dr. Armstrong, in attributing much of their efficacy to the sulphureted hydrogen which they contain, and I

have also observed a similarity between their action and that of calomel. As however this resemblance is greatest in the Lower Spring, which contains less of this gas and a larger impregnation of saline substances than the rest, and as the highly prized White Sulphur Springs of Virginia, have been found by analysis to contain comparatively a small quantity of this gas and very similar saline constituents with the Lower Spring at Avon, I infer that the agency of these salts is scarcely less important than that of this gas in the alterant effect of the Harrowgate, Virginia and Avon waters.

On this point there has been some discrepancy of opinion, and as the question whether these waters lose their properties by transportation is involved in its decision, it has much practical importance. Dr. Moorman views it as "a matter of little or no importance whether this gas escapes or not, as the water," he thinks, "is equally as salutary without as with it, and does not thereby lose its medical virtues;" another writer on the Virginia Springs, Mr. William Burke, seems to manifest fears lest it should be used by invalids when at a distance from the springs, and the good effects lost; and also that it will be successfully imitated by some apothecary.

Much good may arise from the transportation of sulphurous waters, or from the use of an artificial imitation of them. The water of the Lower Spring at Avon loses but little of its gas when transported to a distance, if the bottles containing it, have been properly corked and sealed at the spring. Many cures commenced at the springs have been perfected by its use at home.

Again, we find the waters of Avon impregnated with an alkaline carbonate, the carbonate of lime. This substance is alkaline and antacid—forming no purgative combinations with the contents of the stomach. Hence it is adapted to the relief of that kind of diarrhoea which is caused by acidity of the *first passages*. It is also viewed as manifesting a peculiar action on the lymphatic system of vessels, producing the resolution of glandular and visceral swelling. Its effects on the urinary organs are manifested both by exciting them to action, in the same manner as diuretics properly so called, and also by changing their secretions. Hence it is used in scrofula and in some diseases of the bladder.

Chloride of calcium is, in small doses, tonic and deobstruent; it has been successfully used in typhus fever, ill-conditioned ulcers, and in some diseases of the skin.

The sulphates of lime, magnesia and soda are other compounds found in these waters. The two last are saline aperients or purgatives, according to the dose in which they are administered.

The sulphate of magnesia, epsom salts, is an active and efficient purgative. Although the quantity of this salt, contained in the water used, is comparatively small; yet its effects are so much increased by its large dilution with water, and by its combination with other neutral salts, as to render it better adapted to chronic diseases, and less liable to produce irritation than the large doses commonly administered. "It is chiefly on account of the small portion of the neutral salts dissolved in the Harrowgate sulphurous water, says Dr. Armstrong, that it operates on the bowels; and even in the prescription of purgatives for chronic diseases, we should do well to imitate nature in this particular; for repeated observation has convinced me, that we give far too large doses of purgative salts in chronic diseases, the effect of which is generally to irritate the system first and to exhaust it afterwards." The popular use of this salt as a domestic remedy is in doses of from one to two ounces dissolved in a part of a teacup of water. This quantity generally produces several liquid evacuations. These are sometimes

so copious as to cause much inconvenience to those in good health and to be attended with serious consequences to invalids. A degree of flatulence is also frequently produced which continues for a considerable length of time after the operation of the medicine.

Besides, when the immediate effect of the medicine administered in this way, has passed off, a constipated state of the bowels sometimes follows. But physicians have found by experience that the distressing effects of these full doses may be avoided by dissolving a small quantity of the sulphate of magnesia in a large quantity of water. From one to two drachms of this salt dissolved in a pint, or a pint and a half of water, or taken at the same time, will produce all the purgative operation which is required in most cases, and is not productive of so much irritation.

The "Lower Spring" contains of this salt 49. 61 grs. in every gallon of the water.—The White Sulphur of Virginia, contains 44. 70 grs. in the same quantity of water. Both of these when heated and thus deprived, in a measure, of their gaseous contents act as aperients and their effects on the human system are said, by those who have made use of them both for chronic disease, to be very similar. Water serves many

purposes in the animal economy, some of which have been already ascertained. It is not only a solvent of the food received into the stomach, and thus aids in the process of digestion ; but it combines chemically with the hydrochloric acid of the gastric juice and the soda of the blood and bile, which substances it derives from the common salt with which our food is so frequently seasoned. It cannot appear surprising then that the soda, magnesia and lime when combined by the hand of nature as these substances exist in our mineral waters, and when so largely united with this compound of hydrogen and oxygen, should have the ratio of their action on the human system very much increased.

“The long use of ordinary medicines,” continues Dr. Armstrong, “almost always tends to injure the general powers of the system ; but this is not the case with those waters which contain the sulphureted hydrogen gas largely, for they have an invigorating influence, even when taken almost daily for weeks together.” * * “Nor need we fear, with the exception of complaints of the chest, to purge patients freely every day with the Harrowgate water ; for under this system of depletion, they generally gain flesh and strength, particularly in gastric, hepatic, and intestinal affections.”

Even when the Avon waters purge patients daily, I have found that the appetite is very much increased and the digestive organs stimulated to a more perfect discharge of their functions. Nature, in her preparation of compounds for chronic disease, appears to form only such as, when judiciously used, increase the secretions, without producing irritation, or greatly accelerating the peristaltic motion of the intestines.

Most observers have united in the belief that the peculiar effect of sulphurous waters is an increased action of the secretory organs; but some difference of opinion exists as to their immediate or primitive effect or that which is precedent to increased secretion. The use of the terms *stimulant* and *sedative*, with an indefinite meaning attached to them, has perhaps been a chief cause of this. All agents possessed of the power of affecting the human system have both a stimulant and sedative effect upon it, according to the quantity or the mode in which they are administered, and the condition of the human body at the time when they are used. A small quantity of a medicinal substance will produce a stimulant effect, when a larger or excessive dose will act as a sedative. This fact is one of common observation. Alcohol and alcoholic liquids possess a high degree of stim-

ulant power in proportion to their sedative, which only appears when they are used in excess. For this reason physicians have been in the habit of calling them stimulants, and when they speak of any agent as being a stimulant, or a sedative, they mean, the proportion which these two opposite effects, that may be produced by the agent, bear to each other. Medicines present an almost infinite variety in this respect. This variety is so great, and the state of our knowledge of their precise operation under all the varied circumstances attending their administration, so imperfect, as to prevent hitherto any established classification of them founded on this difference of action; physicians have therefore merely distinguished medicines according as they are found to be best suited to act upon particular parts or organs of the human body. They have, agreeably to this distinction, called them purgatives, expectorants, diaphoretics, diuretics, &c. &c. It appears to me highly important that definite views be entertained of the immediate effects of medicines, and there is, as has been before remarked, some discrepancy of opinions in regard to the immediate effects of sulphurous waters. We find in the treatise on mineral waters of William Saunders, London, 1805, page 411, second edition, the sensible effects of the Harrowgate waters

are described as "headache or giddiness on being first drank ; and as it should appear, more frequently than follows a full draught of the simpler waters. The water of Aix-la-Chappelle is described in the same work as producing "some degree of cheerfulness and gaiety of spirits, but, if taken largely, it slightly affects the head with some degree of vertigo and sleepiness. It sometimes excites nausea," &c., page 432.

Bordeu considered the waters of Bareges as "producing a marked excitation of the whole organization and determining in a special manner critical movements from the centre to the circumference. He viewed them as "stomachics, as stimulant of the digestive functions, increasing the appetite and rendering nutrition more perfect." Another writer on the Bareges waters, Mons. Gasc, informs us that when using them "*la bouche est pateuse et fade, et l'appetit sensiblement diminue les premiers jours.*" Others view all mineral waters as stimulants and adduce for proof the former celebrity of those of Bath in England, which are remarkable for their purity and freedom from mineral impregnation. Water is an article of diet and the common experience of mankind teaches them that when free from a distinguishing proportion of mineral and medicinal ingredients, it is not under ordinary

circumstances, a stimulant. We have only then, amidst the prevailing discrepancy of opinions on this point, to refer to the mineral ingredients, which the different springs at Avon are known to contain as foreign to pure water, for an explanation of its curative effects in disease.*

The primitive action of Avon water is followed by certain secondary effects, which are, a perceptible increase of the secretions from the alimentary canal, the augmentation of the cutaneous and pulmonary respiration, and the secretion of urine; in other words, they become cathartic, diaphoretic, expectorant, and diuretic.

In regard to the cathartic operation of this water, we find some upon whose digestive organs it acts promptly and effectually; others again, upon whom the largest doses produce not the slightest effect. In some cases, the water acts readily at first; and, in a short time, perhaps after the first week, seems rather to produce constipation. This disparity of action we conceive to be owing to some peculiar state or condition of some of the different parts or organs of the body of the individual using the water, which renders them more or less susceptible to its influence; what this state or condition is, in the present imperfect state of

* The sulphureted hydrogen must, of course, make them *stimulant*.

our knowledge of hydro-sulphurous waters, it is impossible to determine! A long course of observations and numerous cases are requisite to decide with any degree of exactness. In some cases which I have seen, the stimulant effect has been perceptible upon the skin solely; and it would appear probable, that the excretions from the cutaneous surface were so abundant as to deprive the system of all the products of intestinal action. Generally, four or six half-pint glasses, drank during twenty four hours, produce a mild cathartic effect; and under its long continued use to this extent, no debility ensues, but, on the contrary, the appetite and strength are very much increased.

As it is to chronic diseases that these waters are particularly applicable, any thing more than a daily and healthy movement of the bowels is usually not desired. We ought not in these cases ordinarily to seek for any considerable increase of the natural evacuations. It is certain that when these waters purge very actively, their alterative effects are commonly less than where their action upon the bowels is more subdued. As however in some cases it is found that they do not produce sufficient cathartic effect, it frequently becomes necessary, to accompany their use with other purgatives. The mode which has succeeded best in my practice has

been, to administer according to the circumstances of different cases, either the compound rhubarb or aloetic pills, or the blue pill at bed-time, to be followed by a half-pint bottle of the heated water, before breakfast the next morning.

It is however, for its action upon the skin particularly, that this water is conspicuous. This increased activity which the functions of the skin receive, is manifested by an itching sensation, or, as it has been described, a feeling similar to that of the stinging of small insects; and there is often a florid color of the body, showing the high degree of capillary excitement produced. There is also, in most cases, a sensible increase of perspiration; and frequently, even gentle exercise produces profuse sweating. The oily, unctuous feeling of the surface of the body, on leaving the bath, also shows the capacity of this mineral water to cleanse the skin: the alkaline carbonate, which is one of its component parts, forming a species of soap with the oily matter collected upon the epidermis.

But it is to chronic inflammation of the skin whether effusive, suppurative, depositive or, squamous that the Avon water is particularly applicable. In many of these diseases successive crops of eruption appear and disappear, passing through separate

stages of inflammation, followed either by effusion, suppuration, deposition or desquamation. Any agent or alterative which restores the skin to a healthy condition must do so, by increasing its power of discharging its functions of exhalation or elimination, and of absorption. Now this cutaneous envelope of the body is continuous with the mucous membranes which line the nose and mouth, and the respiratory organs, as well as those organs which serve for the digestion of solid and liquid alimentary substances. Hence the reason why a disordered condition of the skin may produce a corresponding derangement of the lungs or digestive organs, and, conversely, a deranged state of the lungs or digestive organs may produce a disease of the skin. An increased secretion from the mucous membranes being the usual effect of the waters, a similar effect will ordinarily be transmitted to the skin.

“As a striking example of their alterative influence on the cutaneous surface,” says Dr. Francis,* “I may mention the case of an individual, now in the twenty second year of his age, incommoded by congenital ichthyosis; and whom I recommended to repair to these springs last season. The free use of these waters, internally and by bath-

* Avon Mineral Waters, New York, 1833.

ing, for some ten weeks, so effectually removed this morbid alteration of the skin, as in divers parts to leave no trace of the previous existence of disfiguration."

Other instances, equally remarkable, might annually be adduced, illustrative of the diaphoretic effects of this water. Cures of the most obstinate herpetic, psorous, and leprous eruptions, are very numerous; and are matters of astonishment to those unacquainted with the powers of this medicine.

This water possesses, also, a peculiar property of stimulating the urinary organs.—This property is manifested, not only by the discharge of urine being more copious, but also by the changes produced in the quality of the urine. Some hours after its use, either internally or externally, the urine commonly becomes more highly colored, depositing a sediment, or is much increased in quantity.

I have stated that this water is an *expectorant*; and this property, from experience in very many cases, I accord to it most fully. It is not merely by a sympathetic effect, that the pulmonary organs are affected by it; but the simple respiration, in an atmosphere so highly charged with hydro-sulphuric acid gas as that around the spring, must have an immediate action upon the mucous membrane. In restoring the nor-

mal secretion from the skin and bladder, there can be no doubt but the pulmonary functions are benefitted! And this action is direct; for, by a revulsion or counter excitation, we remove any local determination which may give rise to pulmonary irritation, and thus the lungs are invigorated and enabled to expectorate any offensive matter.— In the administration of this remedy in cases of pulmonary disease, the utmost caution is requisite; as it will be readily perceived, that the misapplication of a medicine endowed with such a power of excitation cannot but be attended with the most fatal consequences.

Many of those who use this water, experience an almost immediate increase of appetite and apparently receive an increased energy of the stomach; yet others are affected in a very different manner, and a diminution of appetite, nausea, and other symptoms indicating an action of an opposite nature follow its use. Its tonic properties cannot then be considered as *absolute*; but *relative* to the circumstances of the individual making use of them, or to the state and condition of the different organs or parts of his body. An individual affected with intermittent fever may check its progress by the use of some particular tonic: the same medicine administered to one afflicted

with a chronic bronchial disease may facilitate expectoration, and to another the surface of whose body is covered with an obstinate cutaneous eruption it proves an effectual cure. These are, however, to be considered as the secondary effects of this tonic medication, which only take place under certain conditions, and which may, and often do, succeed the use of medicines entirely different from tonics.

“Among the medicinal attributes of our medicinal waters,” says Anglada in his treatises on the mineral waters of the oriental Pyrenees, “which should serve as a guide in their employment, we may consider also their tonic action: they strengthen very sensibly different organs, and impress upon them more strength, not, really by a direct action as tonics properly so called, but in the same manner as excitants, as a preparatory condition, facilitating the vital process of the re-establishment of the vigour of parts. It is here that the distinction of forces into *radical* and *active*, or forces of power and forces of action, so well established by Barthez and so important in medicine, should be called to our aid. For example, these waters readily excite to new action the digestive, and thus exhibit themselves decidedly stomachic. Under their influence the appetite acquires a remarkable activity: we

must be cautious in satisfying it ; for here we shall find an apparent incongruity, the digestion will be badly performed if the stomach has to act on too large a quantity of food." This view of the operation of sulphurous waters is in accordance with my experience of the effects of the Avon waters. The tone which they give to the stomach appears to me to be the result of the increased secretion of the fluids connected with the digestive process which they produce. This effect is sometimes produced by them in such a degree as to be attended with unpleasant consequences. I have known several cases of profuse salivation accompanied with diarrhea, to such an extent as to enfeeble and reduce the patient very much. Increased secretion from increased action is the true *modus operandi* of these waters : it is in this way that they become cathartic, diuretic, diaphoretic, expectorant, emmenagogues and alterative, and their tonic effect is not an immediate increase of *power*, but a secondary influence,—an invigoration which results from the restoration of healthy secretions.

CHAPTER IV.

MEDICINAL APPLICABILITY TO PARTICULAR DISEASES.

The indications which call for the use of the Avon waters are first, where there is a torpid state of certain organs or tissues, to excite them to increased action. Thus, in chronic disease of the liver, after the vascular excitement has been reduced to a certain level, a restoration of the secretions of this organ and a removal of all obstructions which may exist, is usually attempted by physicians. The judicious exhibition of mercury often effects this desired object, but its long continued use frequently enfeebles the system, and it sometimes fails even where circumstances are apparently the most favorable. "Although," says Dr. Armstrong, "the efficacy of mercury is so notorious in chronic affections of the liver, yet upon the whole I am disposed to think, that it is inferior to that of the sulphureted hydrogen

gas." The second indication in chronic diseases is not only to excite the functions of diseased parts, but to correct the various derangements of their functions in such a manner as to restore them to a healthy state, and even to effect a favorable change of their structure. Both of these indications are fulfilled by a course of these waters in the following diseases; viz : Rheumatism, some diseases of the skin, and of the urinary passages ; in what are called stomachic.

Rheumatism.—This water has, from the earliest period at which it was known, been used freely in cases of rheumatism. Perhaps there is no disease in which it is more generally useful. Nevertheless, there have been some instances in which it has failed of success, and others in which the cure has been very gradual. In such, we should inquire if the disease be not neuralgic in its character, or if there is not some other disease existing, with which the rheumatism is complicated, which operates as a continual cause, and which is aggravated by the use of the water.

The good effect of the Avon water seems to be in some measure dependant upon its action on the capillary vessels : if free and healthy perspiration be produced and sustained, the resolution of the disease speedily follows. As a condition of its successful

application, the disease should have lost its inflammatory character; and when this is not perfectly the case, resort should be had to vene-section, previous to the use of the water. As acute rheumatism is a disease in which both the sanguiferous and nervous systems are deeply implicated, it is important that the effects of this remedy be cautiously watched. The cures of persons afflicted with this painful disease have been annually numerous; and it is my opinion that seven-eighths of the cases in which this remedy has been made use of, have been either relieved or cured. At some future period it may be in my power to present the public with an accurate report of the whole number of cases, during several seasons.

In a report made by M. Merat, to the Academy of Medicine, on the mineral waters of France, it is computed that from the year 1834 to 1836, there were thirty thousand persons afflicted with rheumatism, who resorted to the use of the mineral waters of France, the most of which are sulphurous; in the great majority of cases with decided benefit.

It is however, a remedy which is wholly inadmissible in the early stages of acute-articular rheumatism. By increasing the activity of the cutaneous and urinary secretions and having an alterative influence on those of

the mucous membranes, the Avon waters effect the speedy resolution of arthritic swellings, and, by their use, joints which have been for a long time stiffened or ankylosed, are restored to their original form and motion. But it is only in cases of acute rheumatism which have passed to a chronic state, or in chronic rheumatism, that sulphurous waters are indicated. On this subject Anglada remarks, "if our waters," (that is, the thermal sulphurous waters of France,) "produce less beneficial effect in rheumatic gout or articular rheumatism, than in common rheumatism, it is evidently attributable to the character of the complication which distinguishes it. It is only where it is found to have passed its acute stage and when all fluxionary activity has disappeared that we can promise ourselves any good effect from this mode of treatment." Proper regulation of the diet and exercise of rheumatic patients, as well as the bathing is absolutely indispensable.

Diseases of the skin.—In the treatment of the various diseases to which this tissue is subject, the Avon water may be very successfully used. Those cases which are the most recent, are most susceptible to its influence. In the acute stage of some eruptions of the skin, its exciting qualities tend to aggravate the evil; and it would be better,

previous to its use, to have recourse to such remedies as will lessen the excitability of the system. To illustrate this, I will relate a case which was under my care in 1834.

J. A., aged 24 years, of a sanguine temperament, had been well until six weeks before his arrival here, when a diffuse psorous eruption made its appearance upon his arms, and extending itself gradually to his neck and shoulders. The itching and smarting were very distressing, so much so as to deprive him of sleep, and threaten to injure his health. The use of the water produced a considerable aggravation of his sufferings and extension of the eruption, when he called upon me for medical advice. Vene-section to the extent of twelve ounces, mild purgatives and diaphoretics, allayed the intensity of the cutaneous irritation, and he had recourse to the waters under more favorable auspices, which entirely cured him in three weeks.

It not unfrequently becomes necessary, during a course of these waters, to suspend their use for a few days, and resort to emollient applications and demulcent drinks; the eruption becoming very much exasperated, and a temporary return of the irritative stage taking place. This may be accounted for, by supposing that the latent internal cause has never been fully removed, although

the eruption has disappeared; and that some change, unfavorable to the operation of the water, has taken place in this cause.

R. A., aged 31 years, resorted to the Avon Springs for the cure of impetigo figurata of the hands and wrists of two years standing. This disease had succeeded to a bilious fever which had been attended, thro' its whole course, with acute pain and tenderness of the right hepatic region. The use of the water for three weeks, removed entirely every vestige of the disease, and he was about returning home. The day before his anticipated return, he drank twelve glasses of the water, which was nearly double the average daily quantity he had used. During the night he was seized with a return of pain in the side, and in the morning found the eruption had returned.—A six-weeks course of the water again cured him.

It has been frequent subject of remark at these springs, that the good effects produced by the waters, are not always apparent until after their discontinuance. It is not uncommon to see diseases of the skin apparently resist the operation of the remedy, during the continuance of the treatment, but yield a short time afterwards in consequence of its curative effect being prolonged. Many cases have occurred, which would establish this truth beyond a doubt.

A physician from Manchester, Ontario County, who was afflicted with leprosy to such a degree as to be an object of disgust to his patients, abandoned his profession, and was entirely cured by the use of the waters *in one year*.

Diseases of the Urinary Passages.—The curative or palliative effect of our alkaline-sulphurous waters, in the treatment of diseases of the urinary organs, may be readily understood, by a reference to their diuretic properties and their chemical composition. Among the number of diseases of this nature, in which they are manifestly useful, are, chronic catarrh of the bladder; chronic inflammation of the urinary organs, whether the discharge be muco-purulent or purulent; the lithic diathesis, or the disposition of the urinary organs to the formation of calculi, in common language, the gravel. In these cases, however, the greatest caution is requisite in the administration of this remedy, it should not be employed to the extent of producing active inflammatory reaction; it should never be made use of, until these inflammations have passed to a chronic state; and it is almost always necessary, during the treatment, to resort to antiphlogistic remedies, and opiates occasionally, in order to moderate the excitement produced by the stimulating properties of the water.

I have never, as yet, advised them in cases of chronic catarrh of the bladder and gleet, except in union with some mucilage ; though I have known a number of cases where, unaided, they have effected a cure. In two instances, the cures were rapid and complete.

Bordeu advances the opinion, that the waters of Barrege, which are alkaline-sulphurous, dissolve urinary calculi by a chemical action. Home and Mascagni have observed the efficacy of the alkaline bicarbonates, in cases of gravel ; and their opinions rather favor the theory of the chemical action of the alkaline carbonates of hydro-sulphurous waters. There is, however, no necessity for resorting to any speculation of this nature, since their known efficacy in producing and facilitating healthy urinary secretions, either by removing from the urinary system the irritative causes of disease, or by correcting the morbid disposition of that system, is sufficient to account for all the phenomena which follow their use.—The alkaline carbonates have frequently quieted, in a few hours, the most severe nephritic pains ;* a longer time would seem to be required, for the chemical decomposition of calculi.

* Prout Treatise on Gravel, &c., p. 195.

Diseases of the digestive organs.—In the various and complicated disorders of the primæ viæ, unattended with inflammatory action, the Avon water has proved to be eminently useful. Of these, chronic affections of the stomach are the most common, in consequence of the nature of its functions, and its sympathies with other organs. The diseases of this part, are readily communicated to other parts of the system, and it feels sensibly the diseases of all the rest.—In obstinate dyspepsia attending a debilitated or depraved state of the digestive functions, acidity, flatulence, and heartburn ; in that which succeeds to acute diseases, and is accompanied by jaundice, frequent vomiting of mucus, pain in the right side or the region of the stomach, this remedy may be so administered as often to afford prompt and effectual relief. The remarks of Dr. Francis coincide with my own experience.

“Clinical observation has enabled us to affirm, that few disorders of a constitutional origin are more perplexing in their diagnostic character than the maladies arising from long persistence in errors of diet ; from this, among other sources, the digestive functions become enfeebled or broken up, and the irritations of impaired digestion, associated with the undue secretion of uric acid in various forms, lead to the production of

gout, gravel, and other formidable and agonizing derangements of the kidney and urinary functions.

“In cases of this sort, Dr. McLean and others of enlarged experience have testified to the eminent usefulness of the Saratoga waters; and I believe it will be found that those of Avon possess merits of a similar quality, if not of a higher degree. It behoves us, however, previously to relieve the system, by unlocking the several emunctories, to abate inordinate action, and regulate the habits of the sufferer; for even of waters so comparatively feeble as the Bath waters, England, it is said by Dr. Parry, that they are in no form whatever beneficial, during the paroxysm of gout, or in any inflammatory disposition, which may exist in the interval.

“After the preliminary management of the case by depletory means, and appropriate alvine aperients, the use of the water of Avon for a few days, or perhaps weeks, has wrought an alteration of the most gratifying character, evinced by improved appetite, increase of flesh, and invigorated health; and while the body receives the impress and partakes of all the advantages of increased physical energy, a corresponding improvement marks the capacity of the intellectual powers.”

Scrofula.—This disease, which in our climate, is so frequently the consequence of atmospheric changes, vicissitudes, or improper diet and medical treatment in infancy or during dentition, is very frequently dependant upon, or complicated with irritation of the stomach and bowels. The effect of the waters in the restoration of healthy action to the digestive organs, renders them powerful therapeutic agents in this distressing, and often destructive malady.—But other and perhaps more frequent causes of scrofula are exanthematous eruptions such as measles, scarlatina, &c., and hooping cough. Dr. John Mackintosh in his principles of Pathology remarks that he requested his friend Dr. Robertson, Surgeon to the Eye Dispensary of Edinburgh, to preserve a list of all the diseases of the eye usually denominated scrofulous, as well as those accompanied by glandular and cutaneous affections, in order to ascertain how many were attributed by the parties themselves or their parents, to the exanthemata and hooping cough. He was informed, after twelve months investigation, that almost all the cases were attributed by the parties themselves or their friends to those diseases. Now nothing can be better adapted to remove secondary effects of these diseases than sulphurous waters, both from their action on

the mucous membranes and on the skin.— During twelve years I have witnessed the amendment produced in some very severe cases by the use of those of Avon, and many young persons with whom I am now acquainted have been perfectly cured.

Bordeu has extolled sulphurous waters in chronic diseases of the chest, but the indication which calls for the employment of this remedy, must be very manifest, and its application seasonable, or it will aggravate the evil which it is designed to cure. The stimulation produced by the Avon waters, so far as my experience extends, is attended with fatal effects, in the advanced stage of tubercular phthisis; and speedy dissolution has, in several instances, followed its misapplication. Its action, however, in promoting a healthy secretion of mucous membranes, renders it beneficial in certain chronic pulmonary affections succeeding pleurisy or acute pneumonia; in asthenic pulmonary catarrhs; in mucous phthisis, even when these diseases are accompanied by marasmus, hectic fever, night sweats, and all the characteristics of consumption. “In the incipient and active stage of pulmonary irritation,” says Dr. Francis, “It becomes our duty to precede their employment by venesection, and the other customary means of depletion, analagous to the practice we

have recourse to with the Ballston or Congress waters. The same observation applies to hemoptysis, to acute disorders of the digestive organs, liver, and other viscera. The direful consequences which inevitably occur in such cases from the Saratoga waters, when these cautions are not heeded, are too painfully known to be dwelt upon in this place."

Some remarkable cures of asthma have been effected by the use of these waters—one, which occurred in 1834, I have extracted from my notes:

M. C., a young lady, 19 years of age, of spare habits, had been subject to paroxysms of asthma for seven years. The duration of the fits was generally about twelve hours. Cough distressing, but expectoration scanty; and the paroxysms were caused, her physician thought, by an irregularity of the menstrual function. She came to the Springs with her sister, who was an invalid, and without any hope of receiving benefit herself from the water. Was persuaded to drink four half-pint glasses of the water daily, and to bathe at 92° F. twice each week. Following this course, she remained eight weeks; and the day before she left, had one of the most severe fits. From this time there was no return of the disease for three years, and then but very

slight. I saw her but a short time since, when she expressed her conviction to me that she had entirely recovered.

The effect of the water, in this case, appears to have been an increased severity of the paroxysms ; and it was not until its use was discontinued, that its alterative influence upon the mucous membrane of the air passages was perceptible. The action of the warm bath too probably aided in preventing the continuance of the spasms.

Diseases of Females.—The indirectly tonic properties of Avon water render it a valuable medicine in many forms of menstrual derangement ; and these properties, resulting from its general action upon the organs of secretion, it may commonly be administered without any apprehension of danger. The nature of this remedy, however, requires that, previous to commencing its use, in almost every case, a depletion, adapted to circumstances, should be adopted. It has been much used, and with benefit, in chlorosis, leucorrhœa, amenorrhœa, and difficult and painful menstruation. The efficacy of bathing (universally acknowledged) in disorders of the menstrual function, renders its use in this form very common, and our experience somewhat enlarged. Great caution is requisite in the administration of either the hot or cold bath : for general use, the

tepid bath is to be preferred. In pregnancy, Avon water is inadmissible ; it is, however, generally reputed to possess peculiarly prolific qualities.

Puerperal Thrush.—That peculiar form of inflammation which succeeds parturition in females, affecting the mouth and sometimes the whole alimentary canal, has been in many signal instances relieved by the Avon waters. In these cases I have frequently administered them in connection with the mucilage of gum arabic, and powders of calomel and pulv. ipecac. et opii, one grain of the former to four of the latter. This treatment has been very successful in chronic cases. One of the powders taken every night appears to prevent the intestinal irritation, which the use of the waters during the day, will sometimes occasion. Several very severe cases have been entirely cured, however, without the aid of any additional medicine. The warm water has been a valuable, and I consider it an indispensable auxiliary in their cure.

During the years 1832 and 1834, these springs were the resort of hundreds of persons from our neighboring cities—viz., Rochester, Buffalo, Albany, &c., where the Asiatic cholera prevailed. Many of them were suffering from that state of the bowels which is said to be indicative of the ap-

proach of this formidable disease. Such was the effect of the waters, however, that no case of disease of this kind occurred; but, on the contrary, the premonitory symptoms were removed, in every individual case.

CHAPTER V.

MODE OF ADMINISTRATION & THERAPEUTIC APPLICATION.

We come now to the consideration of the proper mode of using the Avon waters in the cure of those chronic diseases to which, under different forms, they have, by experience, been found applicable. It is to be borne in mind, that each individual case has its own peculiarities, and consequently that only general directions can be given for the administration of any remedy. Where the case is of such a nature as to require caution in the use of medicines, the same principle will apply to this as to any other medicinal compound of equal power—viz., that if it be inapplicable, or improperly administered, it cannot cure, and may be productive of injury.

There are several springs, each of which, in its composition, is adapted to particular forms and stages of chronic disease ; and

this variety serves to give value and therapeutic efficacy to the waters in the aggregate. For instance, in proportion as the disease which we wish to remove partakes of the character of acute inflammation, which may be in some measure ascertained by the local pain, or by the febrile excitement attending it, we desire to lessen the quantity of sulphuretted hydrogen gas. It would certainly be very injudicious to commence by drinking the prescribed quantity of the water of the New Bath spring, which contains 35 cubic inches of gas to the gallon ; for it should be remembered that the White Sulphur Springs of Virginia, according to the analysis of Professor Rogers, contain only $2\frac{1}{2}$ cubic inches of this gas in every gallon ; and Dr. Moorman, the resident physician at those springs, considers it "greatly advantageous in many cases, particularly in very excitable persons; to have the gas expelled, in part or in whole, before using it." When the nature of the case indicates caution, we would advise the visitor to commence with the heated water of the Lower Spring ; thus diminishing the quantity of gas as much as possible. The quantity of sulphuretted hydrogen contained in a gallon of the water of the Lower Spring, as may be seen by reference to the preceding analysis, is ten cubic inches; by heating

in an open vessel, this quantity may be greatly reduced : and there being springs in the neighborhood presenting every possible variety in this respect, the Avon waters may be considered as adapted to all cases of disease in which the use of sulphurous waters would be admissible or advantageous.

There is one fact which is of some importance, and should be borne in mind by the invalid visitor of these springs. Upon exposure to the atmospheric air, or if the temperature of the water be changed, a partial decomposition takes place ; and the same effects cannot be expected to follow its use as will if drank as it issues from the fountain, or at its source. Its medicinal effect cannot fail to be very much altered by exposure or changes of temperature. Suitable precautions should be taken, if the water be drank at a distance from the springs, that its original nature be preserved. *Quo propius aqua bibitur a fonte, eo efficacior ; quo remotior, eo fit languidior,*" * was the assertion of Hoffman.

The use of milk associated with sulphurous waters was recommended by Hoffman and Bordeu. The latter relates the case of a

*Hoffman, Op. T. IV. § 15. "The nearer to the fountain water is drank, the more efficacious ; the more remote, the weaker the action."

very delicate and feeble woman, who was cured of a hemorrhage from the womb, by the waters of Barreges. When she drank them pure, they caused a very great heat and high fever. Cases of a similar nature have occurred at the Avon Springs. The treatise of Hoffman, "*De Connubio aquarum mineralium cum lacte, longe saluberrimo*," is extant. The disagreeable taste of the water is, in some measure, concealed by this admixture.

The operation of Avon water upon the human system is modified by the quantity drank in a given time, and by the constitution, habit, and disease of the individual. Generally speaking, 4 or 6 half pint tumblers of the water, drank during the day, produce a mild cathartic effect; and under its long-continued exhibition to this extent, no debility ensues, but, on the contrary, the appetite and strength are very much increased. In very large doses—eight or ten tumblers a day, for example—it operates powerfully upon the bowels, kidneys, and skin. A moderate use of this water, persevered in for a considerable length of time, will produce an alterative effect, in cases where there is no acute inflammation.

"A judicious mode of commencing the use of the Avon water," says Dr. Francis, "is to take six or seven half-pint tumblers

during the twenty-four hours : a couple of tumblers may be advantageously drank before breakfast, and two or three hours after that meal the same quantity may again be taken, and an additional tumbler or two in the afternoon. To the sense of smell they present the usual properties of sulphuretted hydrogen gas, but in a very small degree ; they are not oppressive to the digestive organs. Some, however, take them in larger quantity, and often repeat the draught. Others, again, never use them until after the first meal. Like the Ballston and Saratoga waters, they are sometimes drank to a pernicious extent. It is expedient, therefore, in all cases, to regulate their administration by their immediate effect ; and regard must be paid to age, sex, disease, constitution, and individual peculiarity. To guard against undue local determination, either cerebral, thoracic, or visceral, will always become a matter of professional duty." No rule can be given which will apply to many of the complicated and intractable cases which annually present themselves at these mineral fountains. With some, from half a pint to a pint daily is all that can be administered ; while there are others upon whom six or eight half-pint glasses make but a trifling impression.

A painful tension of the epigastric or hy-

pochondriac regions is sometimes occasioned by the use of the water—a sensation of weight or constriction of the stomach, nausea, loss of appetite, or a suppression of some of the natural secretions. In these cases, the excitement which is produced is not distributed in an equable manner. This difficulty may be obviated by lessening the dose—by using gentle exercise, in order to produce slight perspiration—and by various means adapted to individual peculiarities.

When heated, the Avon water is deprived of a portion of its sulphuretted hydrogen gas, and the salts with which it is impregnated are rendered more immediately aperient. It may therefore be used in this way when the inflammatory diathesis prevails to such an extent as to resist its beneficial and successful administration in its natural state. If, however, the tendency to inflammation exists to such a degree as to preclude the use of the heated water, it becomes necessary to resort to other and more active purgatives, or to the lancet, in order to produce such a condition of the system as will be more favorable to its operation. Here, again, the variety of springs affords us efficient aid in the accomplishment of our object. If the chemical composition of the different springs be referred to, the quantity of aperient salts will be found to vary from

82.96 grains in every gallon of water, (the New Bath spring,) to 296.24 grains, (the Sylvan Spring.) But the most active purgative salts contained in these waters are the sulphates of magnesia and soda. Of these the Lower Spring contains 63.34 grs. in every gallon of water—the New Bath, 46.80 grs.—the Upper, 26 grs.—and the Sylvan only 12.960 grs. The effects produced by the waters of these various fountains correspond with the known effects of the different substances which they contain; and we find the heated water of the Lower Spring to be the most brisk cathartic.

The time and manner of using the waters may be so diversified as to produce various effects upon the human system, or upon particular organs. Their purgative operation is mild, but certain, when from four to six half-pint glasses are taken in the early part of the day. When used as alterants, they should be taken in small quantities frequently repeated, and their course continued a sufficient length of time for the manifestation of their action. Half a pint before breakfast, the same quantity at eleven o'clock and at twelve in the forenoon; will answer the intention: or if this be more than is demanded by the nature of the case, and the condition of the patient, the quantity taken at one time may be re-

duced. In some obstinate cases of rheumatism and cutaneous disease, benefit has been received from the use of the heated water in the evening ; but this should not be attempted without proper medical advice.

In short, the administration of these waters may be so regulated as to adapt them to fulfil various indications. They may be so administered as to render them efficient in many different ways. We may direct their action towards the respiratory, the digestive, the urinary, or the generative organs; or to the capillary circulation. Again, by the selection of an appropriate spring; by the regulation of doses, and of the time and manner of using them, we may produce a more immediate, or a more general and alterative effect.

External Application of the Waters.—The publisher has, from necessity, excluded some general remarks on bathing, that were thought important, and calculated to excite interest. The effect of bathing in hot or cold water endowed with so much power, from its impregnation with gases and mineral salts, is not to be viewed lightly. Particular directions, and those adapted to individual cases, can only be given by a physician well acquainted with the human system, the laws by which it is governed, and

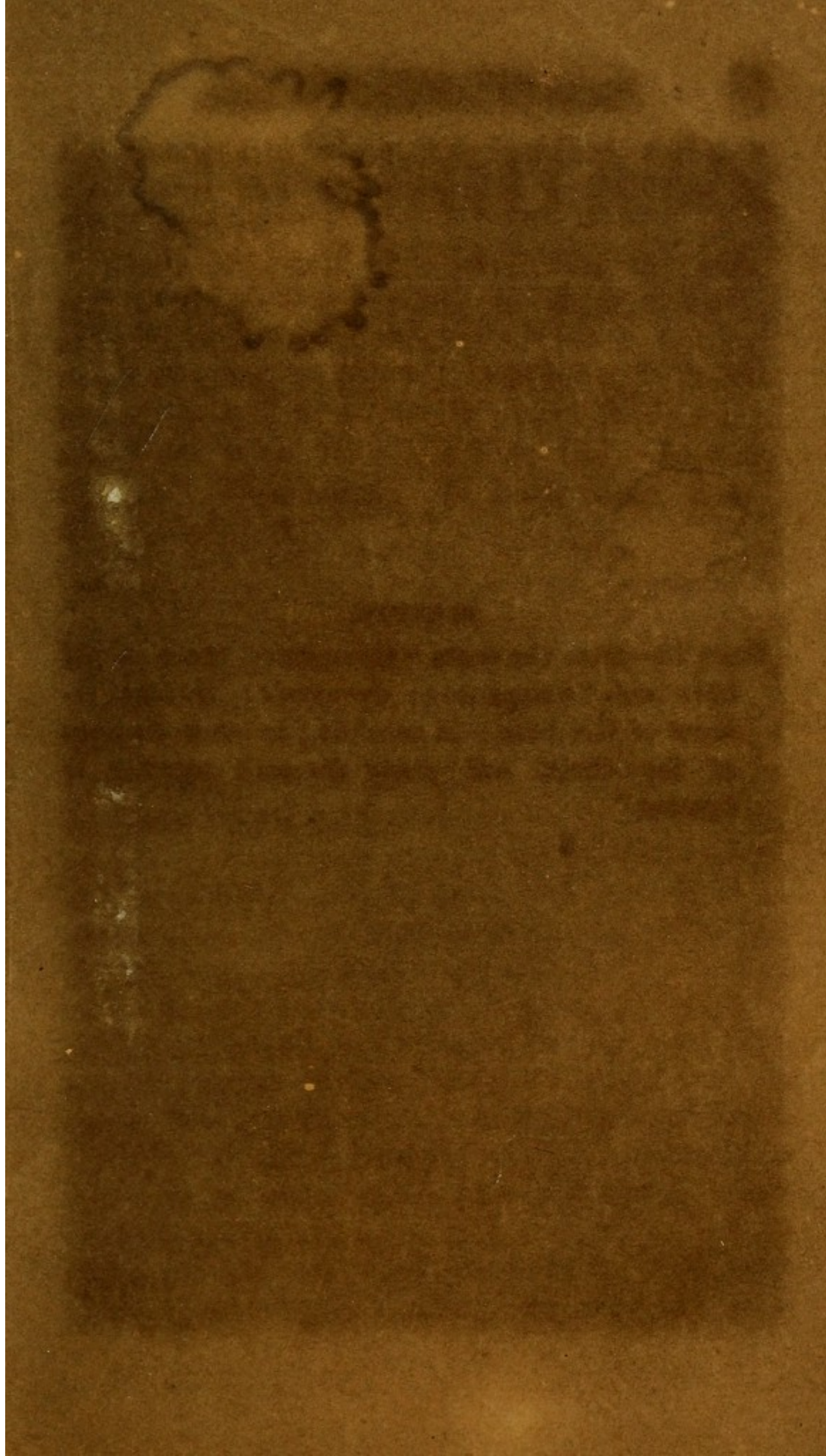
the diseases to which it is incident, and one also who has experimental knowledge of these waters.

The author will give advice on the subject *to the poor* according to their circumstances, either gratuitously or for a trifling remuneration, at the "Upper Spring" Bath-house, from 8 to 9 o'clock every forenoon ; and from 9 to 10 o'clock at the "Lower Spring" Bath-house. In both cases, Sundays excepted.

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ERRATUM.

Page 72—after the word "stomachic" there should have been "complaints; dyspepsia; chronic diseases of the liver; in scrofula; in some diseases of the chest, and many diseases peculiar to females."



BATHING, &C.

The proprietor of those of the Springs now appropriated to Bathing, has made such arrangements as he hopes will be beneficial and satisfactory to those who visit the Springs, either for the prevention and cure of disease, or for recreation.

Warm Baths, with particular regard to the temperature desired, furnished at both the "Lower" and "Upper" Springs, at all hours of the day, from 6 o'clock A. M. to 9 o'clock P. M.

At each of the Springs, **SHOWERING** Baths are so constructed that a greater or smaller shock may be received.

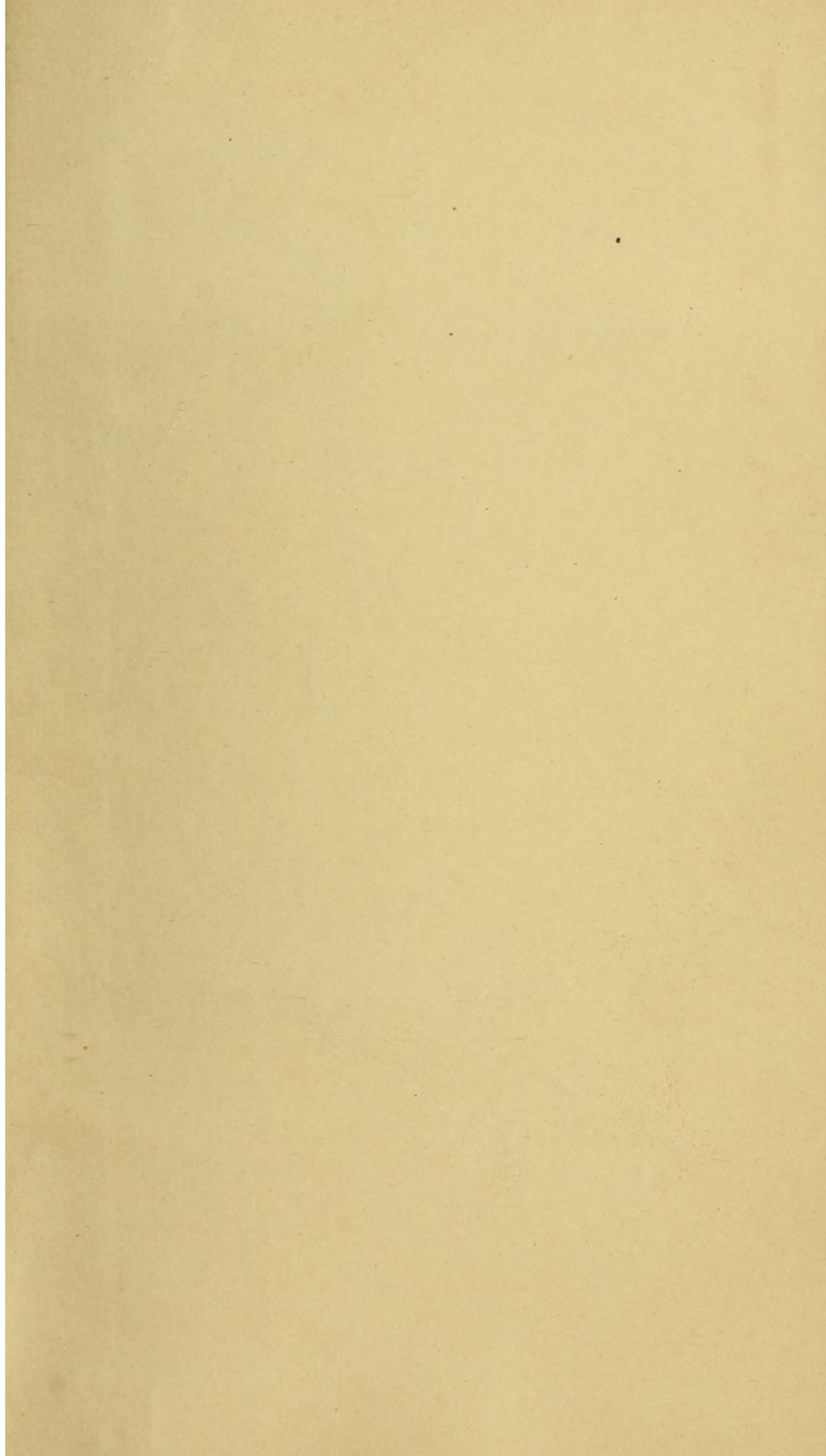
For invalids afflicted with local diseases, a *hose* is so arranged that either a large or small body of water may be directed upon the diseased parts.

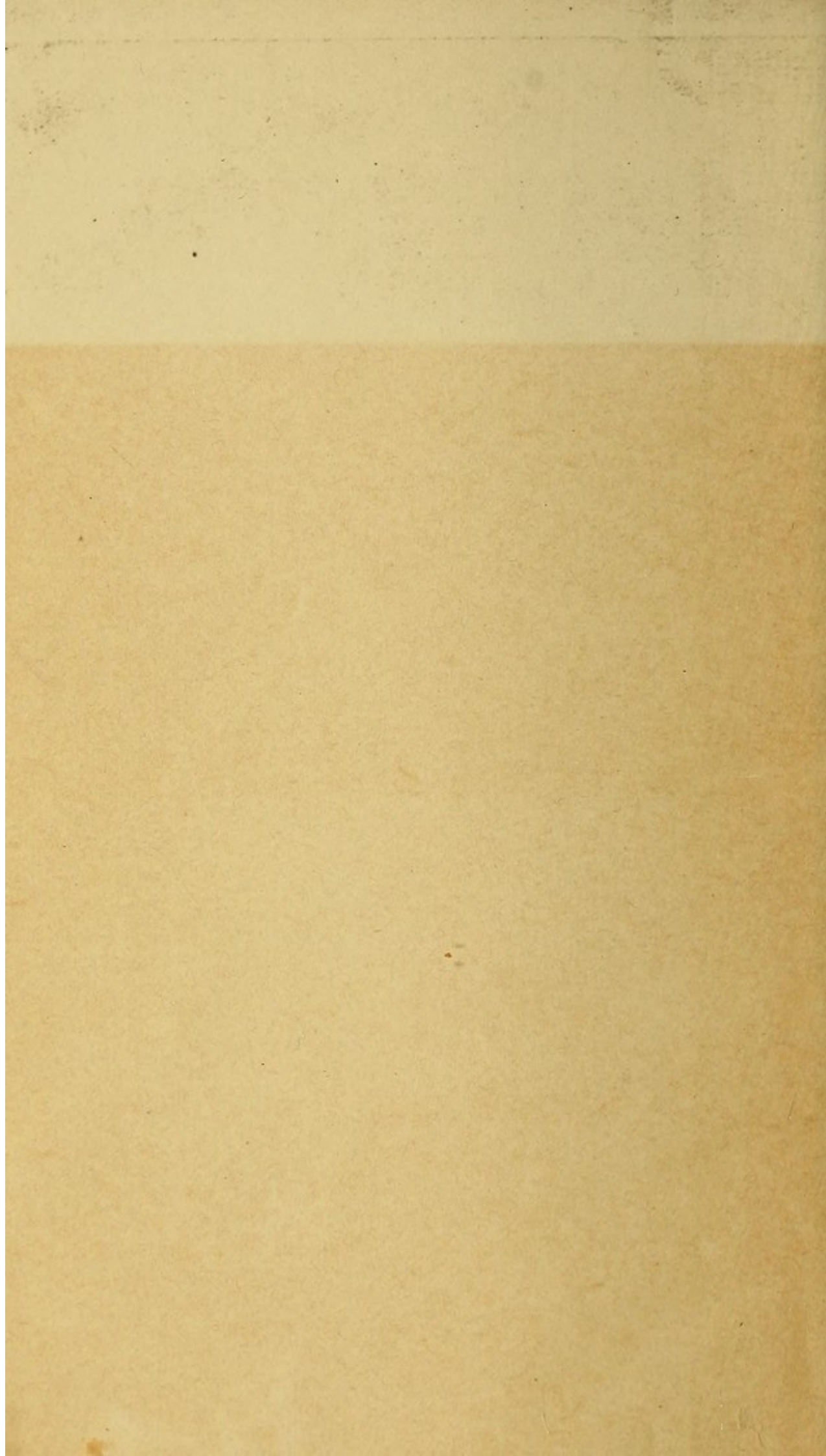
The Gentlemen and Ladies Bathing Rooms and Parlors are in both establishments entirely separate, and provided with attentive male and female attendants. The utmost attention will be paid to cleanliness.

ASA NOWLEN, Proprietor.

A refectory with a Billiard Table and Ten-pin Alleys, have been erected at the "Lower" Spring, apart from the Bath-house, to afford amusement and exercise for the bathers.

The Avon Water may be sent to any part of the world, and its purity preserved. It is put in bottles, corked and sealed, packed in boxes, and sent according to order, by Canal or Rail Road. Orders may be left at the "Lower Spring," or a line directed to the proprietor at the Avon Post Office, will reach him, and be promptly attended to. Letters from persons at a distance, directed to A. Nowlen, Avon, Livingston county, N. Y., on this subject, will receive immediate attention.





(Feb., 1891, 20,000)

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