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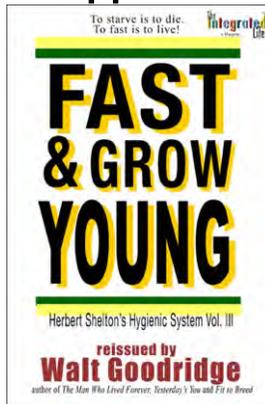
SUN & AIR BATHING

Herbert Shelton's Hygienic System Vol. III

reissued by
Walt Goodridge

author of *The Man Who Lived Forever*, *Yesterday's You* and *Fit to Breed*

The supplement to



The HYGIENIC SYSTEM Vol. III
THE SUN BATHING SUPPLEMENT

By HERBERT M. SHELTON

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WHY?

Fast & Grow Young is Herbert Shelton's 1934--now public domain--classic, *Hygienic System Vol III*, re-issued under a great title. Our goal is to provide easy access to this treasure trove of vital information for the benefit of the public's health and healing.

Shelton's work underscores the Ageless Living™ philosophy that "*the universe is perfect, nature is foolproof and the body is coded to heal.*" That perfection and coding can be activated by harnessing Sunlight, Water, Earth (including real food), Air and Time (S.W.E.A.T.).

The concept of fasting harnesses time and allows nature--through our coding--to proceed at its own pace to *reverse and cure* the effects of unnatural/impure light, air, water, earth and unnatural food. There is perhaps no greater, no simpler, no more thorough and no more easily accessible nor practiced cure than fasting. It is nature's first cure--animals are known to fast when ill. The concept is simple: allow the body time to rest from the energy-consuming process of digestion and assimilation and divert all its energy toward healing. This is the simplicity of natural cure, and Shelton's research shows the amazing extent to which this is so.

As insightful and accurate as his insights are, Shelton, like many authors, was limited by the worldview of his culture and times. Consequently, certain content may not "pass" today's standards of political correctness. Don't let this deter you from full appreciation of Shelton's work. The reader who can make allowances for the biases of his time and dig below a few politically incorrect references, will uncover and rescue the underlying philosophy which is, at its core, unassailable: that in his quest for health and youth, man is best served by looking to nature for guidance. You are your own authority.

With that said, I present to you, with minimal editing and spelling corrections to the original text, *Sunbathing*.

*Walt F.J. Goodridge, author of over 20 books including The Ageless Adept, Yesterday's You: How to Reverse Aging
Fit to Breed and others*

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Helio-Hygiene

(SUNBATHING)

MAN wants but little here below, and between meals a pickaninny will content itself with liberty, light and air, and a couple of rag-babies.

FELIX L. OSWALD

THOUSANDS of sickly nurslings, pining away in the slums of our manufacturing towns, might be saved by an occasional sun-bath. Aside from its warmth and its chemical influence on vegetal oxygen, sunlight exercises upon certain organisms, a vitalizing influence which science has not yet quite explained, but whose effect is illustrated by the contrast between the weeds of a shady grove and those of the sunlit fields, between the rank grass of a deep valley and the aromatic herbage of a mountain meadow, as well as by the peculiar wholesome appearance of a "sunburned" person or a sun-ripened fruit.

FELIX L. OSWALD



The beautifully developed, sun-kissed bodies of the ancient Greeks, as exemplified in the above picture of Eros and Psyche, far surpass the undeveloped and etiolated bodies of the Modern American

Sun-bathing

CHAPTER XXXVIII

"Life is a sun-child," says Dr. Oswald; "nearly all species of plants and animals attain the highest form of their development in the neighborhood of the equator. Palm trees are tropical grasses. The python-boa is a fully developed black snake; the tiger an undiminished wild cat. With every degree of a higher latitude, Nature issues the representatives of her arch-types in reduced editions--reduced in beauty and longevity, as well as in size and strength."--*Nature's Household Remedies*, p. 79.

This statement was made in 1885 and, although *Hygienists* had been employing the sun-bath in this country for over thirty-five years at the time Dr. Oswald's statement was made, the practice was still frowned upon by the medical professions and all who employed sun-baths were denounced as charlatans, quacks and ignorami. People who took sun-baths were called faddists, extremists, fanatics and other pleasing names. Indeed, these names were still being applied to sun-bathers in 1911, when the present writer began taking sun-baths.

Sunbathing antedates recorded human history. Savages, "primitive" peoples, little boys and animals instinctively seek to avail themselves of the benefits of sunshine. There has never been a time when mankind has not enjoyed its influence and only a false ascetic pattern of life and the monastic ideals ever, even for a time, deprived part of the race of at least occasional use of the sun.

During recent years the wearing of very scanty clothing, shorts, abbreviated bathing suits, etc., by both sexes, young and old, has served to give the youth of today the advantages of sunshine. The rise of nudism has also contributed to this effect. Today on our school grounds we see boys and girls at play with large parts of their bodies exposed, while smaller children run around in their sun-suits.

Due recognition for these radical changes in our ways of life and our attitudes toward the body is not being given to those men and women who fought and suffered for a hundred years to bring just this thing about. Today children are reaping the benefits of the struggles of the *Hygienists* and are being lied to about to whom credit belongs.

Before present practices could come into vogue, people had not only, to be told of the value of sun-bathing but they had to be educated out of their prudish notions about the body and its various parts. Much work remains to be done, but we must not overlook the great work done by those who have gone ahead.

Before discussing the modern phase of sun-bathing I deem it in order to give a brief account of the practice in ancient times. Evidence of the use of the sun as a health restorative and preservative measure, may be found in every period of history, in all peoples, savage or civilized. Positive evidence of the hygienic use of the sun is found in the history of the Egyptians and other peoples. The Babylonians, Egyptians and Assyrians had their sun gardens; the Greeks their helioses; the Romans their solaria.

Akhenaton, of Egypt; Zoroaster, of Persia; Hippocrates, of Greece; each and all elevated the sun to the dignity of a god and a force. The great sanitarium of Hippocrates, on the Island of Cos, was equipped with a large solarium for the use of the sun. The Roman thermæ were all equipped with solaria for those taking sun-baths. Pliny says that in these hot-houses the sun is very helpful. Hippocrates extols the exsiccative (drying) action of sun-light. Herodotus gives extensive instructions for the use of the sun-bath, emphasizing its effect in strengthening the muscles and nerves.

Antyllos describes at some length the effects of sunlight, his description comparing well with those of modern users. Philostratus tells us that the Olympian athletes were required to take sun-baths.

Celsus, Pliny the younger, Galen, and Cicero, are among the Roman writers who describe the use of the sun-bath. "Sol est remediorum maximum"--the sun is the best remedy--declared Pliny. The flat roofs of the southern houses were esteemed as solaria by the Romans. In Rome, Pliny the younger, tells us of Vestricus Spurina, that as soon as the hour of the bath had come, he went to walk completely naked in the sun if the air was calm, then played with a ball a long time.

The old German epic poem, the Edda, tells us that Germans used to carry their sick, in the springtime to the sunny mountain slopes, in order to expose them to the sunshine. Certain Germanic tribes placed their feverish children in the sunlight on the tops of their houses. On the shores of the Bay of Gascony, sunlight is still employed in rheumatism. The Incas of Peru treated "syphilis" with sun baths. In Haiti similar procedures are still employed.

Man was originally a nude animal. He first learned of the kindness of the sun, when, migrating into the temperate zones, or following earth's change of climate, he felt the sting of cold and the bite of cloudy, inclement weather. He learned the warming and cheering power of the sun and came in time to worship the sun as a god. Sun worship antedates recorded history. At one time or another, the whole human race has worshipped the sun. At the time of the discovery of America, the more advanced Indian tribes of both continents were sun worshippers.

It is asserted that the first Egyptian temple was erected to the sun god and that the Egyptians employed the sun bath over five thousand years ago. This temple was erected in a city called On, which was east of the Nile. Later, the name of the city was changed to Heliopolis--City of the Sun.

Religion and philosophy alike taught that the sun is the source and creator of life, and there are yet many who hold this view. In the third century, A.D., Mithraism, or sun worship, came very near becoming the universal religion. It was so like Christianity in every essential respect that it became its chief opponent. The final triumph of Christianity and its extreme reaction against everything "Pagan," practically ended the sun-bath, so widely employed by well and sick alike in ancient times, just as it destroyed the Roman thermæ.

The Ancients, as disclosed by Herodotus and Antyllos, knew that "the sun feeds the muscles," and the Romans made use of its effects in strengthening and enlarging the muscles in training their gladiators, to whom they gave sun-baths. Ancient physicians declared the sun to be "the best food and medicine in the world."

Between the Ancient world and the Modern, there was interposed the Middle Ages, or Dark Ages. There was a thousand years reign of anti-natural madness that practically destroyed all that was of value in ancient civilization and preserved for us chiefly its worst or least desirable features. During this millenium of madness, the only physicians who employed the sun-bath were among the Jews and Arabians.

The modern phase of sun-bathing had a dual origin--one of these in Europe, the other in the United States. I shall discuss the European phase first.

Arnold Rikli, who died in 1907 at the age of 97, is regarded as the originator of the modern practice of sun-bathing. For over half a century he prescribed sun-baths in his institution established at Weldes Krai, on the Adriatic Sea, in 1855. This institution in Austria attracted patients from all over the world. Rikli wrote seven books about his methods, of which the principal ones were translated into the Spanish, French and Italian languages. It would be a reasonably safe guess that Loncet, Finsen and Rollier were all acquainted with the work of this "irregular" or nature cure practitioner. F. Thedering, M.D. (Germany), Dr. Liek, A. Monteuuis, M.D. (France), Laurason

Brown, M.D., Saranack Lake, N. Y., each give Rikli credit for his work, although Dr. Brown attempts to hide his true character by calling him a physio-therapist.

Waldvogel, of Bohemia, in 1755, had advocated sun-bathing; but he had few or no followers; while Madame Duhamel, at Berck, exposed tubercular children to sunshine as far back as 1857, believing that sun-bathing would hasten recovery. Dr. Lahman employed the "Sun and Air Cure" in his institution in Germany, as did Bilz in his famous institution; Bilz employing it as early as 1872-73. Sun-bathing has continued to grow in popularity in all parts of Europe and has been adopted by both the Youth Movement and the Nudity Movement.

In America, the first advocate of sun-bathing was Sylvester Graham, who declared, while discussing the evils of clothing in *"Lectures on the Science of Human Life."*--p. 638: "My object is not to advocate bodily nudity in society; although I cannot doubt that morality would be greatly improved by it, in the course of two or three generations, if in all other respects mankind conformed to the true laws of their nature; * * *.

"If man were always to go entirely naked, the external skin, the anatomical structure and functional character and relations of which we have fully contemplated, would be preserved in a more healthy and vigorous state, and perform its functions more perfectly, and thereby the whole human system in all its properties, powers and interests would be benefited; the circulation, and particularly the venous circulation which is near the surface, would be more free and unobstructed; respiration, or breathing would also be more free, full and perfect; voluntary action would be more unrestrained and easy; the bones be less liable to disease and distortion; all the muscles of voluntary motion would be better developed and more powerful; in short the anatomical development and symmetrical proportion, and the physiological power, and functions of every part in the whole system, would be more perfect, and, as a natural consequence, the

sensual appetites would be more purely instinctive, and exert a less energetic and despotic influence on the mental and moral faculties, and imagination would be deprived of its greatest power to do evil."

Following close upon Graham's heels, Dr. Trall placed great emphasis upon the power of sunlight, both in health and disease. He discusses it at great length in his *Hydropathic Encyclopedia*, p.p. 304-307 (Vol. 1). He declares that "abundant sunshine" should "be allowed special prominence in the remedial plan" in "*Cachexies--scrofula*, in its various forms of humors and tumors, glandular enlargements, white swelling, cutaneous eruptions, fever sores, rickets, lumbar abscesses, hip disease, otitis, ophthalmia, etc., as well as plethora, scurvy, elephantiasis, cancer, etc."

In his *Water-Cure for the Millions* (1860) Trall says: "The importance of light as a remedial agent, is not sufficiently appreciated. Many persons who live in elegant and expensively furnished houses so darken many of the rooms, in order to save the furniture, as to render the air in them very unwholesome. The scrofulous humors which prevail among those inhabitants of our cities in rear buildings and underground apartments, sufficiently attest the relation between sunshine and vitality. Invalids should seek the sunlight as do the flowers--care being taken to protect the head when the heat is excessive, exposing the whole skin in a state of nudity, frequently, to the air, and even to the rays of the sun, is a very invigorating practice. For scrofulous persons this is particularly serviceable."

Although others had suggested the use of sunlight in rickets before him, credit for the discovery of its value in this condition is given to Huldschinsky, who in 1919, "definitely proved that sunlight could prevent and cure rickets." A reading of Trall's works would show any unbiased student that he was nearly seventy years ahead of Huldschinsky in making this discovery.

Dr. Geo. H. Taylor, Trall's co-worker, in a book published in 1860, under the title, *The Swedish Movement Cure* and reproduced in

1883 under the title, *Health by Exercise*, lays great stress upon the value of sunlight, both in health and in disease. He particularly emphasizes its value in scrofula (tubercular adenitis) and its great service to nursing mothers. "It is wonderful," he says, "and delightful to see how soon a pale, attenuated, miserable child, after being freely exposed to the sunlight for several hours every day, will begin to improve, and the symptoms here described (scrofula) to disappear. Even scrofulous swelling of the glands of the neck, or other parts of the body, will quickly succumb under the magical influence of sunlight and pure air."

In his *Weak Lungs and How to Make Them Strong* (1863), Dr. Dio Lewis devotes a brief chapter to sunshine in which he says: "I have assisted many dyspeptic, neuralgic, rheumatic, and hypochondriacal people into health, by the Sun-Cure. I have so many facts illustrating the wonderful power of the sun's direct rays in curing certain classes of invalids, that I have seriously thought of publishing a work, to be denominated, the '*Sun-Cure*'."

Dr. Lewis presents a few cases illustrating the results of exposure to the sun, including the case of a lawyer suffering with partial paralysis, constant pain in the loins, and other symptoms. He directed the man to lie in the direct rays of the sun coming through a window, daily, beginning with ten minutes a day and increasing the exposure to a full hour. "His habits were not essentially altered in any other particular." The man made a complete recovery in six months.

Lewis says: "Seclusion from sunshine is one of the misfortunes of our civilized life. The same cause which makes potato vines white and sickly, when grown in dark cellars, operates to produce the pale sickly girls that are reared in our parlors. Expose either to the direct rays of the sun, and they begin to show color, health, and strength."

Dr. James C. Jackson devotes twelve pages to sunlight in his *How to Treat the Sick Without Drugs* (1868), in which he says: "I do not know of any man in this country who has made as constant use of

it (the sun) as I have." He describes seventy-five to one hundred and twenty-five persons taking sun baths at one time for periods ranging from twenty-five minutes to three hours, even to four or five hours, for sixty to ninety days in the summer season. His patients were not nude, but were "clad in as light colored clothing as the patient may be able to wear."

He says: "The effect on the persons is quite as astonishing as the sight to the new observer is strange. Many of these persons who have failed under the application of the best tonics and anodynes soon become so strengthened and innervated as to be able to sleep, not only when they go to bed at night, but also while taking their sun-baths." Again: "Therapeutically considered it (sunlight) is to be regarded as one of our most powerful remedial agents, and has, in my estimate, come to fill so important a place in Nature's materia medica as to give me great confidence in being able to use it in the treatment of certain diseases with a success which challenges my highest satisfaction."

Dr. Benedict Lust says "the first sun-baths given in America were at Butler, New Jersey, at the *Youngborn*, in 1897." While, as seen above, Dr. Lust is in error, the fact is that the sun-bath has been employed continuously in this country for a hundred years or more.

It is only since World War 1, that any considerable attention has been given to sun-bathing by the medical profession and there yet remains much opposition to it in medical circles. Most medical writers on the subject attempt to show that sun-bathing was an old medical practice. However, it is false to say that the instinctive sun-bathing of savages and the sun-bathing of the sun-worshippers of ancient Egypt, Greece, Rome, India, Peru, etc., was a therapeutic practice or that it belonged to or was a discovery of the medicine men of the past.

Now that the medical profession has partially recognized the value of sunlight, they forget the work of those they formerly denounced and derided, and tell us that Dr. Loncet, of Lyons, France, made the first series of observations as to the effects of sunlight in

disease in the decade of 1890-1900. Dr. Neils Finsen, of Denmark, who experimented with sun rays and also with artificial light is given much credit. In 1890 a Dr. Palm, of England, contributed an article to *The Practitioner* in which he discussed the value of sunlight in the prevention and correction of rickets. In 1911 Dr. Rollier, a French physician, began following Loncet's methods, and continues his work to the present. Many physicians, among them Sir Henry Gauvin, of England, and Dr. Hess, of this country, have plunged into this field with earnestness and zeal. Today sun-bathing has attained respectability despite the fact that it is not yet understood by its medical supporters.

Sunlight

CHAPTER XXXIX

Scientists have made many efforts to define light and many more to determine what it is. So far no fully satisfactory definition has been formulated and no one would be so dogmatic as to claim he knows what it is. We shall devote no space to recounting any of the hypotheses that have been invented in an effort to explain light, but shall view its physical properties only.

Light is a composite entity, which may be broken up, by means of a prism, into the color band of the spectrum--red, orange, yellow, green, blue, indigo, violet. These different colors represent different rates of vibration of the light rays. From red to violet the wave lengths decrease, while the rate of vibration increases.

Sunlight contains, in addition to the color rays, a number of other rays, the "vibrations" of which are not perceptible to our ocular sense and are therefore invisible.

Today it is known that there is a continuity from one end to the other of the spectrum from waves of electricity miles long at one end to the recently discovered Milikan waves, at the other, which are shorter even than gamma rays. These long electric rays vibrate only a few times a second, while gamma rays, which are only three-hundred millionth of a millimeter in length, vibrate one hundred thousand billion times a second.

Expressing these smaller waves in centimeters or even in millimeters quickly brings us to exceedingly small fractions, so that smaller standards have come into use, such as millimicrons, equalling a millionth of a millimeter, or an Angstrom Unit (A.U.), equalling a ten millionth of a millimeter. An Angstrom unit measures

approximately 1,250,000,000th of an inch. This is to say, it requires 10,000,000 of them to equal the diameter of a human hair of average thickness.

The visible or color spectrum is composed of rays that vibrate from 8100 A.U. (red) to 3900 A.U. (violet). These are the rays of light visible to the eye and give us sensations of light, color and heat. They possess chemical and heating power. Their heating power is greatest at the red end of the spectrum where they blend with the infra-red rays, while their chemical activity is greatest at the violet end, where they blend with the ultra-violet rays. To the right of the violet band is a group of very short rays called ultra-violet rays, ranging in sunlight from 2900 A.U. to 3900 A.U. To the left of the red band are invisible rays, of longer wave-lengths than the visible red--the infra-red rays.

Waves between the length of 3900 A.U. and 2900 A.U. are classed as waves of middle ultra-violet. These rays are highly destructive and do not reach us from the sun; being, fortunately for us, filtered out by the atmosphere. No rays shorter than 2900 A.U. reach us from the sun. Shorter rays must be produced by artificial radiation. The infra-red rays run as big as 600,000 A.U., but there is no extension of the ultra-violet end of the sun's spectrum beyond 2900 A.U. even on the tops of high mountains.

The invisible rays of the sun seem to be the most beneficial to our bodies--the infra-red, below the lower (red) end of the spectrum, and the ultra-violet, above its upper (violet) end, are the rays to which the greatest importance is attached. As will be seen later, however, the complete solar-spectrum, with all its colors and shades so blended and proportioned as to produce white light, is needed for ideal growth and development.

It is estimated that the amount of ultra-violet in the sun's total radiation is, upon entering earth's atmosphere, 5%; visible (light) rays, 52%; infra-red rays, 43%. Due to atmospheric conditions, the amount of ultra-violet energy reaching the earth's surface is only about 1% with the light constituting 40%, and the infra-red 59%. The amount

varies with locality, season, altitude, cloudiness, etc., of the atmosphere. Enough sunlight passes through clouds and fog to vitalize plant and animal life.

Infra-red rays are absorbed by carbon dioxide, and water vapor in the atmosphere. While water vapor is transparent to ultraviolet rays, smoke absorbs both these and the visible rays, particularly violet, blue and green. Glass is opaque to rays of shorter wavelengths than 3000 A.U.

The Use of Sunshine

CHAPTER XL

Dr. James C. Jackson wrote: "I think it may be said with perfect truth, that no living organism, of whatever species, whose subject has a brain, a pair of lungs, stomach, bowels and back-bone, can ever be equal in the exhibition of capacities, if it be kept in shaded sunlight, to what it would be if permitted to follow out its own habits in unshaded sunlight. * * * Superior qualities are uniformly found existing in animals of the same species as these live in unshaded sunlight. This is just as true of humans as it is of animals; whoever lives habitually in the sunlight grows strong. This is not only true of the body itself in its various parts, but is true of the intelligent and responsible faculties which reside within the body. If women lived in the open air as much as men do, they would have capacities as much greater than now as men have now greater capacities, than they would have if they lived in homes like women."--*How to Treat the Sick Without Medicine.*

The manner in which sunlight is used to produce the effects that follow is not well understood, and many theories, some of these very ridiculous, have been offered to explain its use. That it is used in some way similar to the uses of vitamins seems certain to me. I look upon it as a catalyzer and its action that of catalysis. A catalytic agent or substance is one which possesses power to instigate a chemical reaction without itself being transformed or destroyed in the course of the process.

Most of the chemical changes with which the chemist is familiar require something to "touch off" the reaction. Thus explosives require a jar or a shock to cause them to explode. Hydrogen and oxygen gases, if mixed in the dark do not unite. If

mixed in the light they unite explosively. Photography is based entirely upon the power of light to instigate chemical change or reaction. That plants and animals make use of this power of sunlight is certain.

Sunlight is vitally important in the nutritive processes of both plant and animal life. Perhaps we cannot call it a food, but we can, at least, call it an accessory nutritive factor. Its office would seem to be somewhat like, if not identical with that of the vitamins. Take away sunlight and all life upon earth would perish. In the tropics, where the sunlight is most abundant, life exists in greatest profusion. In those portions of the earth where nights are longest and days are shortest, and where long winters prevail, life is either absent altogether or it consists of poorly developed forms.

Under the influence of light, plants both excrete and absorb oxygen. The absorption of oxygen goes on continuously; but its excretion takes place only when the plant is exposed to light. The plant leaves absorb carbon dioxide from the air. They employ the carbon in producing starches and sugars and release the oxygen which may again be used by animals.

Light enables plants to assimilate carbon dioxide and convert it into plant substances. The carbon dioxide is transformed into formaldehyde and this in turn is polymerized to sugar by the action of light. A carbohydrate is thus formed by plant metabolism under the influence of light.

Photosynthesis is the manufacture of carbohydrates out of carbon dioxide and water in the chlorophyll-containing parts of plants exposed to sunlight. Both chlorophyll and xanthophyll are associated in the process of photosynthesis; chlorophyll being the most important. The radiant energy acting in the synthesis of carbohydrates has been shown to be located in the visible spectrum. Red, orange and yellow light rays are considered most important light rays in plant assimilation, blue and violet show the least synthetic energy.

Green leaves chiefly absorb the red rays and only absorbed rays are chemically active. It has been said that, "It is the red rays which make a green world; it is red rays which make life possible; and the rosy cheek is in truth on fire with the red light hidden in the green leaf."

The starch of fruits and some plants, like cane and beets, is converted into sugar in the ripening process. This conversion requires the action of light. Heat will accomplish part of the work, but the perfection of these sugars requires the work of ultra-violet rays.

Sunlight is essential to the production of both the green coloring (chlorophyll) of the leaves and the many colors of the flowers, stems, leaves and fruits. The beautiful colors of flowers cannot be produced or perfected without light.

Sunlight helps plants to tear down compounds and to synthesize new ones. Both phases of catalysis are represented in its work. It aids them in transforming one of its products into another. The chemical effects of light are related to the processes of photosynthesis, photolysis, photopolymerisation, photo-oxydation, and reduction, photoisomerisation.

An examination of a leaf in the early morning reveals little or no starch. After a few hours of exposure to the sun's rays, plenty of starch will be found in it, the quantity increasing with the length of exposure to the sun. If two pieces of cork or cardboard are pinned closely to opposite sides of the leaf, the covered part of the leaf will be much whiter, in a few days, than the rest; and if the rest of the leaf is left exposed to the sun's rays, a test with iodine will show the presence of much starch in the healthy green part, while the paler or covered part contains little or no starch.

A plant kept in darkness grows colorless, flaccid and stunted. Given sunshine, it soon regains its color and unfolds bud, leaf, flower and fruit. Moss, mould and fungi are all that can grow in a cave. Deprived of sunlight, the plant dies outright or puts forth a sickly, colorless growth. If any rays of light chance to filter through the

coverings of the plant, the plant will bend towards the light in its effort to receive the little understood, but nonetheless actual benefits of the light. If it fails, it soon withers and dies. The pale colorless plant deprived of sunlight, is said to be etiolated.

The stalk of a potato that sprouts in the cellar will be as white as chalk and as tender as bleached celery and the substance of the potato will be exhausted without a new vegetable being formed. Put the potato out-of-doors, where it will receive sunshine, and it will put forth green leaves, its stalk will become thick and strong, it will grow and produce more potatoes.

Etiolation is the change in appearance and structure of the plant caused by growth in absence of light. Chlorophyll is lacking in etiolated dicotyles and monocotyles, and its absence makes the yellow pigment, carolin (formerly called etiollin), evident. Red light, free from blue or violet rays, produces all the etiolation, except lack of chlorophyll. The more refrangible portion of the spectrum is the important portion in determining growth and structural modification in plants. Etiolation is not limited to monocotyles and dicotyles, but appears in gymnosperms, ferns, mosses, algæ and fungi.

Plants turn their leaves and flowers to face the sun, and some of these, like the sun-flower, follow the sun around, seemingly in order to have the largest possible area exposed to its radiations. Bonnier subjected Alpine plants to dim light and high humidity and converted them into arctic plants.

I quote the following from *Rational Diet*, p.p. 25-26 by Otto Carque: "Of the many experiments which have been made so far to demonstrate the beneficial effects of sunlight, that of John Blayton is the more remarkable and significant. In order to determine whether the indirect or diffused daylight, perhaps during a longer period of time, has the same effect as the direct sunlight, he selected twelve bean plants of the same variety and in the same state of development. Then he planted them in such a way near one another, that six always had full direct sunlight while the other six received only the diffused

daylight. In October, the pods were harvested and the weight of those exposed to the sun's rays was found to be in the proportion of 29:99 that of the dried beans 1:3.

"This result was to be expected, but in the following year, when all the plants grown from the same seed received the full amount of sunlight, the surprising fact was ascertained that those which had been raised in the shade only yielded half the amount of the previous year's harvest, while in the fourth year, they blossomed but did not mature. The deprivation of sunlight during one summer weakened the stock in such a degree that the species became extinct after four years."

This series of experiments reveal that the absence of sunlight has a harmful effect upon the germ-plasm and is thus an actual cause of racial degeneracy. We are dealing with a more important element of *Natural Hygiene* than has heretofore been realized.

The greater part of a seed of a plant constitutes a lunch-basket for the baby plant that lies as an embryo or germ in one end of the seed. Mature plants take the raw materials of the soil, water and air, and, with the aid of sunshine, produce their own food. Quite an equipment of roots, green leaves and other organs are necessary to do this. The tiny plant, just emerging from the seed, or coming up through the soil, is not so equipped, so that a few days must elapse before it will be able to produce its own food out of the raw materials, and thus be self-supporting. The seed is a store-house of food for the embryo plant, just as the egg is a storehouse of food for the embryo bird, and just as the bird could never develop, except its food be prepared for it in advance, so, the little plant, if left without food to carry it through its embryonic stages, would die. It is, therefore, supplied with enough previously prepared food to enable it to construct its own food-securing roots, leaves, etc.

When we consider that one squash plant in the garden requires fifteen miles of root and that each corn stalk in the field requires about a thousand feet of root to extract the calcium, sulphur, iodine,

potassium, sodium, magnesium, etc., from the moist soil around them, we get some idea of the great amount of root structure required to take up the soil elements for food. View, then, the immense surface these and other plants expose to the sun and air, in the form of leaves, to take the elements from the air and to convert the soil elements and the elements from the air into plant substances and we begin to understand why plant-seeds are lunch baskets for the "embryo" plants resting in one end of them. Until their leaves are developed, so they can make use of sunshine, they are not able to utilize the elements of the soil.

Dr. Trall pointed out that "in some of the lower animals the process of metamorphosis is arrested by deprivation of the solar influence. The tadpole, for example, instead of developing into the frog, either continues to grow as a tadpole, or degenerates into some kind of monstrosity; and the specimens of human monstrosities, developed abnormally, in consequence of the absence of a due degree of 'Heaven's first-born,' are neither few nor far between in the underground tenements of large cities."

Colors of animals, butterflies and birds, as well as the development of the eyes of mammals, are determined by light. Complete absence of light not only results in blindness in animals, but even in eyelessness. The young of blind fish and crustaceans have normal eyes, but mature forms may be entirely eyeless. Light is responsible for pigmentation in animals and for changes in color.

The animal body does not assimilate calcium in the absence of sunlight. The noted physicist, Eddington, has shown that the ultraviolet rays of the sun are capable of ionizing sodium, calcium, and perhaps hydrogen, magnesium, silicon and iron. Sodium is only singly ionized while calcium is doubly ionized by these rays. Ionization is a splitting up of the atoms into their constituents. (Double ionization is the splitting off of two ions.) I do not know how much this ionization of calcium and sodium, by the ultra-violet rays, has to do with the use of these and other elements in the body, but suggest that further study of the subject may be productive of results.

Chickens raised in the sunlight produce harder and thicker shells on their eggs. Chickens, geese and other birds raised in the dark put on fat more rapidly. Calcium does not seem to be "laid down" in the absence of sunlight. Children born in the Spring and Summer, and dying in the Winter, show less rickets than those born in the Fall.

A few years since, some experiments were performed on rats at the Johns Hopkins University. Eighteen rats were fed a diet which was known, from previous experience, to produce in rats, rickets, which resembles in every way the same "disease" in man. Twelve of these rats were sent to New Haven, Conn., where they were exposed to the sunshine for about four hours daily for about two months. The other six rats were kept in Baltimore and raised in well-ventilated, but poorly lighted rooms. At the end of the period the rats were all killed and examined. The report states that in the rats exposed to the sun no evidences of rickets were found. Their condition was normal with the exception of the bones, which were more delicate than in rats of a corresponding age which had been raised on a more satisfactory diet. An abundance of fat was present. The rats raised in Baltimore, away from the sun, presented but scant fat, as well as evidence of rickets.

Are we to conclude from this experiment that sunlight can be made to take the place of a proper diet? Shall we conclude that the sun's rays supply the lacking food elements? Not at all. We can only claim that rickets is due to a combination of "causes," among which is lack of sunlight. It is evident that the required food elements were present in the diet but that the rats out of the sunshine were not able to extract and assimilate them. The other rats under the beneficent effects of the sun's rays were enabled to extract the food elements and assimilate them.

The phosphorus and calcium content of an infant's blood rises and falls with the seasons, there being less in Winter and more in Spring and Fall. Dr. Hess, of Columbia University, has pointed out that in New York City, rickets reaches its peak in March--that is, at the end of Winter after months of deprivation of sunshine.

As previously pointed out, it was known to the ancients that "sunshine feeds the muscles." Today every athlete employs sunbathing as a regular part of his or her training. For it not only adds to the size and qualities of the muscles, it increases the calcium in them and adds to their enduring powers. The firmness of the athletic muscle requires calcium in considerable amounts. Such muscles contain far more calcium than flabby ones. After exercise their calcium content is diminished. Muscles subjected to proper sun exposure grow larger, firmer, and have their contractile powers enhanced even without exercise, due partly to the increase of lime in them, and partly to improved nutrition in general.

Milo Hastings tried raising a thousand chickens in an airy, sunless building, by feeding them an abundance of green food — lettuce, rape, chard, etc. He says: "I nursed and nourished those thousand chicks most carefully and never once let them out of doors; but I fed them green leaves galore and far more abundantly than any outdoor chicks would have been able to provide for themselves. My chicks thrived for a few weeks and then began to spraddle and sprawl, and developed bow-legs aplenty. One hundred of them died from their mal-formations and inability to get around to their food. Then I turned the rest of them out of doors, and they recovered promptly, and the weak legs grew strong, though the worst of them remained twisted and bent at ridiculous angles."

The skin that has become weakened by clothing serves as a less effective barrier to infectious matter from the outside. Medical books list about twenty different forms of skin inflammation, about forty different varieties of hypertrophies, thirty-five atrophies, several forms of neurosis, several varieties of skin hemorrhages, about sixty to seventy kinds of new growths, and many parasitical affections. These skin "diseases" appear almost wholly among the much clad denizens of the hot house condition we proudly term civilization, and are seldom, some of them never, met with among the unclad races.

George Wharton James, author of *What the White Man May Learn From the Indian*, says:

"While there is no doubt that the uncivilized and unclothed Indian occasionally suffers from a few forms of skin disease, I can abundantly testify from my thirty years intimate association with the tribes of the Southwest, that amongst those who have been least in contact with civilization, there is so little skin disease as to make it inappreciable. For many years I scarcely saw a skin disease amongst them, and when the skin would be torn or injured in any way, as I have often seen it, by their falling from a horse, by riding through the forest after deer and catching the projecting limbs of trees, etc., the rapidity with which the wound healed was both surprising and enlightening. It was enlightening in that it revealed to me the advantage, from this standpoint at least, of their life over mine. When my skin was torn there was a good deal of pain and it took a long time to heal, and yet I was far healthier than many white men. Yet what to me was a severe skin wound they regarded as a trivial affair, paying little or no attention to it, and the rapidity with which it healed justified their scornful laugh at my warnings that they take care of it lest greater evil ensue."

Mr. James also says: "I have never seen an Indian with a poor head of hair or with dandruff or any other disease of the scalp."

In general the pigmented skin is more resistant to infections and pathological causes. Even nipples that are covered with a delicate, lightly pigmented skin are more liable to become sore from sucking. During pregnancy the nipple aerola becomes pigmented to lessen the disadvantages incident to nursing. A good coat of tan also increases resistance to both cold and heat.

A skin, well-pigmented in response to sun-bathing, tends to become firm and strong, but at the same time delicate and soft, almost silk-like in texture. Sunshine is the finest cosmetic. Increased turgor, followed, in a short time by a filling out or padding out of the exposed

skin and a smoothing away of wrinkles results from sunbathing. Increased beauty is the outcome.

SUNSHINE AND RESISTANCE

Saleeby says: "That a properly aired and lighted skin becomes a velvety, supple, copper coloured tissue, absolutely immune from anything of the nature of pimples or acne, *incapable of being vaccinated*, (meaning its resistance to infection is greatly increased--Author), and its little hairs usually show considerable development. When the visitor touches such a skin in the cool air, he is surprised to find it quite warm. The sun was not shining when I did so first, and the patient was, of course, perfectly nude except for a loin cloth. Evidently plenty of heat was somehow being produced in that little body, with so large a surface to cool, relatively to its mass."

The increased resistance to infection and to "disease" influences seen in the skin extends also to the internal organs. Dr. TraLL declared that "nearly all forms of disease are more severe and unmanageable in low, dark apartments." With an insufficiency of light, the blood fibrin and the red corpuscles become diminished in quantity. The serum or watery portion of the blood is increased, inducing leukemia, a condition characterized by a great increase in the number of white blood corpuscles. A total exclusion of sun-light induces the more severe forms of anemia, a fact emphasized by Trall, originating from the impoverished and disordered state of the blood.

Cancer is less prevalent in the sunny regions of the earth. Inhabitants of southern mountain slopes are stronger and healthier than those living on the northern sides. Tenement house districts, in the large cities, to which sunlight has no access, have the greatest infant mortality and are the chief breeding places for rickets and tuberculosis. Pneumonia is most prevalent during dark, cloudy weather. Trall declared that "diseases of all kinds, from the most trifling toothache, quincy, or rheumatism, to the severest attack of

fever, scrofula, or consumption, are much less manageable in low, dark apartments. And it is notorious that during the prevalence of epidemics, as the cholera, the shaded side of a narrow street invariably exhibits the greatest ratio of fatal cases."

Dr. Carl Sonne experimented with the light bath on guinea pigs to determine its action on diphtheria toxin in the body. He, of course, employed experimental "diphtheria," that is, cultures of the supposed diphtheria bacillus. His findings, however, are of value for the introduction of this material into the body means the introduction of powerful toxins. He found that the bath tends to the rapid destruction of the toxin. Saleeby describes the results thus: "The destruction in the course of a single light bath lasting two hours, without the production of any fever (rise in the general body temperature) is as great as that caused by a fever of 40 degrees C., lasting several days and nights. The possible significance of this remarkable result for the treatment of such disease as diphtheria will be evident to the reader.

The germicidal power of sunlight is well known. It is the greatest of all disinfectants and antiseptics. Drs. Trall and Taylor both emphasized its powers in these directions. However, even in allopathic circles, where the germ theory is strongest, the idea is growing that light is less valuable in killing the germ than in raising the body's resistance to it.

In 1876 Downes and Blunt discovered the bactericidal power of violet light, although sunshine had long been used to disinfect "contagious" garments. There is now much effort to show that sunlight works by killing pathogenic bacteria and Finsen has attempted the treatment of lupus with artificial light.

However, sunlight has proved most valuable in rickets, anemia and a few other conditions in which bacteria are not assumed to act as etiological factors, while investigations have shown that the rays of short wave-lengths employed by Finsen have such feeble penetrating power that one bacterium shields another and that it is practically

impossible that many of the well-entrenched "bugs" can be reached and destroyed by the rays.

Drs. Hill and Eidinow attempted to show that the ultra-violet rays cause the production of bactericidal substances. Dr. Eidinow found that sufficient ultra-violet insolation to cause erythema will increase the bactericidal power of the blood and it is now claimed that the Finsen lamp is more effective in the treatment of lupus if supplemented by general ultra-violet radiation.

SUNSHINE AND MENTAL EFFICIENCY

As might have been expected, any influence which produces such marked effects upon nutrition and occasions such profound changes in the superficial as well as the deeper tissues of the body, as does sunlight, exerts a wholesome influence upon the mind. It is a matter of common observation that on dark, cloudy days, people are more subject to worry, ill-temper, moroseness, the "blues," etc., and that as soon as the skies become clear again and the sunshine returns, happiness and good naturedness return. But the sun's influence strikes deeper than this.

Dr. James C. Jackson noted nearly eighty years ago that "the more a man lives in sunlight, other things being equal, the more vigorous will his brain be; the more vigorous this, the more energetic and competent to their office will his mental faculties be."

A class of boys from the slums of London were taken to the garden of a private home on Clapham Common, where they studied and played all day attired only in very short "shorts" and no shirt. At the end of six weeks, in the feeble light afforded them by smoky, foggy London, they showed an increase in mental capacity and alertness.

Comparisons were made of physically defective children of London with physically defective children who had received light treatment at the Lord Mayor Treloar Cripple's Hospital at Alton. Both

groups were mentally retarded because of their afflictions, and both were about the same age, eleven years. The London children had had more schooling. The mental retardation of the London children averaged 1.95 years while the Alton children averaged 1.14 years.

SUNSHINE FOR THE UNBORN

Sunshine stimulates the growth of hair. Under its influence, breathing becomes deeper and slower; sleep sounder, blood-pressure is diminished, and urinary excretion is increased. Ulcers, sores, skin diseases, etc., heal more rapidly under its influence. The skin itself is rejuvenated by such bathing. Sunshine aids in building good teeth. It undoubtedly aids in preserving the normal alkalinity of the blood and should prove an effective aid in restoring normal alkalinity.

There is not a tissue or function in the body that is not favorably affected, either directly or indirectly by sunshine. The sun's rays enable the animal, as they do the plant, to analyze compounds and to synthesize new ones. Sunshine is an essential catalytic agent in both plant and animal life.

The benefits to be derived from sunshine apply to all periods of life, but are greatest during periods of development and rapid gains in flesh. Not enough emphasis has been placed on its value to the unborn child.

The unborn child is supplied with food, water and oxygen from the mother's blood. Sunlight aids in skeletal development of babies before birth and aids in the production of milk after birth.

SUNSHINE ASSURES BETTER MILK

Sunbaths before and after childbirth increase the mother's ability to nurse her baby and improve the quality of the milk, while

they tend to prevent tiredness, backache, nausea, loss of appetite, emotionalism and hysteria during pregnancy.

Sunshine is even essential to the production of good milk. Hess showed that milk from cows fed on pastures in the sunlight maintains the health and growth of young animals, whereas, milk from cows maintained out of the sun and fed on fodder will not maintain life and growth. The *American Review of Tuberculosis*, Vol. XIII, No. 2, Feb. 1926, says: "Something also may be accomplished in this direction (the prevention of rickets) by improving the hygienic condition of milk cows. At present many of these furnishing the best grade of milk are kept throughout the year in sunless barns, are allowed a very limited amount of exercise, and receive little or no fresh green fodder."

It seems not to have occurred to them, as it did to Taylor, that the nursing mother would also be benefited by sunshine and that it would enable her to supply more and better milk for her child, so that she would not be forced to depend on the cow to mother her offspring.

It is notorious that the clad races and especially those who live in the cities and are in the sun but little, are unable to supply their children with milk that will sustain them. Babies that are themselves light-starved and that are fed on milk from light-starved mothers or light-starved cows are at a double disadvantage.

Drs. Binbury, Chisholm and McKillap, of England, report that in 50% of cases of mothers who lose enough blood at childbirth to be left weakened, sunshine means the saving of a failing supply of breast milk.

Mellanby says: "The antirachitic action of whole milk has been found to vary greatly according to the diet of the cow and the degree of exposure to sunlight. These facts have been worked out by Luce, who found that, when the cow was pasture-fed and exposed to sunlight, 2.6 cm. of its milk had approximately the same antirachitic action, when tested in rats, as 15 cm. of milk of the same cow when fed on a diet of white maize, gluten meal, oats and barley and mangolds, and kept in a dark stall."

Not vitamins alone, but minerals, are concerned in this problem. Milk from pasture-fed cows is not only richer in vitamins, but contains much higher percentages of phosphorus and calcium and fifty per cent more citric acid. Cows and mothers can produce perfect milk only when given green foods and exposed to the sun. Young animals fed exclusively on milk from cows fed in the shade on dry fodder lose weight and die. Similar animals fed on similar quantities of milk from cows that run in the pasture, getting both sunlight and green foods, grow and thrive.

Dr. Taylor declared: "Nursing mothers, especially need these hygienic influences (sunlight) to maintain the purity and vigor of their system that they may not lay the foundation for lasting disease in their offspring, for the child is sure to suffer, even sooner than the mother, the grievous consequences of her physiological errors."

SUNSHINE FOR MOTHERS

The subjection of a pregnant woman to daily sunbaths will benefit both her and the developing foetus, and I am convinced, will also do much towards lessening the pains that now make childbirth a harrowing ordeal in so many cases. Sufficient sunshine during pregnancy will not only produce better general health in the mother and better development in the child, but it will prevent the loss of so much blood by the mother. Girls brought up in the sunshine, properly fed, and normally active, should develop so well that normally painless childbirth should be the rule instead of the now rare exception. It is worthy of note that those mothers who are in the sunlight the least are the ones who have the most difficult deliveries in childbirth. The unclad races have the easiest deliveries.

SUNSHINE IN GROWTH

Sunlight is also especially important during puberty and adolescence, when profound internal reorganizations are taking place.

After a fast or a wasting illness, when it is desired to build up a lot of flesh, sunlight will aid in building the best kind of flesh.

It is asserted by some that sunshine enables the body to manufacture vitamin A. The theory has been advanced by Saleeby that the skin is an organ of internal secretion and that as suggested by Sheridan Delepine, under the influence of sunshine it contributes to the making of hemoglobin. He insists that in the pigmented skin, under the influence of sun-light, very active chemical processes are occurring.

If this view proves correct, it will justify Graham's attachment of so great importance to its effects upon the skin. Others think they have found that by the aid of sunshine the body manufactures a substance called cholestrin which is essential to calcium metabolism. Whichever way we turn the emphasis is on nutrition.

We can no longer relegate to an inferior position an element of hygiene which has so important and so necessary an influence on health and growth. Yet, "noon lulls us in a gloomy den, and night is grown our day."

After reviewing the evidence possessed in his day, Trall declared "these facts show us that light, and an abundant supply of it, is indispensable to a due development of all organized bodies." This statement expresses the fundamental difference between the orthobionomic use of sunshine and its medical use.

Due to the fact that sunshine is an essential of healthy nutrition, being necessary to growth, development and repair of tissue, it is of value in all states or conditions of the body. It is not a specific "cure" for one or two so-called "specific diseases," as the medical profession teaches. It is a hygienic, not a therapeutic agent, and is needed as well in health as in conditions of impaired health. It

is needed by the healthy, growing, developing child, the pregnant or nursing mother, the chronic invalid, the convalescing patient, the athlete, and by all who desire to maintain or regain health. It is an important aid in building and maintaining health and we should not wait until we become sick to make use of it.

Trall and Taylor studied sunlight as food--not as an essential in certain states of impaired health, but as an indispensable elemental condition of continued active life and normal development and function. It is this difference in viewpoint of the two schools that accounts for the difference of application. *Hygienists* lay great stress upon sunshine--to the medical man it is of small importance.

SUNSHINE FOR PRESERVATION OF HEALTH

If sunlight is so necessary to the perpetuation of life, and the production of normal development, it is equally necessary to the preservation of health and the prevention of "disease." if it is as necessary to life and health as are food and air, the body must inevitably be weakened and "diseased" in its absence. It fills an important need in the organism and its place cannot be filled by anything else. The highest degree of health cannot be attained and maintained without it.

It is essential to the restoration of health and hastens recovery in all forms of illness. I agree with Saleeby, who declares: "Every Sanitarium which is not essentially a solarium must today be called a tragic farce."

Etiolated plants are structurally weaker, possess less resistance to weather changes and to "disease" influences. They are unable to fructify and often unable to put forth leaves. "Etiolated" animals are the same. Their bones are more delicate, tissues less firm and resistant; they are short-lived, subject to "disease" and possess less resistance to weather changes. Plants grown in the dark lack color, and are unable to flower and fructify. Some of them, like the potato,

are unable to put forth leaves. They are of very poor quality, breaking easily, and short-lived. Every cell and fiber in the plant and animal body is strengthened by the sun's rays. People who live in-doors out of the sun, are pale, weak and flabby. Every home should have a solarium.

Sunlight dominates the chemistry of the blood. People who do not get sunlight do not have the same richness and redness of blood as do those who secure plenty of sunlight. It is not merely that their skins are etiolated (pale and white), but one may appropriately say that their blood and inner tissues are also pale. There is not a tissue nor a function in the body that is not benefited by regular and judicious sunbathing. Many experiments both in this country and England have shown, to use Saleeby's words, that "without any amelioration of a thoroughly vicious and defective diet, the amount of phosphorus in the blood will be doubled after a week or two of daily exposure, lasting a few minutes only, to sunlight. Some chemical process is thus begun, some ferment, or internal secretion, or 'hormone,' constructed which enables the body to take and keep and use, from the diet, what it would otherwise have to go without. And the children at the school in the sun, most inexpensively and simply fed without medicine or cod-liver oil, flourish and grow strong and straight, and remain so, doubtless because these mysterious and as yet unexamined vital processes are set going in their bodies by the prime source of all life and health."

Quinke and Behring have shown that the oxygen consumption of living cells, is vastly greater in light than in darkness. Light, by increasing the chlorophyll in plants, and hemoglobin in animals, both of these being oxygen carriers, exerts an enormous influence on the metabolic processes of oxidation, reduction and synthesis.

Sunlight greatly increases the body's consumption of oxygen. Through added numbers of red cells and increase in their hemoglobin, the oxygen carrying power of the blood is increased. Indeed, sunlight benefits the ailing human body in the same manner that it influences

impoverished plant life--in both cases it increases the oxygen-carrying matter--hemoglobin or chlorophyll.

Heitel found that the double spectrum line of oxygen in the coloring matter of the blood is diminished by the action of light, to the single band of reduced hemoglobin. Light acts on the one hand to disrupt the oxygen molecule from its loose connection with the hemoglobin, and on the other hand, to facilitate its combination with oxidizable food substances. Behring and Meyer pointed out that this process consists in activating certain oxidation ferments present in the blood (peroxidosis).

A few minutes of exposure daily to the sunlight will double the quantity of phosphorus in a baby's blood in a fortnight. The circulation of the blood itself is improved while blood-pressure is lessened. The power of the blood to build and repair tissue is increased, and its coagulating power greatly improved. Sun baths are indispensable to hemopheliacs or "bleeders."

Dr. James C. Jackson says that "a man who lives out in sunlight will grow thin in flesh but full in nerve. His muscles will diminish, but as they diminish his nerves become increased in size and strengthened, and their action on the muscles is such as decidedly to strengthen these; so that when one comes to look at him and judge of his strength by his apparent bulk, if he does not understand and fully appreciate the effect of living largely in the sunlight, he will greatly misjudge his muscular capacities."

In view of our greater knowledge of the influence of the sun upon the muscles, we are sure that what Dr. Jackson mistook for a decrease in muscular size coincident with an increase in strength and endurance, was, in reality, a loss of the fat in the muscles. It is not likely that the nerves increased much, if any, in size, but it is certain that they improved in quality and condition and increased their control over the muscles.

Describing tubercular patients, which he saw at Rollier's place, who received no exercise, and whose bodies were warm, though nude,

while the air was quite cool, Saleeby says: "This would seem to be a puzzle, for these patients have, in many instances, never moved a muscle--practically speaking--for months; they have not even had their muscles innervated (sic) by the farradic current; they have not been massaged. But always the muscles are firm and well developed under the warm skin. 'The sun is the best masseur,' said Dr. Rollier to me; and one realized that the stimulant light, playing upon the nude skin in the cool air, induces and maintains that condition of tone in the muscles which, indeed, moves no points but is yet a form of muscular activity essential for the production of bodily heat and for the proper posture of the bodily parts. Hence we understand how plaster of Paris is here as utterly unknown as the knife. The tone of the muscles, thanks to the nude skin and the reflex response to the light, is enough to keep the recovering young spine, for instance, in proper position, and to form what Rollier calls the 'corset musculaire.' One sees very little fat on any of the patients. Their condition is more like that of the trained athlete, and one's ideas as to the importance of fat in tuberculosis go by the board."

Sunshine In Sickness

CHAPTER XLI

It should not be assumed that sunlight is, in itself, a *cure* for "disease." It is supplementary to other hygienic or nutritive factors--it is not a *cure*. It may be used in building health, in improving the nutrition of the body, but not as a therapeutic measure.

The true lesson of all that has gone before is one of hygiene, not one of therapeutics. We will have learned our lesson well when we have eliminated smoke from our cities, blinds, shutters, shades, etc., from our windows, remedied the crowded, sunless sections of our cities, provided parks and playgrounds for our city children, equipped the roofs of all apartment buildings with sections for sun-bathing, provided free public sun-parks for the sexes of the cities, and learned to wear clothing that permits sunlight to reach the body, or else, as suggested by Graham, go nude, except in the most inclement weather.

Every woman is very careful to put her pot plants out into the sun--why not her children also? Sunlight is especially important to the growing, developing child. The offspring of undernourished and tubercular parents, or children of the scrofulous diathesis should have a superabundance of sunshine throughout their entire childhood. Scrofulous children particularly need sunshine; they are anemic little human flowers which will bloom properly only if transplanted from dark, damp, tenements to sunny sections.

The great influence of sunshine upon the development of the bones has been previously shown. Graham spoke truly when he declared: "If man were always to go entirely naked, the bones would be less liable to disease and distortion."

Cartilage is transformed into bone when the calcium and phosphorus salts are properly utilized by it. Only through the aid of sunshine, particularly the ultra-violet rays, may the laying down and fixation of phosphorus and calcium be accomplished in an ideal way.

Dr. W. T. Bowie, Professor of Biophysics, Harvard, gathered statistics which show that about ninety-seven per cent of all the babies born in our northern cities are afflicted, to a greater or lesser extent, with rickets.

Dr. Bowie raised two flocks of chickens in a green house. Both flocks were fed the same food, given the same space in which to run about, both wallowed in the same dust and scratched the same gravel. Their conditions of life were identical, except for the fact that one flock was exposed for fifteen minutes a day to the ultra-violet rays of the quartz lamp. Seventy-five per cent of those not receiving the light died of "weak legs" (rickets), while the survivors were by no means normal. All those treated by the ultra-violet rays, except a few killed by rats, lived. These latter were larger and more vigorous than those raised under the glass of the green house, but which received no ultra-violet light. Ordinary glass does not permit the ultra-violet rays to pass through. Basking in the warmth and light of the sun that passes through the window pane is of small value in the prevention of "disease" or the restoration of health. The unfiltered rays of the sun alone are capable of assisting the work of metabolism.

The evidence is clear from animal experiment and human experience that if a child receives an abundance of sunlight it will thrive on almost any kind of diet, whereas, if you deprive it of sunlight, it will not thrive well on the best of diets. *Sunlight is one of the most important elements of the natural diet.* Every child should have sunlight before birth and after birth. No "just-as-good" substitutes should be used. Despite the claims made for cod-liver oil, by the huge commercial enterprises built around this substance, it cannot take the place of sunshine.

More than once I have taken children suffering from rickets, who were growing worse on cod-liver oil and quartz lamp treatment, and seen them begin immediately to make rapid improvement when orange juice was substituted for the cod-liver oil and sunshine displaced the lamplight. Rachitic bones are defective, mis-shapen, brittle and easily broken. They get this way due to a lack of sunshine.

Rickets presents deficient calcification of the bones, with a tendency of the weakened bones to bend. Swelling occurs in the cartilaginous zones at the ends of the bones of the limbs, so that the joints become thickened. Globular swellings form on the ends of the ribs along the sternum, forming the so-called rachitic wreath. Permanent deformation of the bones and joints is the usual result.

Sunlight causes an increase in calcification of the bones to set in immediately. Deformities are straightened and overcome. Sunlight is far superior to quartz light in this condition.

On July 1, 1929 the United States Children's Bureau made public its figures which were held to show that lack of sunshine is the direct cause of rickets in children, and that lack of food or deficient food is not a contributing cause. These statistics, which are held to prove that the sun-bath alone will give immunity to juvenile bone "diseases," are the result of prolonged study of children in Porto Rico, where an abundance of sunshine wholly prevents rickets in badly undernourished children.

Out of 584 children whose forearms were X-ray photographed, only one showed active rickets, and this child had always lived in an artificially lighted cellar. Of all the children examined, 68% were tanned by the sun; 88% lived in houses that permitted the free access of an abundance of sunshine; 10% lived in houses that admitted a fair amount of sunshine and only 2% lived in dark houses.

H. B. Cushman, who was born among the Indians, of missionary parents, while they were still east of the Mississippi, and who went west with them when they were ruthlessly driven from their

homelands, spending nearly seventy years among them, says in his *History of the Choctaw, Chickasaw and Natchez Indians*, (1889) p. 246, that among the Choctaws, "deformity was almost unknown, proving that nature in the wild forest of the wilderness is true to her type." Again, "It is said of the Natchez, 'that the sight was never shocked by the appearance of deformity,' such as are so frequently observed among the white race; and with equal truth the same may be said of all the North American Indians."--p. 533. George Catlin tells us that "amongst two millions of these people" (Indians) he met with "very few cases of deformity."

It is important in this connection, that we take account of the fact that there was no tuberculosis, anemia, leukemia, rickets, no hunch-backs, no bow-legs, no idiots or lunatics, no defective teeth, no deaf and dumb, and almost no deaths either of mother or child in child-birth, and few skin "diseases" among the Indians before the white man "civilized" them--that is, clothed them, gave them "firewater" to drink, cooped them up on reservations and taught them to eat white bread, salt-bacon, black coffee and sorghum molasses. Rickets and tuberculosis, like scurvy, should be regarded as "deficiency diseases," largely due to lack of sunlight. Rickets is said to be unknown in light-loving animals.

Dark-skinned races do not absorb sunshine as rapidly as the lighter skinned peoples and, consequently, when housed, clothed and transplanted to regions where there is less sunshine, suffer more from light starvation than do the light-skinned races under the same limitations of exposure to sunlight. It requires more sun-shine to remedy rickets in negro than in Caucasian children.

Although the following description by Trall, of the condition of certain sections of our city children was written a hundred years ago, it needs slight, if any, modification to fit many sections of the larger cities of today. He says: "Almost the entire population of our large cities, who occupy back rooms and rear buildings, where the sun never shines, and cellars and vaults below the level of the ground on

the shaded side of narrow streets, is more or less diseased. Of those who do not die of acute diseases, a majority exhibit unmistakable marks of imperfect development and deficient vitality, and in fact, as with, animals and vegetables in like circumstances, often run into deformities and monstrosities, not more reproachfully, however, to those parents who propagate under such disadvantages, than disgraceful to the city, state or national government which either compels or permits any class of its citizens to live in such abodes."

After due consideration of the influence of light in promoting the development of animals, Trall declared that the exposure of the whole surface of the body to light is favorable to symmetrical development and offered insolation in the open air as a means of preventing and remedying rickets and scrofulous conditions. Then he adds: "All persons in order to acquire and maintain the best condition of health and strength, should be frequently exposed to the light of the sun, except when oppressively hot. Children are generally maltreated, more especially in cities, in being kept almost entirely excluded from sunshine. Many good mothers are more fond of the delicate faces and pale complexions of their little ones, than intelligent in relation to their physiological welfare. A little sun-browning occasionally of their faces, necks, hands and feet, and, finally of their whole bodies, would not only render their development more perfect and enduring, but tend to the production of the greatest symmetry and beauty in manhood and womanhood. Parents should not be too careful in putting umbrella-hats and bonnet-sunshades on the heads of their children every time they run out of doors."

Sunlight will prove a spring of renewed health for those who are ailing. In the mountains, at the seashore, or on the plains, the sun's rays are beneficial and meet the needs of plant and animal life. The number of sunny days during the year, even in northern countries, will permit utmost advantages to health if properly utilized. The Southern United States is far better endowed for sun baths than either Germany or Switzerland.

Sunbathing is no panacea. It is only one of several vital factors in restoring and maintaining health, but it is of sufficient importance that it should never be neglected.

Dr. Saleeby says: "The clinical evidence is clear that when the sunlight fails, as it not infrequently does at Lysen, the patients are injured, and that they prosper when it returns. The natural process of excretion of rubbish--such as a morsel of dead bone--may be observed to cease in obscure weather, and may be resumed when the process of insolation is again permitted by the atmospheric conditions." Such facts make it clear that sunlight is used in some more subtle and more fundamental manner than that of killing bacteria. This is further proved by the fact that it beneficially influences deep-seated local affections, when applied to the skin, and by its beneficial effects upon affections and wounds, which no one supposes to be due to germs.

Although medical men do not employ sunlight in all conditions, as do *Hygienists*, they are coming more and more to see its value in many conditions in which formerly they did not consider it useful. When once they have grasped the fact that it is a hygienic and not a therapeutic method, and when they understand the unity of "disease," they will be better able to appreciate its universal use by *Hygienists*. Rollier's records, covering over twenty years include recoveries of extreme cases of spinal tuberculosis, with paralyzed lower limbs, etc., pulmonary tuberculosis included, rickets, many skin "diseases," varicose ulcers, many of these of long standing, war-wounds, non-healing operative wounds, osteomyelitis, bed sores, etc. We are informed that bronchitis, colds in the head and rheumatism do not develop at his place in Lysen, although germs must be plentiful.

Cautiously applied, sunbathing is very valuable in nervous affections. It is invaluable in cases of glandular inactivity. Irregularities of ovulation, pubertal difficulties, impotency and other glandular difficulties are favorably affected by sunshine. Acne, representing disturbances of the glands of the skin, is quickly helped by the sun's rays. Psoriasis is also speedily improved by sun-bathing.

Due to the effect of sunshine in increasing the coagulating power of the blood, sunbathing is of inestimable value to sufferers from uterine hemorrhage.

Dr. James C. Jackson, observed that "persons who could not be made to sleep by administration of opiates in any of their various forms * * * are peculiarly good subjects for nervous sedation under sunlight; and that persons who are readily affected to sleep by the use of opium in one or other of its various forms * * *, do not readily go to sleep when lying down in the sun. I think it will be found true, as a general fact, that all persons who take opiates fall asleep better in darkened than in lightened rooms; and that persons who are made awake by the use of opiates go to sleep better in light or sunshine than in shaded or darkened rooms."

Corpulent, anemic individuals have their weight decreased by sun-bathing, due to acceleration of the oxidation of fat, although most people gain weight. The unhealthy increase in fat so much sought after in tuberculosis is certainly not desirable. The sun-bath, by increasing oxidation, affords greater relief to the fat-burdened patient.

All forms of tuberculosis are favorably influenced by sunlight. Bone, glandular and pulmonary tuberculosis each yield to the kindly influence of the rays of old Sol. The intense suffering endured by those with bone tuberculosis speedily stops under sun-bathing.

Rollier, "discards meat, except very rarely, absolutely excludes alcohol, in all stages of all cases of tuberculosis, gives no cod-liver oil," and "detests and scrupulously avoids" "overfeeding, hitherto a cardinal principle in the therapeutics of tuberculosis." He condemns the cutting out of tubercular glands which form part of nature's first lines of defense. Indeed, Rollier has adopted the nature cure or Hygienic plan almost in its entirety and we naturally suspect him of having browsed among the books of the "quacks."

The removal of tonsils, adenoids and scrofulous glands aggravates and does not help the tubercular condition. Surgical treatment for the diseased glands is very unwise.

The sun's light is not a salve or an ointment. Great as are its effects, however, when applied locally, it cannot be made to suppress a local effect of a general or systemic condition. In London, in Aug. 1922, patients who had been given local light treatments, applied to the "diseased" areas, but who had failed to improve, were given general sun baths, without exposure of the "diseased" areas at all, and they all recovered rapidly. These results serve to further confirm the orthopathic premise that these local effects are secondary to the general effect and that all "treatment" must be constitutional. Those little quartz rods and tubes in the offices of the physio-therapists and physicians, for insertion into and treatment of the nose, throat, ear and other orifices of the body, are wrong in principle and failures in application.

In some parts of the world, England, for example, the complaint is made that there is not sufficient sun. But these parts receive enough sun to supply the needs of plants and animals--why not enough for man? The statement that the temperate zone does not supply enough sunshine for man usually has a commercial basis. It comes from those who exploit lamps. So-called primitive races the world over, the present-day Canadians and the plants and animals in the temperate regions, prove that these regions do supply sufficient sunshine.

While it is true that in the higher altitudes one receives more of the beneficial rays of the sun, it is also a fact that both plants and animals may receive sufficient of these at sea level or below sea level, to enable them to maintain health, growth and development, and to reproduce themselves. Indeed, there is no habitable part of the earth where there is not sufficient sunshine to supply the needs of man. Even the denizens of the jungle receive sufficient sunlight. Man in the jungle does likewise. It is the over-clad, over-housed, inhabitant of the smoky cities who is deprived of his fair share of the sun. Those who live in the modern caves that line the canyon walls of our modern cities and who dress in heavy, dark clothing, suffer most.

In northern latitudes, when the sun is not always available in winter, it is wise to lay in an ample supply of sun-made reserves during the sunny seasons. Stored capacities and substances constitute the reserve power of an organism; power held out of activity under ordinary conditions and circumstances to be used under extraordinary conditions--acute crises, poisoning, prolonged or intense cold, prolonged or intense heat, prolonged periods of cloudiness, prolonged exertion, profound emotional experiences, shock, or other emergency and stress.

The body does not store up sunshine. It stores up substances produced with the aid of sunshine. Not alone vitamin D, but other materials are synthesized in the body with the aid of the sun's rays, and the surpluses of these are stored in the tissues as reserve capital for times of stringency.

If full and proper use is made of the sun during seasons of sunshine and warmth, and if the general mode of living is not such as to dissipate what should be stored as reserve, an abundance of sun-kissed reserves will be stored in the body to carry the individual through a long, sunless winter; provided, again, that the mode of living during the winter season is not of a kind that rapidly consumes these reserves.

The man who has received no sunshine, who has stayed indoors or has clothed his body in a way to exclude the sun, and the man who has dissipated his reserves cannot go through the winter without suffering. The body that must ceaselessly use its substances in neutralizing, detoxicating, and resisting poisons--toxemia, alcohol, tobacco, coffee, drugs,--will not be able to store up ample reserves. All forms of excesses, dissipations, all overworking of the emotions, all lack of rest and sleep, etc., not only dissipate the reserves one already has, but prevent the accumulation of more. Reserves are wasted by a denatured diet, by sexual excesses, by overwork, and by any overtaxing of the body.

The best preparation with which to meet long, cold, cloudy winters, is a sensible, natural mode of living during the warm, sunny months. The same sensible living should be continued through the winter; for, reserves that have been stored by the organism during a summer of prudent living may be quickly dissipated by excesses, indulgencies, dissipations and wrong foods in winter.

Suntan and Sunburn

CHAPTER XLII

Prolonged exposure of the unprotected skin to the sun's rays results in severe and painful burning, prostration and even death. Necessary and useful as is sunshine, it is a powerful chemical agent against which the body must protect itself to avoid serious damage. It is estimated that the "normal," unprotected skin can endure fifty minutes of sunbathing without burn, but this estimate must not be taken too literally. First, we must ask: What is a normal skin? Next we must take into account the time and place for sunbathing. Is it to be taken at the shore or in the lowlands or on the mountains? Is it to be taken in the early morning or at noonday?

The body is well-equipped with defenses against the sun and burning can occur only when more sun is secured than the defenses can protect us against. There are three chief means of protection and these will be discussed in their logical order at this place.

TANNING

The bronzing or browning of the skin due to a deposit of pigment (melanin granules) around the nuclei of the epidermal and basal cells, following exposure to the rays of the sun, constitutes *suntanning*. Pigment is the most important protecting mechanism by which the body prevents getting an overdose of sunshine. Melanin, or the pigment that gives color to the skins of man and animals, is absent in albinos and in cases of leucoderma. There is at all times, a certain amount of pigment present in the skins of all normal individuals and this pigment screen is the body's most important protection against too much sun.

Tanning (pigmentation) prevents the over-absorption of ultraviolet rays, and thus, prevents burning. The layer of pigment is the body's barrier against the penetration of an excess of ultra-violet rays, and the more one is tanned, the less is the danger of light rays causing suffering.

Before pigmentation has occurred, an overdose of the chemical rays of the sun, has injurious effects on healthy tissues. Once pigmentation has occurred and a deep brown skin has been obtained, any length of exposure may be endured without discomfort.

Just as chlorophyll is formed as a light screen and filter in plants, so a brown pigment, called melanin, is deposited in the presence of sunlight as granules in the deeper cells of the epidermis. This pigment deposit absorbs the visible and ultra-violet radiations and, after converting them into radiations of less energy and lower vibration, and increased penetrating power, passes them on to the deeper structures.

Melanin prevents the penetration of excesses both of ultra-violet rays and of heat. When melanin powder, obtained from ox-eyes, is mixed with water to form a brown-black suspension, and a few drops of this is placed on the palm of the hand and exposed to light concentrated by a burning-glass, the water will be evaporated without over-heating the hand. Pigmented skin radiates heat more quickly than unpigmented skin; thus a negro's skin exposed to strong sun is cooler than a blonde's skin.

It is customary to divide pigmentation into two types--*instantaneous tanning* and *delayed tanning*. The first develops almost immediately after exposure to sunlight; the other develops gradually and continues for several days after exposure to sunlight. The division seems to be unnecessary, as the two types of tanning are parts of the same process.

The first part of suntanning seems to be a darkening of the pigment already present in the skin. There follows closely upon this a deposit of more and more pigment, as exposure to the sun is repeated,

so that a very heavy color screen may be produced in the skin. The tanning process is really more rapid in the skin of most people than is commonly realized, for the manufacture of pigment begins at once, when the skin is exposed to the sun and, within a brief time after the first sunning, pigment is laid down in the skin. But a few short sunbaths are required to occasion a perceptible tanning.

Except in the cases of albinos and some red blondes, pigment is quickly formed in all human beings when exposed to sunlight. It is produced most abundantly in black races, not so abundantly in brunettes as in the blacks and least abundantly in red-blondes. In each type it may be increased to a maximum by exposure to sunlight.

The deepest pigmentation is occasioned by a combination of infra-red and ultra-violet rays. It may occur without any preceding erythema; that is, by gradual insolation without any appreciable burn. In some works on "sunbathing we read about the "tanning rays" or "pigmentation rays" of the sun. All such talking and writing is sheer nonsense. There are no such rays. The sun's rays do not produce pigment; they only occasion its formation. Pigmentation is a vital or physiological process. Pigment is manufactured within the body, out of the elements of food and is deposited in the skin by the processes of life. It is a protective device made by the body itself. If one person tans and another does not, this is not because the sun has power to tan one and not the other, but because one body has full pigment manufacturing ability and the other is deficient in this power. Pigment is manufactured in and by the body and is deposited in the skin by the body, not by the sun. Whether or not you tan deeply depends upon you and not upon any supposed tanning power of the sun. Two people equally exposed to the sun will tan differently--one becoming a dark brown, the other a light tan--and these differences are due to the differences that exist in the two individuals. No amount of sunning will pigment a dead body. Commonly the white patches of skin seen in *leukoderma* will not tan no matter how often, how long nor how persistently the patient sunbathes.

Tanning may range all the way from very light to almost black, depending on the amount of exposure to which one is subjected and one's pigmentation ability. Contrary to the prevailing view, I doubt that the deep, dark tan can be considered a desirable acquisition. It is my opinion that, both for appearance and for benefit, a light tan is preferable.

In infancy and early childhood, when sunshine is of greater importance than later in life, tanning is a slow process and is almost never (in the white races) dark, even after months of sunbathing. With rare exceptions, a child must be four to six years of age before it will become dark from sunbathing.

It is my opinion that too much stress is placed on the tanning process and too much magic is invested in the tan. I hold that the tanning is merely part of and is concomitant with a general revitalizing process that involves the whole organism and is not confined to the skin.

Nor do I accept, as true, the axiom that "a tanned body is a healthy body." I have seen bodies that were so tanned they were almost black, and their possessors were dying of cancer, or Bright's "disease," or diabetes. Sunshine is no substitute for right living in other departments of life.

Dr. Rollier thinks that pigment acts as a kind of dynamic accumulator and says: "Experience, at least, confirms this by showing that the resistance of the patient is nearly always in proportion to the degree of pigmentation; it acts not only in protecting the skin against the too violent irritation of the ultra-violet rays, but in regularizing the thermic contribution of the sun. Finally it is probable that the pigment receives, furnishes and activates the elements essential to the metabolism of the hormones. Pigmentation is the expression of the deep biological processes of a fermentative and hormonal nature, as demonstrated by Bloch in the skin, by Pinkuseen in the blood, and by Bickel and Ischido in the marrow of the bones."

Jesionek believes that the pigment, itself, passes in solution into the blood and is changed there into substances that act favorably in pathological processes, such as tuberculosis.

The more rapidly pigmentation occurs, the quicker will one receive the full benefit of the sun. Rollier lays great stress on the strongest possible pigmentation, not only to arm the skin against the inflammatory stimulus of the ultra-violet rays, but also because experience has shown that only a strong deposit of pigment in the skin warrants certain success in *healing* tuberculosis. Pigment cells are also thought to secrete substances which are carried into the blood and beneficially affect the rest of the body--the skin thus becoming an organ of internal secretion. There are some who think that pigment transforms the shortwave rays, which would otherwise act only superficially, into deep-acting, long-wave rays.

Good pigmentation depends upon regular sun bathing. Subjects with fair or red hair do not pigment as readily as dark-haired subjects. These first become a coppery red color and then, light brown. It takes some time before they become at all dark, but under constant sun treatment, even red-haired people will pigment or tan. Brunettes, on the other hand, pigment very quickly. In Egypt the Englishman soon becomes as dark, or even darker in many cases, as the Egyptian or Arab.

Eskimos and polar explorers are poor in pigment. The explorer Shackelton, remarks: "At the close of the night of four months duration our faces were greenish yellow, but the sun soon tanned us again. Yet stranger was the discovery that the eyes of almost all of those which were brown and black become blue or gray during the long night."

I have started a number of blonde and red-haired babies sunbathing from birth and have had them continue to do so on through their infancy and childhood and none of them have freckled. This has led me to believe that were all such types given sunbaths from infancy, the freckles that bother them so much would not

develop. It would seem that freckling is due to a certain loss or disturbance of the ability to tan as a result of long denial of sunshine during the formative years of life.

As these babies and children have all been provided with superior nourishment, it may well be that nutrition also plays a very important role in this matter. The worst cases of freckling we see are in red-heads and, as these are in children and adults whose nutrition is far below ideal, it may be that poor nutrition is at least partly responsible for such undesirable developments.

I have witnessed the development of thousands of large freckles on the affected portions of the skin of a man suffering with leucoderma. As the man was under my care for but a limited time, there was no opportunity to determine what may have been accomplished ultimately, but I consider the formation of the freckles to be indicative of the possibility of complete remedying of the condition. It should be understood that sunbathing in this patient was accompanied with other *Hygienic* measures, such as fasting, improved nutrition and a correct mode of living. I do not think for a minute that sunbathing will remedy leukoderma.

PRECAUTIONS FOR HELIOPHOBES

Individuals whose skins redden, blister and sizzle, but never tan, are said to be *heliophobes*, and are advised to stay out of the sun. I think this is pernicious advice. These people also need sunshine and can take it if they use sufficient precaution. The first precaution is to get their sunbaths in the early morning, or in the late afternoon, when the sunlight is not so abundant in ultra-violet rays. The next precaution is to stay in the sun but a few minutes at a time. Begin with but one minute on each side and cautiously and slowly increase the time of exposure. It may even be possible, where time permits, to have two, or even three such short periods of exposure a day. In many, if not all cases, *heliophobia* may be gradually overcome. Even

the albino can profit by sunbathing if he exercises due caution. I have seen albino cats whose ears were inflamed and covered with scabs throughout the summer months, but which healed up during the winter months. There is no reason why man should spend so much time in the sun that this should occur.

LOTIONS AND SUNTAN PREPARATIONS

Articles on sunbathing which appear in popular magazines and newspapers tend to emphasize the dangers of sunbathing on the one hand, and the "virtues" of sun-tan lotions, on the other hand. Rarely do they ever stress the great benefits to be derived from sunning. It is possible to overdo sunbathing, even after one has built up a heavy layer of pigment in the skin, so that burning no longer occurs after the most prolonged exposure. Drying and harshness of the skin and general enervation result from such over-exposure.

The injurious results of excessive sunbathing are not to be prevented by the use of lotions, oils, etc. If they prevent the thickening and drying of the skin, if they prevent sunburn, they do not prevent the enervation that results from over-sunning. To avoid the harshness of the skin and the enervation that result from over-sunning, it is only necessary to avoid undue exposure to the sun. If the lotions afforded the "protection" that they are claimed to provide, they would also prevent tanning and would at the same time deprive the bather of the benefits of sunbathing.

A uniform tan is achieved by exposing the body uniformly to the sun. Lotions cannot provide a uniform tan. In a broad general sense all of these lotions are frauds, none of them are ever necessary, and many of them are actually harmful. I unqualifiedly condemn the use of any "tan-without-burn" preparations, as well as the use of olive oil on the skin in sunbathing. "Suntan stimulants" and make-believe tan are merely commercial products. Many of these things are endorsed by men and organizations that are supposed to know, but I

can find no need for them and no value in them. It is not mere tanning that we seek, but the total hygienic value of the sun upon all tissues of the body.

THICKENING OF THE CORNEUM

The second protective mechanism developed by the body is a thickening of the *corneum*. This is the horny or uppermost layer of the skin. The pigment is in the skin layer that is below the sun-sensitive cells and thus gives these no protection. Thickening and hardening of the outer layer of the skin provides the needed additional protection. This is somewhat like the thickening of the same layer of the skin on the palms of the hands when we indulge in hard work.

Too much exposure to the sun occasions an excessive thickening of the corneum and, at the same time, makes the skin dry and causes it to scale. A harsh, dry, coarse skin is the result. Certainly this is not desirable and it is the worst kind of folly to stay in the sun long enough that this takes place. It is largely to avoid this dryness and harshness of the skin that olive oil and certain other lotions are employed by those who refuse to exercise a little intelligence in their sunning. Instead of buying and using the various commercial preparations that are sold to prevent the harshness and dryness of the skin that results from over-exposure, the intelligent person will avoid undue exposure and thus avoid the undesirable consequences.

A silken, smooth skin is the result of proper sunbathing. Such a result is for those who exercise intelligence in sunbathing. The ancient rule of moderation should guide us here, as in eating, exercising, etc. We have never learned self-control. We tend to go to excess in everything we do. We know next to nothing of our limitations, consequently, we never respect them. We are never satisfied with anything until we have had too much; then, because too much harms us, we are likely to abandon the thing altogether, rather than learn the true lesson. We work on the principle: *The more of a*

good thing the better. Never was there a greater delusion. A little boy asked his mother: "If a teaspoonful of salts will do daddy good, why not give him the whole box and get him well in a hurry?" Too many people work on this principle in everything they do. They over-eat, over-exercise, over-bathe, over-sunbathe, etc. Lotions are not substitutes for intelligence. Only the foolish will waste their money on such preparations.

AVOIDING THE SUN

The body's third defense against the sun is that of getting out of it before an over-dose has been received. Even animals whose bodies are not nude, but are covered with hair, feathers or thick, heavy scales, instinctively avoid over-exposure. They may be seen actively feeding in the sun in the morning, when it is cool, but they retire to the shade before noon and remain there until later in the day, when they come out again. Birds, beasts, insects, even the red and black ants, observe this simple precaution.

SUNBURN

Sunburn is distinct from suntan. It is a real burn and injures the skin just as much as fire or scalding water. It results from an overdose of sunshine in those who lack adequate protection against the sun's rays. The sun's rays may penetrate deeply and burn the underlying tissues.

When exposure is too prolonged before pigmentation or after most or all of a previous pigmentation has been lost, more or less inflammation follows. Burning, often severe blisters, and peeling result. Sunburn is usually superficial, and quickly heals without leaving scars. As in other burns, there are three degrees of sunburn.

First degree burn is a slight redness (erythema) which causes little or no discomfort and results in no harm. The redness is due to the excess of blood in the skin.

Second degree burn results when you stay in the sun until the skin glows like a boiled lobster. It is very painful and accompanied with fever. Blisters develop, burst and discharge their fluid contents over the body. There is much itching and peeling of the skin. There may be diarrhea, vomiting and other unpleasant symptoms as a result of the terrible beating taken by the nervous system.

A *third degree* burn results in a sloughing dermatitis and may end fatally. Inflammation of the brain, stomach and intestines, blood poisoning, hemorrhages and tetanus are said to follow as complications of severe burns.

Sunburn does not show up immediately. One burns without realizing it until hours later. The only safety lies in not overdoing the sunbathing until a protective coat of tan has been built.

TANNING WITHOUT BURNING

The manufacturers of "suntan preparations" have posed the dilemma of *acquiring a tan without a burn*. They propose to solve this problem with their various lotions and oils. This is a commercial program and does not represent a sane approach to a simple problem that is simply and easily solved without cost.

Sunburn occurs when the unprotected skin is exposed to the sun's rays too long. Short of this, only tanning occurs. It is not necessary to get sunburned in order to tan. Indeed, the purpose of tanning is to prevent sunburning. As tanning occurs from exposure short of burning, it is easy to acquire a tan without a burn and without artificial preparations applied to the skin. To avoid burning, it is only necessary to avoid excessive exposure of the body or any part of it to the sun until a good protective coat of tan has been acquired. Those impatient individuals who seek to get a coat of tan in a hurry and

those foolish individuals who try to get enough sunshine on the first day of their vacation to last the whole year, are almost sure to burn themselves.

At the shore, on the sand, especially white sand, or in the water, more sun's rays strike the body, due to reflection from the sand and water, and it is much easier to get an overdose. Burning will result in a much shorter time at the beach. Even those with a light tan will readily burn in such places.

A thin haze over the sun does not exclude its ultra-violet rays and will not prevent burning. A cool breeze will not prevent burning. It is not the sun's heat rays that produce sunburn. Do not be misled by the fact that it is cloudy or partially cloudy. A very severe burn may be produced by staying in the sun too long under such conditions.

Substitutes for Sun-bathing

CHAPTER XLIII

In some form or other radiant energy plays many parts in all animal as well as plant activity, so that an investigation of the whole effects of the sun's actions on animal life is desirable. We know that heat serves to set in motion the wound-up "machinery" of the germ-plasm; it touches-off the vital spark in the egg and is essential to the continuation of the evolution of the new being.

This does not justify the present efforts to break radiant energy up into its constituent parts and use each part as a specific cure for a specific "disease," as is attempted. In a prior volume we saw how this same mistake is being made in the field of diet. The old conception of drug specifics has been carried over into the fields of dietetics and helio-hygiene.

We see this in the treatment of so-called "diseases" with infrared lamps, ultra-violet lamps and spectro-chrome lamps. One type of ray is employed for one form of impaired health and another wave-length is employed in another condition of impaired health. The conception of the unity of sunlight and the need for balance between its various rays is missed. We are almost justified in saying that the same *Law of Minimum*, which we saw operating in food, operates also in light.

The use of colored lights in treating illness is based on the obsolescent fallacy that there are specific "diseases" and that different "diseases" require different treatment. Colors are employed to stimulate and inhibit function.

Charles Fere made some experiments with regard to the association of light and muscular force. He declares that a light colored light flashed in front of the eyes will greatly increase muscular strength. If this is kept on for "too long," however, muscular strength diminishes. This is purely a method of stimulation and cannot be of value in correcting the cause of the patient's troubles. Red is irritating--blue is soothing. The alternate use of these colors is supposed to increase metabolism. It is much like the alternate use of hot and cold water.

Most of the effects attributed to color are psychological and fail to appear when the subject is blind or blind-folded. Association has been shown to play a big part in their psychological effects. The effects are not inherent in the color.

Green is termed a negative color, but those practicing chromotherapy are advised to include it among their colors "in order to impress the minds of their patients." Although this color is considered unnecessary, "we all know how impressed some people are by a prescription of 'Mica parris'."

In the chemical laboratories of the firm of "Lumiere de Lyon," manufacturers of photographic supplies, the workmen who spend all of their time under red light become nearly mad with anger. The substitution of violet glass panes for the red ones calmed the men. This is a psychological effect produced through the eyes. Violet colored goggles would doubtless have produced the same results.

Finsen placed about twenty worms in a box and covered it with different colored glasses, then exposed it to the sunlight. All the worms assembled under the red glass. When butterflies were used in the same experiment, they crowded under the blue glass. This difference was explained by the fact that whereas butterflies are very active and love the sun, some of the beneficial rays of which pass through the blue glass, the worms love the dark and crowded under the red which only allows the hot rays to pass through.

This would seem to be merely an example of each type of life seeking that condition which more nearly approximates its normal habitat, and may be properly called psychological.

The employment of colored light, different colored wall papers, different colored clothing, etc., while of certain psychological significance, must be relegated to the realm of the hygienically unimportant.

Due to various factors there is a strong tendency on the part of doctors of all schools to rely on artificial light and neglect the light of the sun. This is very deplorable, and may, we trust, not always be the case.

Every imitation of nature is incomplete and seldom, if ever, satisfactory. Physicists have not been able to construct artificial light that possesses the unity and balance of sun-light. There are several marked differences between sunlight and artificial light, and these differences produce corresponding differences in results. Sunlight has inestimable advantages over all forms of artificial light.

Quartz light begins at yellow, being totally lacking in red; but is from 1,500 to 1,800 A.U. richer in the short-waved ultra-violet rays than sunlight, going beyond 1,800 A.U., while sunlight stops at 3,000 A.U. ultra-violet rays shorter than 2,900 A.U., as produced by the carbon-arc and mercury-quartz lamps and other artificial sources of light are destructive of animal tissue.

These short wave ultra-violet rays are totally lacking in sunshine and are thoroughly irritative to the skin and eyes, producing inflammation. The milder ultra-violet rays of the sun are counter-balanced by the red rays, which neutralize ultra-violet. Red is lacking in quartz light.

The balance between red and violet, in sunlight, is beneficial to the eyes and skin. The cells of plants and animals are nicely adjusted to the happy combination of visible and invisible rays of the sun. The complete lack of red rays and the excess of irritative ultraviolet in quartz light constitute a double danger.

The colors of the sunlight spectrum merge into each other, while in quartz light these are divided into distinct lines. The sunlight spectrum is termed the band spectrum, the quartz spectrum is denominated the line spectrum. This is an important physical difference between the two types of light and may be partially responsible for the differences in their effects.

The quartz light develops such an amount of free active oxygen that this soon renders the atmosphere of the room unbearable, and causes malaise and headache.

An excess of ultra-violet rays, as found in quartz light, may easily prove injurious to health. Quartz light gives an excess of short, irritative rays, lacks other counter-balancing rays--lacks balance--and makes the risk of burning the skin and severely injuring the eyes with the "artificial sun" very great. The shorter ultra-violet rays, which render quartz light so irritative, are not found in sunshine.

Neither the ultra-violet rays nor the red rays are the exclusive metabolic agents of light. The combination of red and violet, of heat and chemical rays, is the secret of the sun's beneficial influence. This balanced combination is not found in any artificial light.

The ultra-violet rays destroy bacteria and animals with bare, unpigmented skins. Snails die in twenty-four hours after exposure to these rays. Tadpoles and flies become torpid after an exposure lasting three hours and are killed in five hours. Young grass-hoppers die in two or three days. These facts reveal the dangers that lie in the use of the powerful ultra-violet rays from the doctor's lamps, when compared to the more beneficial rays from the sun which do not so easily or quickly destroy bacteria and young animals.

One marked evidence of the harmfulness of the ultra-violet lamp, is the special precautions that are necessary to prevent it from producing damage, owing to the painful effect of its short wave rays on the skin. The eyes in particular must be protected, either by goggles or by a dark cloth around the head. Conjunctivitis is very common, even from looking for a few seconds at an arc-lamp, if the

eyes are not properly shielded. "Quartz light," says Thedering, "has the richest content in short-wave rays; radiation of the skin of even a few minutes duration causes intense burning, and if the naked eyes are exposed to the light, painful conjunctivitis will result." This condition is exceedingly painful. Sunlight does not produce it. Goggles are not required while taking sunbaths.

It is insisted that our blood has the property of transforming rays and is able to equate the light from a quartz lamp to natural sunlight. This is a mere assumption and lacks verification.

Dr. Thedering, of Germany, and Prof. Roat, of Frieburg, both noted that the super-abundance of irritative ultra-violet rays in the quartz light causes the body to surround itself with such a thickened covering of pigment that this "shuts out the rays like a coat of armour, and the effect of the light bath becomes nil." Dr. Thedering says "the treatment quickly came to a dead end, and the cure made no further progress." This effect follows long light baths, but is claimed not to follow the short ones. Such results do not follow the sunbath.

For the orifices--mouth, throat, nose, ears, rectum, vagina, urethra, bladder, stomach, etc.--special rods are made of quartz crystal. These are employed for local or symptomatic treatment and have no value.

The various lamps on the market, both for professional and home use, vary greatly in their radiant intensity under the spectral distribution of their energy output. Many of them deteriorate after use, even for a comparatively short time. Some of them give off no ultraviolet rays at all. The carbon-arc lamp is the nearest approach to sun-light, but the percentage of short destructive rays emitted by the lamp is high.

Reddie Mallet, in *Nature's Way Monthly*, April, 1929, quotes a report issued under (English) government authority, which, to use his words, "Pours scorn upon the professed effects of manufactured light, and challenges those advocates who engineer its wonders to prove that its claims are justified."

The report says: "The use of artificial light, to supply only what the right food can give, is merely wasteful."

Again, "It commonly costs three or four shillings to give, by light-treatment, an effective supply of Vitamin D that would cost less than a penny if given by the mouth in the form of cod-liver oil, or otherwise." This is a huge difference in cost.

The report says: "There is no present reason to know that artificial light can do more in this way than a mustard plaster."

Finally, it says "It is made obvious that proper food, exercise, and fresh air are greatly preferable to indoor sessions around a lamp."

It cannot be denied that the ultra-violet lamp possesses a limited amount of the influence of the sun. Plants may be grown in artificial light, but they lack the rugged constitution of plants grown in the sunlight. They may be made to grow more rapidly than plants in the sunlight by subjecting them to light for longer hours than the revolving world does, their rate of growth increasing or decreasing with the decrease or increase of light, but forced growth of this kind proves to be defective in more ways than one. The plants do not have the same color, nor equal structural soundness, nor are their flowers and fruits equal to those of plants grown in the sun. The sun has no rival--whether irradiating plant or animal.

Animals grown under artificial light thrive better than those grown in the darkness or under glass, but they are not the equal of animals that have been irradiated by the sun. The lamp cannot produce all of the effects of sunlight.

In Europe, a distinction is made between a light-bath and a sunbath. Rikli advised taking light baths very early in the morning, before sun-rise. The light bath is also taken in cloudy weather. Rikli established his place in 1855. Ten years later he began the practice of air bathing. In 1869 he wrote: "It is my firm conviction that the light and air baths must be the foundation of the atmospheric cure, while the sun baths are the necessary auxiliary method."

Many Europeans--British and Continental--give sun bathing a secondary place. Certain English Naturopaths contend that sun-baths taken in a glassed-in room, the sun filtering through the glass, give satisfactory results. It seems to me quite obvious that these men have missed the true significance of sun bathing, and do not correctly understand its effects upon the body. I do not deny that the light-bath, as distinguished from the sun-bath, has its value; but I am inclined to think this value comes as much from the air bath as from the reflected light.

In several European institutions many things are thought to be able to replace the sun-bath, and many things are used in connection with sun-bathing which are thought to add to its effectiveness. In certain Swiss and German institutions, packs or hot potato baths are used to "replace" the sun bath. Dr. Monteuius, of France, says: "The sun-bath may be replaced' by various hydro-therapeutic applications of vapor or electric light baths." He also says, "The light bath practice is associated so intimately with hydrotherapy that they may be said to go hand in hand with one another."

Lotions, douches, vapour baths, packs, fomentations, sand baths, bare-foot walking, hot baths, etc., are employed in connection with and as substitutes for sun-bathing, both in Rikli's place and in other European institutions. There is too much hydrotherapy and not enough sun. Burying a man in sand and thus excluding the sun, except its heat, from his body may, "weaken by inducing excessive perspiration," to quote Dr. Monteuius, but it does not give him any of the benefits of the sun. All the monkey work of hydrotherapy should be avoided and no effort made to substitute these for the sun's rays.

Objections to Sun-bathing

CHAPTER XLIV

In an article appearing in *The Cosmopolitan*, July, 1949, under the title "In Defense of Dermathermy," Wolcott Gibbs presents the following objections to sunbathing: "sunburn, or tan, according to the most reliable authorities, is a morbid condition of the skin resulting from overexposure to actinic rays. It has been known to be fatal to humans and, in Australia, a certain species of rabbit is so embarrassingly susceptible to it that its ears drop off. These, however, are extreme cases. Far more often, the results are no more serious than rubescence, swelling, chills and fever, nausea, coma, exfoliation of the epidermis or peeling, and minor hallucinations such as the impression that the sufferer has died and gone to hell. As far as science can determine, man is the only animal that deliberately and defiantly exposes himself to the sun for any other purpose than getting warm, or dry, the only animal that is prepared to cook himself as a form of social or sexual decoration, or that imagines that he would, in some mysterious way, look better cooked."

It will be noted that the first part of this catalogue of objections refers to overexposure, while the second part implies that any exposure of the body to the sun, except as a means of getting warm, and this may be done with the clothes on, is abnormal and evil. As I know of nobody that advises or advocates overexposure and as the results of the over use of all things are evil, I cannot see the connection between these objections and that of sunbathing. Would we advocate perpetual fasting because of the evils of over-eating?

I suppose that no one doubts that man is normally a nude animal, that clothes are artificial and abnormal. Before man learned to clothe his body, and the whole race does not do so, even yet, his body was exposed to the sun in the normal course of his daily activities, just as are the bodies of other animals. Perhaps he did not, then, lie on a log in the summer's sun as do snakes and turtles, but he was in the sun nonetheless. Like all other animals, he probably sought the shade during the hot part of the day. Some medical writers on sunbathing write in such a way as to lead to the belief that we would be better off if we spent our lives in darkness and never came in contact with the sun. One hack writer who popularizes medical opinions tells us that, while sunbathing produces vitamin D in the skin, we can get all the vitamin D we require by taking sufficient irradiated milk, eggs, butter-fat and a few other substances, so that "you need never encounter direct sun to be perfectly healthy in most climates." He actually presents exposure of the skin to the sun as a punishment to the skin. The sun is a distinct evil.

Most medical writers, however, damn with faint praise, the sun-bath and then catalogue a whole list of its evils and dangers. They never discuss the dangers of over-exposure to the sun, but only those of sunbathing. They say it causes skin-cancer, it causes hemorrhage in lung tuberculosis. How do they know these things? I doubt not that over-exposure may bring on a hemorrhage, especially in the medically overfed tubercular patient, but I have given thousands of sunbaths in tuberculosis of the lungs and I have never seen a hemorrhage result as a consequence. The regular over-feeding of such patients is the most common cause of hemorrhage.

One writer tells of a blonde who "fried herself so intemperately," that "ever since then her back has been marred by yellow brown blotches that have lasted winter and summer, for ten years." Inasmuch as medical men do not employ sunbathing in their care of either the well or the sick, they come in contact only with cases such as this one. Here is an obvious case of abuse of the sun and

it is upon such cases that physicians and dermatologists base their opinions.

A medical "researcher" warns that to blister your skin in the sun puts a strain on your kidneys, that it may produce toxemia, it may produce shock or even death. This is said to be especially true of people with unstable nervous systems, or with over-active thyroid glands. It is said that it may also dissolve the red blood cells, causing the liberation of two toxins--porphyrin and histamin. But we never advise anyone to blister the skin in the sun. Why condemn sunbathing because sunburning may prove harmful? It is not necessary to sunburn in order to sunbathe.

Suppose it is true that sufferers with hyperthyroidism are easily injured by sunning--must we then condemn sunbathing for those who do not so suffer? I have given many sunbaths to patients with hyperthyroidism and I have never seen the evils we are warned of, but I have never given my patients over-doses. Do we condemn the eating of dates by non-diabetics because the diabetic patient is injured by their use? Do we condemn apple eating by everybody because a patient with gastric ulcer has difficulty with apples?

Tilden says that sunbathing causes sore lips. While I have seen many sore lips heal in patients getting daily sunbaths, I have not seen sore lips develop in sunbathers. But I would not deny that sore lip is a possible development from excess. He says that three years of sunbathing will produce malignancy (cancer) of the neck of the womb in women who have chronic catarrh of the cervix. As malignancy in women who suffer with chronic catarrh of the cervix is of frequent development even when they never get sunbaths, how did he determinate this? He says: "Men of dilettante habits experience a decided induration of the prostate gland, with more or less ulceration, as a result of sunbathing for several seasons--cancer of the prostate may follow." This statement is simply absurd. For centuries men of dilettante habits have been developing prostatic hardening, ulceration and cancer without ever indulging in sunbathing. The troubles of the

dilettante are the results of his dilettante habits, not the results of what may be the only wholesome thing he does.

Oversunning is enervating. In producing enervation it may lead to any trouble that any other enervating influence may lead to. It may intensify any already existing trouble as surely as any other enervating influence. But the evils of over-indulgence shall not be permitted to weigh against the proper and sane use of one of the most important elements in nutrition.

In medical circles sunbathing is blamed for skin cancer. Even on their own showing and by their own admission, the evidence for this is very weak. Many medical authorities reject the idea. Certain it is that skin cancer is as prevalent among clad as among unclad races.

It need not be denied that in certain types of individuals, who tan inefficiently or not at all, and who burn easily, repeated burning may help to develop skin cancer. Such skin cancers are said to be very common among certain red-haired Irish people. On the other hand, I have seen such red-headed Irish who burned every time they were exposed to the sun for a considerable period, and who were repeatedly burned during as much as sixty years of life, without developing skin cancer. It would seem that even in these heliophobic individuals more than repeated burning is essential to the production of cancer.

Let us grant the worst. Let us grant that repeated burning and habitual over-exposure may help to develop cancer of the skin. What has this to do with intelligent sunbathing? Shall we forever have to combat the fallacy that if the abuse of a thing is evil, the correct use of it is also evil? Must we advise everybody to abstain from all food throughout life because overeating is harmful? Must we discontinue to drink pure water because somebody was drowned in the lake? Must we all live strictly celibate lives because overindulgence in sex is productive of enervation? Must we spend the remainder of our lives in bed because over-activity is exhausting? Or, can we not use our intelligence in all of the activities of life and employ all things that have a normal relation to life?

Medical men tend to decry and condemn every wholesome thing, and practice and laud to the skies every unwholesome thing and practice. To them only poisons have value in maintaining and restoring health; the normal things of life are suspect. While they repeatedly warn us of the "dangers" of sunbathing, they even more frequently tells us of the virtues of penicillin or arsenic. They are not to be taken seriously, for the reason that their anti-natural approach to all of the problems of life guarantees that they will be on the wrong side of everything.

The Sun Bath

CHAPTER XLV

Efforts are made in many quarters to convince everyone that the sunbath is a complicated and extremely hazardous procedure that can be applied only by a technically trained man from the laboratory, or a physician. One is almost certain to get the impression, when reading the average book on sun-bathing, that the sun-bath is very difficult, and also very dangerous. There are so many precautions enumerated, so many ceremonial details to be attended to, and so many times and conditions when the sun-bath should be avoided, that one is very likely to give up in disgust and forget the sun-bath.

Much of this is pretense with a commercial basis. Anyone with sense enough to eat, or sleep, or exercise, or breathe pure air, can take a sun-bath. It is as natural as any of these things and equally as simple. The ritual employed by Rollier and other physicians is not essential. These begin by exposing the foot for a few days, then one leg, then both legs, then one thigh, then the abdomen, then the chest, and lastly the back. All of this is needless ceremonial. It is my conviction that Rollier is over-cautious in beginning sun bathing and over-does the process after the patient has acquired a good coat of tan.

A few simple precautions must be observed in sun-bathing, and anyone of average intelligence may understand and apply these. The following precautions are especially necessary to those who have never taken sunbaths.

FIRST THE TAN

One of the first things necessary in taking sun-baths is to acquire a good coat of tan. Women and others who do not desire a dark tan on their faces, necks and arms, may cover these when taking sun-baths. In this way they may control the amount of pigmentation in these regions.

Many people are impatient and desire to tan too rapidly. These are inclined to overdo the sunning process and burn themselves. Do not try to get a year's supply of sunning in one day.

There are those who tan readily and those who tan slowly and with difficulty. There are a few who do not tan at all. The amount of precaution required in commencing sunbathing depends upon the type of skin possessed. Brunettes--that is, people with dark hair, eyes and skin--tan most readily and speedily and are less likely to burn easily.

Blondes and red-heads and other individuals with fair skin (usually, also with blue eyes) often find it difficult to tan, but burn easily. These should not be discouraged; for, with patience and perseverance, they, too, may acquire a nice golden-brown skin. It should not be thought that people who tan slowly derive no benefit from the sun.

It is necessary that blondes and red-heads proceed more cautiously in beginning sunbathing. As no good can ever come of sun-burning yourself, all types should use a little intelligence in sunbathing and proceed with due caution. In general, blondes and red-heads do not tan quickly. These have a tendency to freckle (freckling is spotty pigmentation) rather than to develop a uniform tan. With due caution and persistence, most of these may acquire a beautiful tan. Where the tendency to freckle exists, women may desire to cover the face, neck and arms to prevent these parts from freckling. This will detract-little or none from the value of the sun-bath.

Children do not tan as readily and usually nor as deeply as older people. Neither do they seem to burn as easily as adults.

As pointed out elsewhere, we think the chief value of pigmentation is the protection it affords against burning. We would caution those who have developed a deep tan against excessive sunbathing. The statement that "people with a nicely tanned" skin "are able to stay in the sun all day with no bad effects" is misleading and not based on experience.

ENERVATION FROM OVER-SUNNING

Excess sunbathing proves to be very enervating and Tilden says he has seen patients who had so greatly enervated themselves by sunbathing, they were two years in recovering full nerve energy. I have seen much harm result from excessive stimulation of this kind. It is my advice to patients never to indulge more than an hour, and many cannot take this much sunshine. Referring to the claims of some places that they are lands of perpetual sunshine, Tilden says: "perpetual sunshine would add one more cause to enervation or to our already voluminous nerve-destroying cures and immunizations."

The stimulating effect of light is so well-known we need not dwell upon it here. The claim that sunbathing induces restful sleep and results in improved nerve tone is true only if the process is not overdone. Restlessness and decreased nerve tone result from overdoing it.

HOW TO SUN-BATHE

Sunbathing is entirely different from the popular practice of enjoying the fresh air. The bath is taken with all of the clothing removed. Care must be taken not to burn the body. Too little, rather than too much, should be the rule. Blondes and red-haired people must be more careful than brunettes and members of the dark races.

Begin the sun-bath by exposing the entire body six to ten minutes a day and gradually increase the length of time of exposure

until half an hour to an hour or more, even to three and four hours are consumed. Make haste slowly. Expose the front of the body three to five minutes and then, expose the back three to five minutes. While I often find that even this rate of increase in the time of exposure is too fast, and am forced to slow it down considerably, I do not think that this rule needs to be followed closely by the well and active person. But where one is lying in the solarium, he may more easily over-do sunbathing than when romping on the beach. I believe that more benefit is derived from exposure of the back to the sun than from exposure of the abdomen. I cannot prove this at present. It is only a private theory.

NATURAL PROTECTION ALONE NEEDED

Protection of the head and eyes is usually strongly urged. This advice is pernicious. Man does not require goggles or bonnets any more than do the lower animals. Sunlight is distinctly beneficial to the hair and eyes. It has always been quite amusing to me to hear sunbathers advised to cover their heads and then hear the same advisers describe the wonderful results in increased hair growth obtained by ultra-violet radiation. It is a well-known fact that sunshine accelerates the growth of hair and more exposure of the head to its influence might easily reduce the number of bald-headed people by preventing baldness.

I have gone bare-headed for over forty years, most of this time in Texas, under a sub-tropical sun, and I have yet to be damaged by it. My patients do not cover their heads when sunbathing and they are not damaged.

The eyes are benefited by light and injured by too much darkness. Gazing directly into the sun has been found to greatly benefit weak sight. Fish found in dark caves, where they receive no sunlight, are always blind. Mules employed underground in mines, have much eye trouble not found in mules that work above ground. Men working underground and children living in dark tenement

houses, far from the sun, are always very sensitive to light. Such men and children need sunlight and to prescribe tinted and shaded glasses for them can only make the condition worse. Yet this is what is regularly done by regular physicians and opticians, who are regular in but one thing--the regularity with which they go at everything wrongly.

Writing in *Psychology* (July, 1929), Dr. R. A. Richardson, optician, says: "On a recent trip to Africa, I took advantage of the opportunity to find out whether cataract and blindness, often found there, were caused by the sun's intense light and heat, as I had been told. To my surprise, I discovered that the persons blinded by cataract were not those who worked in the open sunshine, but in the small shops and bazaars of Tunis. Questioning them, I traced their trouble to over-indulgence in proteins, sugars and starches, nicotine and caffeine."

The eyes themselves are not sensitive to light. The eye-lids are sensitive to light, and it is this that causes a closing of lids when a strong light falls on them. They close, of course, to protect the eyes and we should appreciate the full significance of this fact in exposing the eyes to light. They are all the covering needed by the eyes in the sunlight. Goggles and sunglasses to protect the eyes are absurd. They actually render the eyes more sensitive to light and impair vision. Squinting is not necessary, nor does one require dark glasses to prevent it. One needs only to cease squinting. This can be controlled by the will. It is possible to look directly into the mid-day sun without squinting. The development of "crow's feet" about the eyes is the badge of the unthinking. There will be no apparent need for glasses and eye creams if one will merely cease to squint. Squinting serves no useful purpose.

Sunbathing is objected to because of a so-called "drying damage" it does to the skin. This is the result, not of intelligently conducted sunbathing, but of over-sunning. It is perhaps just what we should expect, that the manufacturers of sun-tan lotions and "natural oils," should emphasize the evils of overdoing without discriminating between over-use of the sun and its proper use, in order to sell their

wares, but physicians should know better. Lubricating creams for the face and lotions or creams for the face are certainly not needed by those who have sufficient intelligence to behave themselves. It is not necessary to oil the skin to prevent drying. Dryness of the skin indicates that the skin has been over-exposed.



THE SUN BATH

Anointing the body with olive oil before a sunbath cuts out part of the ultra-violet rays and is not to be recommended. This seems to be a very old practice, although the ancients seem to have followed their baths with oil. If sunbathing is not overdone there will be no seeming need to oil the skin afterwards. Excessive sunbathing leaves the skin dry and even causes it to peel off. When it is not indulged to excess, it will leave the skin soft and properly oiled by its own oily secretion. If the "protective" potions were really as effective as they are said to be, they would prevent the user from deriving any benefit from his sunning.

What excuse is there for remaining in the sun so long that the skin becomes dry and harsh. Why must we abuse everything we undertake? The sensible person will not find any apparent need for oils to replace the natural oils of his or her skin, for he or she will not be guilty of abusing his or her skin with excessive exposure. The purpose of sunbathing is not to see how much you can burn yourself, nor, yet, to see how black you can become, but to supply your body with adequate amounts of sunshine.

It is also objected that sunburn ruins the fine texture of the skin. What has this objection to do with intelligent sunbathing? One is foolish to sun-burn. There is no reason why one should permit oneself to be burned in taking sun-baths. Proper precautions as to the length of the sun-bath will always prevent burning. The intelligent person will build up his or her tan gradually and avoid burning at all times and at all costs. Only foolish girls will remain in the sun long enough to spoil the texture of their skin. Others will substitute intelligence for the ointments and liniments that are offered for sunburn.

People who cannot sun-bathe without sun-burning are in the same class as those who cannot eat without over-eating. They are the uncontrolled type--those who lack self-discipline. They are inclined to over-do everything.

EATING AND SUNBATHING

Some caution against eating during or immediately following a sunbath. I know of no reason for either rule. It will be noticed that the lower animals usually get their food and sunshine together and then retire to the shade to digest their meal. Rikli had his patients to go up early for their sun baths and either to eat while bathing or else to retire to the breakfast room immediately upon coming down from the mountains. I have seen no evidence of ill effects from eating during or immediately after sunbathing.

MOVEMENT VS. LYING STILL

The best and healthiest rule in the sunbath is constant movement. Rest in the shade. Pigmentation is slower, but one is less likely to be injured if moving about than if lying still. However, the fact that one does not have an enclosure where activity is possible should not deter him or her from having a sun bath.

LIGHT VS. HEAT

The devitalizing influence of the hot sun is well known. People who lounge on the sand at the beaches at winter or summer resorts become lazy and indifferent, when they could, by moderate indulgence in sun bathing, and by cultivating less depressing activities, attain to greater vigor.

We must distinguish between the "light" of the sun and the heat of the sun. It is not the sun's heat from which all these benefits flow. Cities like Chicago and Pittsburgh receive plenty of the sun's heat, but less of its light, or less of its non-luminous rays, with the result that the blood of their inhabitants is on an average, about twenty per cent deficient in hemoglobin.

Animals seek the sunlight but avoid its heat. This is to say, they prefer to be in the sun during the cool portions of the day and seek the shade when it grows hot. The extreme heat is depressing and enervating. The guiding hand of animal instinct in avoiding the heat of the sun may be seen in the city's zoological gardens, the country pastures, or in the untamed places of the earth. The Indian in Mexico, Peru, South America, the Negro in Africa, all obey this instinct. The fox, the chamois in Switzerland, the cows in the pasture, the hens in the barn lot, the birds in the tree tops all love to bask in the sunlight of morning, but retreat to the shade as the heat of mid-day approaches.

In taking a sun-bath, heat is rather to be avoided than sought after. A temperature of 64 degrees F., being most suitable. Above 85 degrees F., prolonged exposure to the heat becomes enervating. Below 60 degrees F., the bath is still very beneficial.

In the tropics the leaves of palms and trees are either thick and heavy or have their edges turned toward the sun. At mid-day in Summer, when the sun is hottest, the leaves of plants curl up. Like birds, insects and beasts, the plant escapes the excessive heat of the sun as much as it can. Like the lower animals, led by their unerring instincts, we should obtain our sunbaths during the cool portions of the day.

TIME OF DAY

A sun-bath taken any time of the day will be beneficial and a busy person should take one at any time he or she can. But as the intensity of light and the length of time of exposure play important roles in sun-bathing, greater caution must be observed if a bath is had at mid-day in summer.

The early morning is the best time for sun-bathing, as at this time one may enjoy longer exposure without the depressing influence of intense heat. It is claimed in some quarters, though incorrectly, that the rays of the early morning sun are richest in ultra-violet rays. The late afternoon is also a good time for sun-bathing.

Rikli had his patients arise half an hour before sun-rise in the Summer and go up to the mountains and get their sun-baths during the coolest moments of the day. His baths were given on the mountain and it is here that the ultra-violet rays are most abundant.

Sir Henry Gauvin, English tuberculosis specialist, claims best results are obtained with sunbathing in tuberculosis, if there is also a current of air playing over the body. Cool breezes probably do more for the body than merely protect it from excess heat. If this is true, it only confirms the *Hygienists'* contention that air baths are of great value, even without the sun. Take your sun bath in the cool portion of the day, or else while the wind is blowing.

Dr. Lpeschkin, of the Desert Sanitarium and Institute of Research at Tucson, Arizona, calls attention to a fact with which everyone experienced with sunbathing must be familiar--namely, that sunlight is more likely to be enervating, even when it is not so hot, when it filters through a cloud, than when the unfiltered rays fall upon the body. He offers, as an explanation of this, the suggestion that whereas the visible rays of the sun often destroy the red cells, the unseen ultra-violet rays protect them from the other rays and strengthen them; so that when the ultra-violet rays are filtered out by a cloud and the other rays alone strike the body, the cells are unprotected.

SUNBATHING COMFORT

The sun-bath should be pleasant and, if it is taken progressively, will never cause discomfort. Care must be observed in the employment of sunbathing, in cold or damp weather. Only the hardy can enjoy them or profit by them under such circumstances. Those in poor health should avoid them during such weather, although these need them most. If a warm room is available for sunbathing the weakest may continue them.

WHERE TO SUNBATHE

Medical circles, in writing about sunbathing, frequently stress the Alps and how certain sections of these are especially favored with sunshine. Not only is this largely inaccurate, but there is the more important fact that we cannot all go to the Alps and are forced to make use of the sun where we are.

In most parts of the earth inhabited by man there is sufficient sunshine to meet his needs and the needs of the teeming flora and fauna about him. There are sections in which there is little winter sunshine and from which the sick will do well to retreat when winter comes.

It is cooler in the high mountains, there are more ultra-violet rays and, if one is above the clouds, there are more sunny days, but the fact still remains that there is sufficient sun and favorable conditions for sunbathing in the valley or at the sea-shore.

A WAY CAN BE FOUND

The excuse often offered for not getting sunbaths, that there is no place to take them, is a lame one. Some day all cities will be equipped with solaria. There will be solaria on the roofs of tall buildings in the larger cities. Homes will even be so equipped. In the

meantime, there is no lack of places for sun bathing for those who really desire to secure its benefits.

Where the will exists there is no lack of possibilities and facilities for sun-bathing in any spot where the sun shines. Balconies, flat-roofs, apartment house roofs, open verandas, a sunny place in the garden or park, offer splendid sun-bathing spots and require little or no ingenuity to shut them in for this purpose. The beach and secluded spots in the country offer possibilities for sun-bathing.



Where there is a will there is a way.

A sunny room, with the windows opened from the top, offers a chance for sun-bathing even in winter. Milo Hastings says he took sun-baths through two winters in Tarrytown, N. Y. If you do not have a sunny room in which to take a sun-bath, you may be able to find a friend who has such a room, which you may use. The chemical rays of the sun do not pass through ordinary glass. For this reason, a sun-bath taken in a room where the sun is forced to enter through glass, is of little value. The sun should come through an open window or door.

A sun-bath may be taken on the front lawn, in the back yard, on an adjacent or nearby vacant lot, or other open space by donning

shorts or bathing suit. Much benefit may be derived from sitting or lying in the sun while wearing a thin white gown.

SIGNS OF EXCESS

Excesses in sunbathing are usually quick to make themselves known. If headache, fatigue or upset stomach follow a sunbath, this indicates an overdose. Harm results from over-sunning just as it does from over-eating or any other form of excess.

Erythema (redness) and dermatitis (inflammation of the skin), both of which are painful and distressing, result from excessive exposure before pigmentation has occurred. Fever, headache, weariness, loss of appetite, languor, sleeplessness and such, result from too much exposure, or exposure to the hot mid-day sun. Such undesirable results prove the bath to have been carried to excess. Wherever possible, secure the sun-bath in the early morning or late afternoon, except during the cooler seasons of the year.

Burning and itching of the skin, erythema, aches and pains, and feelings of over-excitement or of depression and, sometimes insomnia result from over-stimulation and indicate that the bath should not be prolonged.

If any part of the body becomes burned or inflamed, due to too much exposure, wait until the burn is healed and the swelling gone before taking another sun-bath.

Sun-stroke is a very remote possibility. Heat-stroke may occur in weak individuals who stay too long in the sun when the weather is hot. If proper precautions are observed, this can never occur.

If, after a sun-bath, you should suffer from nose bleeding, congestion in the head, vertigo (dizziness), this is evidence that you took too strong a dose. In such a case, wait until you have fully recovered before taking another sun-bath and do not take so much next time.

PRECAUTIONS FOR INVALIDS

Sick and weak individuals need sunbaths most; yet these must observe greatest care in taking them. A headache, indigestion, or any other evidence of impaired health means that resistance is low and one so impaired may easily suffer from heat prostration from over-exposure, even where there is sufficient tan to prevent burning. Heart patients must be careful not to over-do the sunning.

The sun-bath often excites weak or nervous patients to such a degree as to prevent sleep. Sometimes after the bath they complain of a feeling of weakness which distresses them. Such symptoms are always the results of too frequent baths or of too prolonged baths. Nervous patients should exercise special care in avoiding over-exposure. Victor Dana, in *The Sunlight Cure*, also cautions against the over-stimulating effects of long exposure in neurotic subjects.

If pains increase, this suggests fatigue and over-stimulation. The sun-bath should leave one feeling better, not worse. If it leaves you weak or depressed or with an increase of any of your symptoms, you have had too much--take less next time.

Sufferers from asthma and tuberculosis may experience a slight difficulty in breathing after a sun-bath. These should shorten the bath next time. Pulmonary patients, especially those inclined to hemorrhage, those exhausted by nerve "disease," and heart subjects should be cautious in taking sun-baths. Hemorrhage of the lungs must be avoided.

In some quarters fear of sun-bathing in pulmonary tuberculosis persists. I have found it very beneficial in these conditions and have not seen any harm come from the practice. In this connection Rollier says: "Twenty years of experience has convinced me that patients with pulmonary tuberculosis do not suffer in the least from exposure to sunlight. Not once has there been a mishap of any kind; on the contrary, a striking improvement under the influence of the correctly administered sun-bath has been the rule in every case."

Fat women often complain that even a few minutes, as little as three to five, in the sun-bath, makes them sick. They complain of nausea, weakness, headache, and dizziness. These women must be handled with care. I have seen such developments in but one thin woman and none in normal individuals.

The Air Bath

CHAPTER XLVI

Sun-baths, light-baths, and air-baths are collectively referred to by Rikli, Monteuius and others as the atmospheric cure. The literature on the subject is so confused that one often has difficulty in determining which bath is being considered. I have tried to avoid this ambiguity of language.

One cannot take a sun-bath or light-bath without also receiving an air-bath, but the air-bath may be taken in one's own room, or in the darkness of night. It does not depend on the presence of light. It consists simply in exposing the nude body to the air.

Dr. Trall considered the air-bath as admirable in cases of scrofula, rickets, and other conditions. Rikli declared: "Man is made to live in the open air; therefore when exposed to the action of light, air and sun, he is in his real element. As a natural agent, water takes only an inferior place, above it comes air, whilst light takes precedence over every other natural agent, and is the greatest essential wherever organic life exists. The nervous system which is an inherent principle of our organism is acted upon by light, especially through the skin. The purposes of the air treatment is the strengthening of the skin by restoring its natural functions and vitality and elasticity it has absorbed from its primitive state when directly in contact with the skin."

Saleeby quotes the French students as saying, "Baths of water are good, baths of air are better, baths of light are best." This is but a shortening of Rikli's statement above.

Benjamin Franklin was in the habit of taking air baths each morning in his room. He made some efforts to induce others to adopt the practice and speaks highly of the benefits he derived therefrom. Franklin particularly desired to divest himself of all clothing when doing mental work. Adolph Just, of Germany, also lays great stress on the air-bath.

Air playing over the body may increase metabolism fifty per cent in ten minutes. Thyroid extract, medicine's only claimed stimulant of metabolism, is said to require a year to accomplish this same thing. An air-bath of twenty minutes duration reduces the hydrogen-ion content of the blood to normal. No drug method known can do this in any length of time.

Dr. Leonard Hill showed that "a high cooling power not only increases the heat production of the body during exposure, but raises the basal metabolism to a higher level. The fire of life is made to burn faster." Together with Sir Henry Gauvin he made a careful examination of children at the Treloar Hospital, Alton, and Hayling Island, and concluded that the high metabolism, produced equally in pigmented and unpigmented children, was due to the cooling power of the air, and not to radiation.

Halstead attributed the results achieved in bone and glandular tuberculosis solely to fresh air. S. Bangs, who has had much experience with both the air-bath and the sun-bath, believes that the air-bath is the most beneficial of the two. Prof. J. Dollinger (Budapest) says that it is impossible to decide whether open air or sunlight plays the most important role in the healing processes in tuberculosis.

Arringer-Cherkoff says: "All painter's models, especially those who on account of their fine figures are in constant demand for sittings and consequently are naked the greater part of the day, soon acquire a fresh rosy tint of the skin, their figures improve, and in a few weeks from the time they take up their occupation enjoy far better health than formerly."

As soon as people realize that sun and air-baths are more important than water-baths, all of our cities will have public sun-parks where the people may go and take their sun and air-baths.

Air baths, accompanied by gymnastic exercise, which are more pleasantly practiced in a state of nudity, will do much to add to the health of everyone. They will also harden one and make him or her more resistant to weather changes. It is a good thing to train oneself to resist an exaggerated dread of cold.

The weak and debilitated person must use due caution in beginning air bathing. Everything must be in proportion to capacity and that of chronic patients or of those troubled with nervous disorders is often very limited. In such cases the first few baths must be short ones. It frequently happens that delicate and sensitive patients cannot endure more than three minutes at the beginning. Their hyper-sensitiveness must be taken into account and duly respected.

The air bath should be pleasant and if it is taken progressively will prove to be so. Its duration must depend on the temperature and on the condition of the patient. The patient must not be permitted to chill. Should chilling occur, no time should be lost in securing proper warmth.

If blind enthusiasm has caused the beginner to prolong the bath too long, fatigue may be experienced during the day, or discomfort may be pronounced and the patient may suffer from excessive weariness, varied by aches and pains in the head or back, accompanied by slight feverishness.

No time is more convenient for the air bath than immediately upon arising in the morning, while one goes through his or her daily exercises. Air baths a la Franklin may be taken by the vigorous and healthy without the above precautions.

Thousands of people enjoy their daily air bath, even in the most inclement weather. Don't say "Oh! but they are used to it." Get used to it! You can then withstand the weather changes with the same ease that they do.

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