

# Healing with Water, Air and Light

an unpublished book *by*  
Gary J. Lockhart  
(1942–2001)

© copyright 2000 by Gary J. Lockhart

edited and PDF of part placed online  
by Arthur Lee Jacobson in 2007



# INTRODUCTION

“Water is great; air is greater; but the greatest of all is light.”

Max von Pettenkoffer

“Out of water and earth and air and fire mingled together arose the forms and colors of all mortal things.”

*Poem on Nature* Empedocles -500

If a clinic in your area opened with a sign reading: “Water, Air and Light Therapy,” would you come? Before I wrote this book, I certainly would have ignored it, and I probably would’ve advised my friends to stay away. I could not have imagined that heart disease, arthritis, hepatitis, depression, malaria and dozens of others conditions could be treated by the elements of life.

Life had its existence in the ancient seas; in the cradle of salt water. The waters of the ancient seas still flow in our veins. The balance of minerals in the blood remains similar to the composition of the oceans some three billion years ago. Nearly all the mineral elements of earth may be found in the seas. Injections of seawater were once used to cure eczema, cancer and tuberculosis. Certain forms of mineralized waters are proven healers in arthritis.

In medieval times baths and baths with herbs were believed to be the greatest of healers. Isolt uses the bath to restore Tristram to health. In *The Beaves of Hampton*, Justin makes use of herbal baths to heal Beaves’ wounds. In *La Morte D’Arthur*, Elaine is sent to collect herbs for the bath of Lancelot.

Jakob and Wilhelm Grimm collected the fairy tales of Europe, before they disappeared from the oral legends. The story “The Water of Life” is about a dying king who learns that special healing water is the only thing that can save him. The first son sets out on the difficult and dangerous journey. He meets a dwarf, but he contemptuously dismisses him. The mountains close in and he is trapped. The same thing happens to the second son. The third son treats the dwarf kindly and tells him about the quest. The dwarf gives him directions to the water of life.

In *The Outline of History* H.G. Wells wrote: “No creature can breathe, no creature can digest its food without water. We talk of breathing air, but what all living things really do is to breathe oxygen dissolved in water.”

Everyone knows that oxygen is the part of air necessary for respiration. Few know that reducing the amount of oxygen in the air for a short duration can cure depression. Breathing sessions of low-pressure air can cure allergies, while high-pressure air may cure serious infections and eliminate the effects of heart attacks when given promptly. Short sessions of breathing carbon dioxide mixtures will cure migraines, eliminate phobias and change negative mental attitudes.

In 1903 Niels Finsen won the Nobel Prize for curing tuberculosis with concentrated light. Light is a healer of rickets and a stimulant of the immune system. Forms of light are able to cure hepatitis, backaches, deafness, fatigue and even bursitis. The triad of water, air and light are nature’s master healers.

Aristotle wrote: “All men by nature reach out their hands for the light, which will lighten their going to and fro in the world.” Ultraviolet light was once applied to the gums of the teeth. They quickly became firm and solid and the need for dentures is gone. I find it incredible that dentists ignore this information. Perhaps there is more money to be made by pulling teeth and making dentures! Numerous examples of the healing effects of light are given here.

There are thousands of articles dealing with alternative approaches in older medical literature. As surgery and new drugs were developed, the medical profession ignored the older findings. People changed too; they wanted a quick fix. And they got it with complex surgery, radiation and drugs. At a time when medical costs are going through the roof, it is time to take a new look at the ancient alternatives.

My real interest has been the use of medicinal herbs, and I have tried to sum up all the knowledge in medical and scientific literature for the past three centuries. As I worked on my set of herb books, I found many studies that didn’t fit, which I felt were important to those seeking healing. *Healing With Water, Air and Light* is an important contribution to a neglected area of healing.

Alternatives in medicine have faced determined opposition from the AMA and FDA. After the American Medical Association lost a long court battle with the chiropractic profession in 1985 the doors opened further for alternative medicine. Standard medicine is usually good medicine, but often it is costly and ineffective. I can cite many examples where important findings were simply ignored. Commercial business has long operated on free competition, but organized medicine has used its monopoly power to legally harass or eliminate competition.

Some of the efforts to suppress alternatives border on the ridiculous. In 1993 the FDA made a determined effort to deny the American people the right to take vitamins unless prescribed by a doctor. Statements were made that the American people are “wasting their money” on vitamins and health foods. The FDA had no objection to Americans wasting their money on junk foods, soft drinks or candy bars, but vitamins and organic food was another matter.

All Americans who believe in the words of the national anthem: “The land of the free and the home of the brave,” should speak out against these efforts to control medical freedom. Does a group of FDA drug company regulators really speak in your best interests? Our right to freely determine what is best for us is at stake.

In speaking this way, I do not advocate any products or therapies, which I describe. I do ask that we have freedom to seek “Life, liberty and the pursuit of happiness.” Water, air and light will help you to pursue the dream of good health and healing.

# Contents

## Introduction

### HEALING WITH WATER

- 1 The Holy Waters
- 2 The Mystery of Water
- 3 The Great Water Cycle
- 4 The Secrets of the Sea
- 5 Fresh Sea Water
- 6 Mineralized Water
- 7 The Inner Sea
- 8 Epsom Salts
- 9 Healing Salts
- 10 The History of the Bath
- 11 The Steam Bath
- 12 Famous Waters
- 13 The Water Cure
- 14 Ayurvedic Waters
- 15 Physiology of the Waters
- 16 Hot Water Therapy
- 17 Cold Water Therapy
- 18 The Schott Treatment
- 19 Healings of the Waters
- 20 Strange Baths
- 21 The Woman's Waters
- 22 Drinking the Sea
- 23 Water Injections
- 24 Sea Water Injections
- 25 Mist Breathing
- 26 Dangerous Water
- 27 Clean Healthy Water
- 28 Hard and Soft Waters
- 29 Energized Waters
- 30 First Aid With Water

### HEALING WITH AIR

- 31 The Discovery of Gases
- 32 What Should We Breathe?
- 33 Beddoes and Beyond
- 34 Breathing Therapy
- 35 Low Pressure Therapy
- 36 High Pressure Therapy
- 37 Oxygen Therapy
- 38 Ozone Therapy
- 39 Nitrogen Therapy
- 40 Carbon Dioxide and the Heart
- 41 Carbon Dioxide and Respiration
- 42 Carbon Dioxide and Psychotherapy
- 43 Carbon Dioxide in Therapy
- 44 The Woman's Air Cure
- 45 Hot and Cold Air Therapy
- 46 Ionized Air

### HEALING WITH LIGHT

- 47 The Miracle of Light
- 48 Healthy or Sick Light
- 49 The Light Therapists
- 50 Light on Tuberculosis
- 51 Light in Therapy
- 52 Red Light Therapy
- 53 Blue Light Therapy
- 54 The Violet Ray
- 55 Ultraviolet Light
- 56 Ultraviolet in Disease
- 57 The Knott Technique
- 58 The Woman's Light Cure
- 59 Light on the Upper Body
- 60 Holistic Light Therapy

### BIBLIOGRAPHY

# 1. THE HOLY WATERS

“When I was eighteen, a sudden spring breeze of religious experience for the first time came to my life and passed away leaving in my memory a direct message of spiritual reality. One day, while I stood watching at early dawn, the sun sent out its rays from behind the trees. I suddenly felt as if some ancient mist had in a moment lifted from my sight, and the morning light on the face of the world revealed an inner radiance of joy.

The poem I wrote on the first day of my surprise was named: “The Awakening of the Waterfall.” The waterfall, whose spirit lay dormant in its ice-bound isolation, was touched by the sun and bursting in a cataract of freedom, it found its finality in an unending sacrifice, in a continual union with the sea. After four days the vision passed away, and the lid hung down upon my inner sight. In the dark, the world once again put on its disguise of the obscurity of an ordinary fact.”

*My Boyhood Days, An Autobiographical Sketch* Rabindranath Tagore

In the first book of Moses, known as Genesis, God creates the heavens and the earth. The second act of God is to say: “Let there be light.” Then God says: “Let there be an expanse in the middle of the water to form a division between the waters.” So God formed the air on that day.

The creation account of the Hebrews was derived from the older Chaldean account. In all religious traditions we find God or Spirit forming the elements of life, which are light, air, water and earth. In a modified form these became the four humors of Greek medicine.

The Jewish mystical book of creation is the *Sefer Yetsirah*. This deals with the mystery of God through the 22 Hebrew letters of the alphabet. “He [God] hewed them, combined them, weighed them, interchanged them and through them produced the whole creation and everything that is destined to come into being.” The Hebrew letter Aleph (A) stood for air, Mem (M) stood for water and Shin (S) stood for light.

A wonderful discussion of the creation is found in the fishing book *The Compleat Angler* by Isaak Walton. Piscator the fisherman, Venator the hunter and Auceps the falconer are talking. “The water is the eldest daughter of the Creator, the element upon which the Spirit of God did first move, the element which God commanded to bring

forth creatures abundant.” There is a discussion on the place of air and scattered remarks about light.

The healing properties of these elemental creations are the subject of the Bible story of Siloam. This pool was excavated in 1895. It is about 18 feet deep and 14 feet wide. The water is normally about 3-4 feet deep. The Levites [priests] went to the pool of Siloam on the last day of the Feast of Tabernacles. They poured water over the sacrifice in memory of water from the Rock of Rephidim.

Large groups of sick people waited around the pool of Siloam in Jerusalem. Suddenly an angel “troubled” the waters and the crowd of sick people jumped into the pool. Whoever was first was supposed to be healed. In the story, one of the unfortunate persons was unable to jump into the water and was healed by Jesus.

The pool of today is far down in a pit, which can only accommodate 5-6 people. Narrow stone stairs lead down to the reservoir cut from rock and arched over with vaulting. Most of the early surviving Bible manuscripts don’t contain this story. Perhaps the early monks who copied the stories just didn’t accept the story of angels turning a stagnant pool into miracle healing water.

What would “trouble” the waters? Many of the famous healing springs have carbon dioxide gas bubbling up through the waters. A few minutes of breathing air enriched in carbon dioxide will cure a migraine headache and help many other problems. Perhaps someone with a migraine jumped in and shouted minutes later: “I was the first to jump in and God healed me!”

The crowd of sick persons waiting for the troubling of the waters was subject to four healing forces. Sunlight heals by creating vitamin D in the skin and activates the immune system. Soaking in mineralized water cures certain skin problems and helps mineral deficiencies. Breathing air augmented with carbon dioxide treats stuttering, headaches, heart and circulation problems. There is a strong element of belief in being healed, and the power of the mind is a great healer. “God helps those who help themselves.” This is not a Biblical quote; it is a statement of reality.

All of the religions of the world have stories of the healing waters of God. The healing significance of the waters became incorporated into religious ceremonies, where it remains as the ritual of baptism.

There was an old belief in the land of Palestine that all springs and running waters were inhabited. Every spring was associated with a deity, saint or evil spirit. The popular explanation of the hot springs of Tiberius was that King Solomon had ordered the djinns in the earth to give the people a natural hot bath.

In legend, Abraham, the founding father of the Jewish race came from Ur of the Chaldees. "Ur" meant "water," for the town was located in the great delta of the Tigris and Euphrates rivers. The root word survived in the Greek word "ouron" which became "urine."

According to Greek legend, Jupiter created a spring for Hercules with a thunderbolt. Many of the hot springs of Greece were dedicated to Hercules. In Sicily, there is a legend that the famous thermal springs were created by the nymphs for Hercules. Gold coins pictured Hercules bathing his injured shoulder in the water.

The great spring at Bath, England was dedicated to the Celtic goddess Sul or Sulis. The Romans called her Minerva, and some of the vessels found while excavating have the combined name of "Sulis Minerva." Another popular deity was Salus, the Sabine goddess worshipped by the sick. Carna, the goddess of health, and Divona also had their followers. With the coming of Christianity, the waters and wells once sacred to Jupiter, Hygieia, or Hercules now received names like St. Helen, St. Mungo or St. Bridget.

The earliest forms of "holy water" were made by putting sacred plants into water. The temples of the Roman Empire were purified by putting verbena into the water and sprinkling the floor and altars. In India water became holy by putting the sacred leaves of basil into it.

In the Zoroastrian religion of Iran, holy water was known as Zohar. The priest recited prayers, while holding two empty metal cups. As he prayed they were filled with water, which then became holy.

The Roman poet Ovid described the spring of Mercury near the Capene Gate. Merchants came here to carry home jars of the waters. A spring of laurel was dipped into the urn, and all merchandise that was to have new owners was prayed over. The water was addressed:

“Wash away past lies, wash away my faithless words of the past day.”

The Tiber River was considered holy in the early days of Rome. During the reign of Tiberius, a proposal was debated in the Roman Senate to change the course of rivers and streams dumping into the Tiber. There were strong protests, because people believed that the Tiber was under the protection of the gods.

The ancient Jewish ritual of Passover was first celebrated during the flight from Egypt to the Promised Land. The first ritual was the sprinkling of blood with hyssop as an emblem of removing sin.

After King David’s great sin, he wrote Psalm 51 to express his separation from God. “Purge me with hyssop and I shall be clean; wash me and I shall be whiter than snow. Hide Thy face from my sins, and blot out all mine iniquities.”

The early Christian church borrowed from the Jewish ceremonials. For many centuries common hyssop *Hyssopus officinalis* was tied to a handle and used to sprinkle “holy water” over the church and the worshipers. Even today the brush used in Roman Catholic churches for sprinkling holy water is called “Hyssop.” During the mass the priest said in Latin: “Aperges me, Domine hyssopo et mundabar.” meaning, “Thou shalt sprinkle me with hyssop, O Lord, and I shall be cleansed.”

In early Christianity, there were many stories about holy water. Aphrates cured one of the emperor’s horses by making it drink water blessed with the sign of the cross. There were stories of instant cures of insanity with holy water. Pope Leo IV ordered all priests to bless water every Sunday, and sprinkle the worshipers with it.

“Holy water” was believed to have amazing curative virtues. In 1866 Abbe Gaume wrote *L’Eau Benite au XIXme Siecle* [Holy Water in the Nineteenth Century]. It was a long testimonial to the curative virtues. But Professor Tissot found that holy water given to the insane to drive out Satan had absolutely no effect at all.

There is an idea that “holy water” is really a transfer of psychic energy from the person doing the rituals. Canon William Rauscher reported that canna plants grew three times higher when watered with water left over from religious services.

An attempt was made to investigate this possibility using 24 plants. Half received ordinary water and half received “holy water” from church services that was not touched by human hands. The most frequent length of the plants with tap water was 12.2 centimeters and the “holy water plants” was 12.6 centimeters. This is a difference of only a quarter of an inch and it hardly seems significant.

Paracelsus threw cold water on the traditional ideas of holy water by writing: “Some people believe that such spirits can be driven away with holy water and by the burning of incense. A genuine holy water cannot be had so long as no man is found who is holy enough to be able to invest water with an occult power . . .”

Christian baptism added to views of the holiness of water. An early prefect of Rome was Agrestius Chromatius, who suffered from gout. Tranquillinus told him about Christianity and he asked Polycarp to baptize him. The saint told him: “I have seen Tranquillinus relieved from gout in his hands and feet, which before were swelled and painful. When I asked him what medicine he used to cure himself, he exhorted me to baptism.” After baptism, Chromatius was healed from his gout.

The baptism ritual came from the idea of cleansing. The origin of baptism came from rituals in which outsiders joined the Jewish faith. This involved three rituals: first circumcision, then the sprinkling of water on the third day, and finally washing with sacred water which made them members of the faith.

Immersion in a mikvah is a ritual hallowed by Jewish tradition. Rabbi Samson Hirsch wrote: “The water must be not be contained in a vessel, but must still be in its primitive state; for instance, gathered in a natural hollow in the ground . . . . So that immersion in the element of water expresses a complete departure from the realm of humanity subject to impurity and is a return to original condition, it completely breaks off connection with the past and introduces a quite fresh pure future.”

It was only natural that Christians adopted a ritual used by Jews to celebrate the change of faith. The church father John Chrysostom wrote: “It [baptism] represents death and burial, life and resurrection. When we plunge our head into the water as into a tomb, the old man

is immersed, wholly buried; when we come out of the water, the new man appears at that moment.” Christian baptism was usually immersion, but sprinkling with water had just as much historic validity. Sprinkling “baptism” was used in the colder climates during the winter months and this gradually became the norm.

Both sprinkling and ritual baths were used by many religions at this time. The early Christian church father Tertullian wrote: “Washing is the means through which they are inducted into the sacred rites of some notorious Isis or Mithras. The gods themselves they honor by washings. They also carry water around and sprinkle on country seats, houses, temples and cities . . . .”

Sigmund Freud called the mystical experience of God “the oceanic feeling.” One of the best expressions of this in religious literature is St. Catherine of Genoa: “I am so pleased and submerged in His immense love, that I feel as though I am entirely under water, and can on no side touch, see or feel anything but water.” St. Francis of Assisi wrote: “Praise by my Lord, for sister water. Who is most useful, humble, precious and chaste.”

Religious expression is rich in water-related topics. In the ancient Middle East, the *Seven Tablets of Creation* contain this hymn: “O thou River who didst create all things when the great gods dug thee out, they set prosperity upon thy banks, and in the middle of thee is Ea, where the king of the deep created his dwelling.”

The Zoroastrian scriptures known as the *Aban Yost* contain this verse: “From this river of mine alone flow all the waters that spread all over the seven Karshvaris. This river of mine goes along bringing waters both in summer and winter.”

The Quran mentions water sixty times. God and the angels were the source of the scarce water that people needed. Some of the verses read: “We opened the gates of heaven with pouring water and caused the earth to gush forth with springs.” “We send you water from the sky and give it to you to drink.” “He sends down water from the sky to cleanse you.”

The Incas had several springs which were regarded as sacred, and they prayed to these waters. Bernabe Cobo recorded one of their prayers: “Lord, you created all things, and among them you saw fit to

create me. You created the water of this spring for my sustenance. I beseech you to keep it from drying up and keep water flowing as you have done in past years, so we can harvest the crops we have sown.”

St. John wrote in the Revelation: “The angel showed me the river of the water of life, sparkling like crystal and coming from the throne of God and of the lamb, and flowing down in the middle of the city’s street.”

There is the old story of the Zen master who asks his pupil: “Do you hear the rushing of the river.” “Yes, master.” The master replies: “That is the way.”

Hermann Hesse wrote the story of Buddha in *Siddhartha*. “The river has taught me to listen; you will learn from it too. The river knows everything; one can learn everything from it. You have already learned from the river that it is good to strive downwards, to sink and to seek the depths.”

The spiritual mystic Edgar Cayce had a dream of little groups of people standing around on rocks separated by streams of running water. A fish jumped out of the water and he tried to catch it, but it broke into pieces in his hands. He began trying to put the pieces together. He analyzed the dream in a trance: “In the dream of water, with the separating of the acquaintances and the body, we find the manifestation of the subconscious forces. The water represents life, the living way, that separates those of every walk of life and exists about each entity or group, building that which radiates in a spiritual sphere, the deeds done in the body.”

In many cultures water pouring from the earth without an apparent source meant that god or a goddess was behind it. In Babylonian mythology the hero Utnapistim survived the great flood and then was sent to the mouth of the rivers. He would become the Noah of the Biblical story. The sources of the Tigris and Euphrates rivers were sacred to the people whose lives depended on their waters. Around -850 an Assyrian king visited the beginning of the Tigris. He left a monument reading: “To the source of the Tigris River, where the waters flow forth, the weapon of Assur I cleansed there, sacrifices to my gods I offered, a sacramental meal I made, I set up my royal image there.”

Around the time of Christ, pilgrims traveled to a spring near the city of Dijon, France to worship the goddess Sequana. A large temple complex was built and pilgrims made wooden offerings to thank the goddess. Sequana was depicted in a bronze image as a boat with a prow of a duck's head and stern of a duck's tail.

The water, which was to become the source of the Seine River, bubbled up in the temple. It may have been a situation very much like the temple of Asclepias where pilgrims hoping to be healed spent a night in the temple. In order to properly honor Sequana, carvings emphasizing the part of the body that was healed were tossed into bubbling waters by the temple.

When we hear the song: "Three coins in a fountain, which one will the fountain bless?" we are actually celebrating a ritual that may have started back in the Stone Age. We know that this ritual is at least 4,000 years old. It is a simple statement of karma, a gift is given and the deity in charge of the healing waters will return the favor.

The first time in literature that a sacrifice to a sacred spring is recorded in the *Iliad* by the Greek poet Homer around -800. "When the ships of the Greeks were gathering at Aulis, bearing evil to Priam and the Trojans, we were making unblemished offerings to the immortals on the sacred alters beside a spring beneath a fair plane tree." A snake rose from the spring waters and swallowed a nest of eight baby sparrows and their mothers. It was interpreted as a sign that there would be nine years of war and a victory on the tenth year.

The earliest offerings were found at the famous spring of St. Moritz. Two shafts timbered with larch contain a series of bronze offerings. This was a difficult spring to reach in earlier times, for it is 6,000 feet above sea level in mountainous country.

The healing spring of Pyromont were once visited by the Roman General Varus with his legions. It was known for its iron-rich water with carbon dioxide. Benjamin Franklin was another visitor to the healing water. Excavations in 1863 went twelve feet down, and revealed hundreds of belt buckles, ornamented urns and Roman coins.

Another early offering site was found by a spring on the Danish island of Moen. The offerings were woman's ornaments and bracelets made of bronze. Maybe it was a magic spring used only by women.

In 1852 the thermal spring of Vicarello, Italy known as Lacus Sabatinus was cleaned. The workers found 1,200 pounds of “weight money.” These were slabs of silver used before coins were invented around -650. Coins were stamped with the images of kings and gods as a guarantee of weight. The spring yielded 1,400 old cast coins. There were thousands of coins from the early days of the Roman Republic to the time of the Caesars. There were also bronze, silver and gold vessels consecrated to Apollo Silvanus and the nymphs, who were in charge of the healing spring.

In 1872 a buried well at Carrawburgh, England near Hadrian’s Wall was uncovered, which was sacred to the nymph Covertina. Nearly 20,000 coins were taken from this well. The earliest was a Greek coin from the second century before the time of Christ. There were also jewels, brooches and pots.

One of Pliny the Younger’s letters describes the headwaters of a small river that flows into the Tiber. He remarks that the waters of the Clitumnus were so clear that he could count coins on the bottom, which the worshipers had offered to the spirit of the water.

We make a wish when we throw coins into waters. The Greek traveler Pausanias wrote that it was a duty to throw coins into sacred wells as thanksgiving for health. The Roman biographer Suetonius wrote: “All ranks at Rome annually threw money into the lake of Curtium, in fulfillment of a vow for the health of Augustus.”

The Roman statesman Seneca wrote: “We worship the headwaters of great streams. The spot where the giant river breaks forth suddenly from its hidden source has its altar. Hot springs are worshipped by us; and the darkness of the unfathomable depth of certain pools renders them sacred.”

There is a Japanese legend of Yosoji, who went to the magician Kamo Yamakiki, for help with his sick mother. “Near the source of this stream, is a shrine to the God of Long Breath. Go fetch this water and give it to your mother, for this alone will cure.”

Yosoji arrived at a place where three paths crossed and wondered which one to take. A woman dressed in white walked up and asked him to follow her. When they arrived, Yosoji was told to drink and fill the gourd with water for his mother. Then she said: “Meet me again

at this place in three days' time, for you will require a further supply of this water."

One of the most curious stories of holy waters took place with the visions of the French peasant Bernadette Soubirous in 1858. The last time the apparition appeared by the Lourdes waters it said: "Je suis l'Immaculee Conception." When she told her story Bernadette became a saint. People knelt before her or kissed her garments. Thousands of people mobbed her, and she was forced to seek the protection of the church and had to retire to a convent. She was accused of hysteria and questioned by French magistrates.

A quarryman had his eyes injured by a blast, and he thought that the waters might benefit his eyes. He claimed a healing. Soon word spread throughout France that the Virgin Mary was the source of miraculous cures at Lourdes.

In 1876 a basilica was constructed above the rock and a statue of the Virgin Mary was placed in the cave where Bernadette had her vision. Lourdes became so popular, that three million pilgrims visited it each year. Some sixty cures are considered a miracle and another 6,000 cures are considered authentic. In view of the millions of sick pilgrims who have visited the grotto, the number of miracles is small. Millions of people continue to hope that Lourdes will be their answer for health.

There is a curious story that dates back to the eleventh century in a location north of Paris. An old manuscript tells how a boy disappeared while plowing a field with a team of oxen. The boy fell into an underground spring. A servant with a large bleeding sore on his cheek rescued the boy. Hours after the rescue, the old sore healed.

Word of this miracle brought an old man crippled with arthritis, who was quickly healed. The scribe wrote: "Miracles performed there by our Holy Father brought Christians from all over the world." But something else happened. The people who didn't get cured spread the word that the spring didn't work. People stopped believing and then they stopped coming. It was forgotten, and nobody knows where the "Lost Lourdes" of France is today.

## 2. THE MYSTERY OF WATER

“What water out of all these various kinds, are we to look upon as best adapted for the human constitution? Different kinds in different localities, is my answer. The kings of Parthia drink no water, but those of the Choaspes, or of Eulaeus, however long their journeys, always have water carried in their packs. It is evident, that it is not merely because this water is river water that is so pleasing to them, because they decline to drink the water of the Tigris, Euphrates and so many other streams.”

*Natural History* Pliny +70

“They used fountains both of cold and hot springs; these were very abundant and both kinds wonderfully adapted to use by reason of the sweetness and excellence of their waters.”

*Critias* Plato

In 1951 a Great Neck, New York prankster left a series of telephone messages: “This is a recording: your water will be turned off in 15 minutes. Fill up your bathtub, sink and all water containers.” Everyone who was called complied with the message!

We hardly think about water unless we don't have enough, or we have too much! One of the most desperate battles of WWI was described by Vivian Gilbert in *Romance of the Last Crusade*. A British army unit left Beersheba for the next objective of the wells at Sharia. A camel train was to follow the troops with water, but they missed the army. The soldiers' tongues and lips became swollen and the eyes were bloodshot. Some of the men went temporarily blind and they followed those who could see. With courage born of desperation they forced the Turkish army unit out. Then the wounded and disabled men drank first and the last men drank four hours later.

Another story relates to the early days of Texas. A cavalry detachment was scouting around the Double Lakes area for a band of Indians. The men filled their canteens, but the day was hot and they quickly emptied them. When they reached their camping spot, the water was so alkaline, they couldn't drink it. They were unable to find water the next day, and by late afternoon the desire for water became uncontrollable.

The men had vertigo and dim vision. When they tried to sleep, they dreamed of water. When the horses gave out, the men killed them and drank their blood. It was so thick, that it was hard to swallow and it gave them diarrhea. The desperate men drank their own urine, which was scanty. Part of the regiment returned to Double Lakes on the fourth morning. They were almost helpless, and as they drank they vomited it back up. In spite of the harrowing experience, only 4 of the 42 men of the Tenth Cavalry died.

The “ship of the desert,” the camel, has special adaptations for life where drinks of water are few and far between. The camel begins sweating only after a considerable increase in body temperature, and even then it does not drip with perspiration. It is known to go for 17 days without water. Which causes a loss of a third of its weight. In a short time, it can drink twenty gallons of water.

Studies in Israel show that camels have a special blood albumin, which enables the blood to retain its water, volume and fluidity even when tissue water is depleted. Veterinarian Kalman Perk showed that camel red blood cells will swell up to 240% of normal size after drinking. The Damascene cattle of Syria had similar blood albumen. When rabbits were injected with camel blood albumin it protected them from heat. Further work showed that Yemenite Jews who had lived for centuries in the desert had higher levels of special blood albumin than European Jews.

Robert Bunsen was struck with the green-blue color of the Icelandic geysers. He examined pure water in a tube and found that it was blue, so he concluded that blue was the true color of water. Chemistry students remember him for the Bunsen Burner.

Twenty years later John Tyndall studied the question of color. He found that the blue of the sky was caused by reflection of the short blue light at the expense of the longer wavelengths. If the longer wavelengths were reflected, the color of the sky would be nearly white.

Dominique Arago noted that water has a color of transmission and a color of reflection that is different. Water is blue by reflection, but the transmitted color is green. When the sea is deep, light is reflected back, which appears blue. If it is shallow, the sand reflects

the transmitted light. Since the color of the transmitted light is green lakes may be varying shades of green and blue by means of depth and reflection from the bottom. Of course, water can be green because of green plants.

Absolutely pure water is a beautiful blue color. Small amounts of salts don't change the color. With high levels of salts the light becomes yellower. The color combination then looks greenish-blue.

If you were asked the question on a psychology test: "What is the taste of water?" what would be a good answer? Since there are no water taste receptors, one answer is "wet." What we experience is a result of what we have been experiencing. After tasting something sour, water tastes sweet. After a sugar solution, water tastes sour. Rats like cool water best, for it has an increased capability to satisfy the thirst.

The tongue is adapted to saliva, which has a low concentration of salt. Water has a "flat" taste, when the salt concentration is lower than the saliva. If you are used to drinking water with a small amount of salt (sodium chloride) in it, a water solution that is weaker is "sour" or "bitter." A solution that is stronger is "sweet" or "salty."

Some people describe distilled water as bitter, while others feel it is flat or insipid. Water may have a "musty" taste, when a poorly insulated hot water pipe is near a cold pipe. Water from lowland reservoirs may have a slight vegetative taste. Upland reservoirs may have a soapy taste.

The brain centers of taste and smell are located near the center for hearing. In 1968 Dristian Holt-Hansen experimented with taste in Carlsberg beer. When his 15 subjects heard the proper pitch of taped sound, the beer was "rich," "full bodied" or "smooth." A higher or lower sound brought reports of "insipid," "watery," "bitter," or "thin." If you listen to the right sound, water will probably taste great!

In the book *Terre des Hommes* Saint Exupery wrote: "Oh water! Thou hast no taste, no color, nor fragrance; thou are indefinable; enjoyed without comprehension. Thou art not necessary to life: thou art life itself!"

Rats prefer water to alcohol, but if they are disturbed or hungry they will drink alcohol. Guinea pigs and porcupines prefer water, but hamsters like alcohol. Rabbits don't care if it is water or alcohol.

In 1973 the British Medical Journal reported that a man managed to get drunk on water. He consumed gallons of water in an effort to flush a giant worm from his body. Then he slumped into a chair mumbling in a slurred voice and collapsed. The excess water had washed the salts from his body fluids producing the symptoms of drunkenness. He was sobered up by the injection of a salt solution.

Water needs were included in the first known code of man's laws. *The Code of Hammurabi* in -1700 provided a priority for the scarce use of water. The primary use of water was to supply the needs of man and animals, then for households, and last for the land. The law of irrigation read: "If a man is negligent in strengthening the banks of his field, and has not maintained his banks, so a breach occurs, letting the waters carry away the soil, the man in whose bank the breach has occurred shall replace the wheat, which he has caused to be lost."

Water has served for proverbs and sayings. When we can't change the past, we say: "That's water over the dam." We explain human (and horse) behavior by saying: "You can lead a horse to water, but you can't make him drink." In the ancient Greek comedy Antiphanes had a slave girl say: "If I don't do so, may I never drink the water of freedom." When slaves received their freedom in Greece, they drank from the Cynadra fountain.

Russian water expressions include: "He'll come out of the water dry." This means that nothing can hurt him. "He wouldn't pollute water." He's very pure. "He saw it in the water." The old people believed that they could predict future events by looking into water. The French seer Nostradamus sat in his home with a candle and stared into a glass bowl of water. He put his visions into poetry.

The ancient megalithic rock art is often decorated with water symbols. The zigzag signs symbolize the wavy action of running water. The comb signs represent rain. When rain was needed for the crops, many cults had ceremonies or imitation magic in which water or pebbles were sprinkled in hopes of bringing the needed rain.

Chemically speaking water is quite unusual. The combinations of hydrogen with elements similar to oxygen in the periodic table have different properties. Hydrogen sulfide boils at  $-61^{\circ}$  C., hydrogen selenide boils at  $-42^{\circ}$  C., and hydrogen telluride boils at  $-4^{\circ}$  C. Water

boils at 100° C. The property known as hydrogen bonding or Van der Waals force makes the unusual properties. Water is slightly compressible under pressure. If this were not true the oceans would rise by 120 feet.

The boiling point of water changes with pressure. If the atmospheric pressure is raised to 30 pounds a square inch, the boiling point rises from 212° F. to 294° F. The boiling point of water decreases by 1° F. for every 600 feet of altitude. If you are at 6,000 feet, the boiling point will drop from 212° F. to 202° F. When India was a British territory, curious geographers sent a group of trained “pilgrims” to map the backcountry where Europeans were not welcome. They made tea at regular intervals, and stirred the water with a thermometer to give them the approximate altitude.

When water becomes ice, it becomes a regular crystal. Ice can be doped to form diodes or even transistors. Electronic components are usually made from silicon, doped with positive and negative charge carriers. Scientists doped ice to form a negative crystal with trace amounts of hydrofluoric acid. A positive ice crystal was made with lithium hydroxide. The semiconductor doesn't work well, but the amazing thing is, that it does work! A computer chip could be made from doped ice. If it warms up, it would give new meaning to the words “melt down.”

While water is composed of hydrogen and oxygen, there are three isotopic species of hydrogen and three of oxygen. For every atom of oxygen 17, there are 5 atoms of oxygen 18, and 2,500 atoms of oxygen 16. Hydrogen in nature exists as one atom of hydrogen 2 (deuterium), to 96,000 atoms of hydrogen 1. Tritium or hydrogen 3 is a radioactive isotope, which is formed in nuclear reactors or from atomic bomb blasts. It has a half-life of 12.5 years. This means that it will decay and only half will be left at that time.

Heavy water [deuterium] is used in nuclear reactors. A solution was fed to rats at a level of ten grams per day. The metabolism began to decrease and body temperature fell by the fifth day. The rats died after seven days. There is a theory of aging, that we slowly accumulate heavy water, which plugs up the cell metabolism until we age and die.

Harold Urey discovered deuterium in 1931 and a year later he was able to isolate it. Scientists found that sugar would ferment at  $\frac{1}{9}$ <sup>th</sup> the normal rate in heavy water. Seeds would grow slowly or not at all when watered with heavy water. An experiment was done by injecting heavy water into an inoperable cancer of the tongue. The results were not satisfactory and there was concern about general body toxicity.

Anders Celsius constructed his temperature scale of 0° to 100° C. from the freezing and boiling points of water at sea level. A gram of water is a cubic centimeter, while a kilogram of water is a cube 10 cm. × 10 cm. × 10 cm.

An equal amount of water takes ten times as much energy to heat as the same mass of iron. This property keeps the summers cooler and the winters warmer in areas along seacoasts. Water is the great heat storage chamber of our planet.

One mystery of water is that small samples that are slowly cooled do not behave like our textbook answers. The National Bureau of Standards did a study in 1937 on the supercooling and freezing of water. Specimens of water were put in glass bulbs and suspended in solutions of alcohol, held by a copper wire. A thermometer was put in the alcohol to determine the temperature when water freezes. Some of the bulbs of water were kept for months at temperatures of from -3° C. to -12° C. without freezing.

The first few freezings of a water sample were often erratic, then the samples began freezing at colder temperatures. Freezing temperatures of the samples studied were:

Stagnant pool water -4° C.

Winter snow water -4.6° C.

Hot faucet water -6.2° C.

Vacuum distilled without boiling -15.6° C.

Distilled water heated to 97° C. for five hours froze at -14° C.

The crazy thing about these tests is that not a single specimen had a spontaneous freezing point of 0° C.! If a bulb contains water that freezes at -15° C., it can be tipped back and forth and it still won't freeze! Wiping a glass surface may initiate freezing when the temperature is only slightly below 0° C.

Another strange fact about water is that hot water freezes faster than cold water. The first observation of this was published in *Philosophical Transactions of the Royal Society* of 1700. In 1755 Joseph Black boiled water for four hours and put it into a flask and cooled it to 48 degrees. He took equal parts of unboiled and boiled water at the same temperature so identical amounts of water were used. The preheated water always froze first!

The old speculations were revived in Tanzania when two high school students were making ice cream as an experiment in a physics class. One student placed cold water and the other put hot water in the freezer at the same time. The hot mixture froze long before the cold one! An account was published in *Physics Education*.

The first explanation is that hot containers partially melted the ice under them and gave better thermal contact. But boiling hot water loses about 16% of its mass by evaporation while cooling. Tests showed that an identical amount of water at 95° C. would reach freezing seven minutes before water at 60° C.

There are a series of mysteries that scientists are still struggling to understand. Water breaks all the normal laws of physics, which states that substances contract when they are cooled. It begins expanding at 4° C., then it increases by 10% when it freezes. Rocks split and mountains crumble, because of this action of water.

Another mystery was first reported in 1834. A glass tube of water is frozen by wrapping it with cotton moistened with ether. This produces a powerful cooling effect, and visible sparks could be seen as the water froze. An active investigation is now underway on the sparks of light produced by cavitation. As microscopic bubbles collapse, they emit flashes of light! Faint light flashes can be seen at night in mountain streams, where swift water flows over pebbles.

Any physics student who has seen Lord Kelvin's experiment will surely reflect that water can be strange. In this case two streams of water from one container fall through separate metal rings. A tremendous charge builds up and there is a crack as a spark passes between them. This experiment was first demonstrated in 1860.

A third mystery that has generally been dismissed is that running water underground emits energy, which can be picked up by dowsers. I heard a story on a neighboring Iowa farm when I was a boy. An attempt was made to find and dig up a clogged tile drainage line. The field had no visual markers at all. The farmer used a willow stick. In a few minutes he called the backhoe operator over and said: "The tile junction is here." It was!

Albert Einstein was a close friend of Herman Wolf. He often went to his country home in Bremen, Germany. On one occasion Wolf talked about the problem of a hidden leak that was draining the large pond in the garden. Professor Einstein remarked that he might be able to help, so he took a willow rod and walked around the pond. Soon he told Wolf that the leak was located in a particular spot, which was then patched. The leak was gone!

Jacque Benveniste believes that water is capable of carrying molecular information. This is the old theory of homeopathy. Water absorbs the energy of a mineral or herb and than can be used for treatment. Most of the studies have not shown this effect, and when they show it they are so weak, that they can be dismissed. If increasingly precise methods can confirm this on a scientific basis acceptable to all, this would be a great discovery.

In ancient legend water assumed even greater mystery. Most Indo-European literature contains accounts of souls crossing the river of death. Some stories tell of two springs. When entering the inner worlds after death, Soul drinks of one spring to remember its past. Before Soul reincarnates into a body again, it drinks of another spring to forget the past. There was a popular tomb inscription: "May Isis give you fresh water." Three of these inscriptions were found at Rome. Isis occupied a place in worship similar to the Virgin Mary in latter times.

Some four hundred years before the time of Christ a gold funeral plaque found at Petelia, Italy reading: "Thou shalt find to the left of the House of Hades a spring and by the side thereof standing a white cypress. To this spring approach not near. Thou shalt find another from the Lake of Memory with cold water flowing forth and guardians standing before it. Say: "I am a child of Earth and starry Heaven,

but my race is only of Heaven. This ye know, but I am parched with thirst and I perish. Give me quickly of the cold water flowing forth from the Lake of Memory.” They will give thee to drink of the holy spring from themselves. And among the other heroes thou shalt have lordship.”

In the *Republic*, Plato gave an account of the “River of Forgetfulness.” He believed that we only learn what we knew before, and soul knew the archetype of everything that existed in the physical world.

Ponce de Leon was one of the oldest companions of Christopher Columbus. Peter Martyr recorded his search for the legendary “Fountain of Youth,” which he hoped to find in Florida. The legend may have passed down in Indian lore, for the Seminole chief Coacoché, who died in 1841 told of his dream of drinking water from the Spring of the Great Spirit, that would make him live for ever. Two springs have claimed to be the fountain of youth. One is the Silver Spring, a few miles from Ocala, Florida. The other is the Green Cove, a sulfur mineral spring on the St. John’s river.

The legend originally came from East India, and it was associated with the Semitic conception of the “Water of Life.” The first mention of the fountain of youth in Europe appeared in a letter of Prester John around +1165. The water was supposed to give eternal health and keep people at about age 32.

There is an interesting account of the waters of immortality in the Mongolian account of Alexander the Great. Alexander reached the land of darkness, and when he was leaving, he was given a cup of the waters of immortality, with the assurance that he would live for 3,000 years. A wise officer tells Alexander that he will weary of immortality, and advises him not to drink of it. He pours the water out on the branches of a cypress tree, which now became evergreen.

A second story of Alexander the Great is supposed to have happened in Egypt. An angel tells Alexander: “In the land of Arabia, God hath set the blackness of solid darkness, wherein is hidden a treasure of this knowledge. Here is the fountain of water which is called, “The water of life.” Whoever drinks of it, even a single drop, shall never die.”

Alexander sends Matun to scout the path for his army. On the way he began to cook a fish in the waters of a well. When he put the dried fish into the water, it revived and swam away. Now he knew that he had found the waters of life.

Exobiologists may speculate about worlds in which life exists without water using ammonia or other molecules as a basis for life. It is likely that life as we know it depends on water. We should be thankful for the diverse variety of life, which an abundance of water on our world has given us to enjoy.

# BIBLIOGRAPHY

The journals in this bibliography are listed in alphabetical order. Most large medical libraries shelve them in this manner. All foreign titles of articles have been translated for the benefit of my English readers. The authors of books are listed after the journals.

## 1. THE HOLY WATERS

- American Journal of Semitic Languages and Literature 35:161, 1919 "The Mouth of the Rivers" W.F. Albright
- Art and Archaeology 30:220, 1930 "The Use and Worship of Water Among the Romans" E.E. Burris
- Ecumenical Review 34:271, 1982 "The Water of Life" W. Ariarajah
- Islamic Quarterly 33:34, 1989 "Water in the Quran" M.A. Haleem
- Journal of Dharma 9:132, 1984 "Water Symbolism in the Religious Life of Man" T. Pereira
- Journal of the Palestine Oriental Society 1:153, 1921 "Haunted Springs and Water Demons in Palestine" T. Canaan
- Proceedings of the Society for Psychical Research 9:#24/ , 1893 "Mind-Cure, Faith-Cure and the Miracles of Lourdes" A.T. Myers et al.
- Psychological Reports 45:381, 1979 "Effect of Holy Water on the Growth of Radish Plants" S. Lenington
- Scientific American 225:July/65, 1970 "The Sacred Source of the Seine" S. A. Deys
- Baring-Gould, Sabine *Lives of the Saints* Edinburgh: J. Grant, 1914
- Cohn-Serbok, Daniel *Jewish Mysticism, An Anthology* Oxford: One World, 1995
- Davis, Frederick Harland *Myths and Legends of Japan* New York: Crowell, 1928
- Neane, Alan *The Happening at Lourdes* London: Hodder & Stoughton, 1968

## 2. THE MYSTERY OF WATER

- American Journal of the Medical Sciences 26:178, 1834 "Sparks In the Freezing of Water by Ether"
- American Journal of Physiology 212:241, 1967 "Metabolic Rate of Camels: Effect of Body Temperature and Dehydration" K. Schmidt-Nielsen
- Fabula 23:19, 1982 "Waters of Memory, Waters of Forgetfulness" B. Lincoln
- Hispanic American Historical Review 21:361, 1941 "Ponce de Leon's Fountain of Youth: History of a Geographical Myth" L. Olschki
- Journal of Research of the National Bureau of Standards 20:799, 1938 "Supercooling and Freezing of Water" N.E. Dorsey
- Military Surgeon 74:193, 1934 "A Cavalry Detachment Three and a Half Days Without Water" J. King
- Nature 200:272, 1963 "The Camel's Erythrocyte" K. Perk
- New Scientist 148:Dec 2/22, 1995 "Supercool Theory Solves Hot Ice Cream Puzzle" M. Chown
- New Scientist 154:June 21/40, 1997 "Wacky Water" R. Matthews
- Prescriber 33:43, 1939 "The Therapeutic Value of *Heavy Water*" G.A. Stephens

Philosophical Transactions of the Royal Society 65:124, 1775 "The Supposed Effect of Boiling Up on Water in Disposing It to Freeze More Readily Ascertained by Experiments"

Proceedings of the Royal Society of London 16:67, 1867 "On a Self Acting Apparatus for Multiplying and Maintaining Electric Charges" W. Thomson

Science 143:967, 1964 "Taste of Sodium Chloride Solutions After Adaptation to Sodium Chloride: Implications for the Water Taste" L.M. Bartoshuk et al.

Gilbert, Vivian *Romance of the Last Crusade* New York: D. Appleton and Company, 1927