conychia may ensue. The secondary ulcerations of the nail are the most frequent syphilitic manifestations, and the disease is characterized by the large number of the nails involved. The first signs are redness and swelling of the last phalanx accompanied by pain. The nail walls become affected and the epidermis is raised by fluid and finally ulcerates. Pus appears from the eponychium and from under the plate on the sides, and causes the plate to look yellow. Blood is imbibed by the plate cells and the nails become red and later black. Ulcerations appear along the bed, and as a result the nails fall. If the matrix is affected, nails may not be reproduced, or may grow again gryphotically deformed. The restitution of such nails is always a long and tedious task, and must be brought about by mild local antisepsis and prolonged general antisyphilitic treatment.

The nail lesion associated with late syphilis usually assumes a dry form, and has been termed scabrities unguium syphilitica or onyxis craquelé. At the root of the nail white, punctate depressions form in vertical series brought about by parakeratosis and acanthosis of the bed. These pathological processes prevent the formation of onychin, and as a result we find hyperkeratosis subungualis with its usual sequelæ, or a thickened, yellow, crumbling plate.

In hereditary syphilis Neumann states that the nails may assume atrophic forms and appear thin and brittle, or poorly developed.

Lepra.—In pure cases of lepra tuberosa nail changes are rarely met with, but in mixed types or in pure anæsthetic forms all degrees of deformities are encountered, extending from simple brown spots to gryphosis and permanent loss.

Variola.—Virchow states that if a pustule of smallpox appears upon the bed, the plate will show a yellow, sunken spot, and may eventually be cast off; and if such an accident occurs, the loss will be a permanent one.

Addison's Disease.—In this affection the nail lesions are practically pigmentary ones. The nails appear white on account of the general anæmia and deposit of pigment in the nail bed or brown streaks or universal darkening of the nails may appear.

Cutaneous Tuberculosis.—The nails show involvement only when the tuberculous process exists in the neighborhood of the nail walls. Transverse depressions and ridges, vertical ridges, discoloration, hyperkeratosis subungualis with its resulting deformities, *i.e.*, raising of plate from bed, increase in convexity of plate, casting off of granular débris, thinning and breaking of nail, and final loss, which in this disease may be permanent, are the lesions usually experienced.

Morbid Processes in the Nail in Connection with Non-Cutaneous Diseases.

Phthisis Pulmonum.—Hippocrates was the first to describe the increased convexity of the nails in consumptive patients, and thus the term Hippocratic is used to denote the high arching which often exists, both longitudinally and vertically, in this disease. Women are affected in this manner oftener than men, and as a rule the thumb nail is the first to show the change. After the thumb the frequency of involvement extends seriatim to the little finger. A plausible explanation of this phenomenon is given by Pigeaux, who says that the regions farthest from the heart are subject to œdema, which lifts up the matrix of the nail and causes elevation of the plate, while imbibition of this same fluid produces a thickening of the plate itself. The dilatation of the vessel causes the disappearance of the lunula.

Empyema.—Hippocratic nails have been observed in this disease also, but have disappeared with the subsidence of the purulent fluid.

Rachitis.—Esbach has noted a shortening of the last phalanx.

Carcinomatosis.—In all cachexias nails become softer, probably on account of the anæmia of the matrix, bed, and walls. Observers have recorded also leuconychia and onychorrhexis.

Heart Disease.—Here, as in consumption, circulatory disturbances are at work, and consequently blueness and Hippocratic nails with "drumstick fingers" appear.

Embolism and Thrombosis.—Observations upon these accidents to the fingers are decidedly rare, but Heller speaks of blackness, gryphosis, and loss as possibilities.

Diabetes mellitus.—The presence of sugar in the blood or the subsequent changes in the vessel walls and tissues, induced by the circulating sugar, may produce transverse furrows, brittleness, exfoliation, or complete loss of the nail.

Malaria.—Writers have noted the phenomenon that before the advent of the chill the nail turns to a pale blue or slate color.

Scorbutus.—In this disease hemorrhage is apt to occur under the nail, producing the variations in color due to oxidation and loss of the nail involved.

Chlorosis and Anæmia.—The lack of nourishment brings about paleness, thinning, and tendency toward koilonychia, while in pernicious anæmia a different class of disturbances have been noted, namely, thickening of the nail with subsequent fissuring and crumbling.

Gout.—Here again apparently opposite results may be reached. On the one hand, the nails may become thin and brittle or, on the other hand, vertical ridges and depressions may form together with elevation of nail from bed, with brownish discoloration and subsequent gryphotic changes.

Rheumatism.—This affection may attack the nails, causing transverse depressions, elevations of the plate with yellow discoloration, brittleness, or gryphosis.

Changes in the Nails in Connection with Diseases of the Nervous System.

Peripheral System.—Paralysis or wounds of cutaneous vessels produce trophic alterations in the nails. Hypertrophic changes cause thickening, vertical ridges or gryphosis, while atrophic modifications are thinning, cracking, loss, slowness in growth, discoloration, vertical or horizontal ridges, and opacity.

Neuritis of Internal Origin.—Here changes are less frequent than after wounds of nerves, but nevertheless writers have described loss of gloss, discoloration, transverse and vertical depressions, brittleness, and bending of the nail.

Morvan's Disease is frequently characterized by disturbances of the nails, such as thickening, blackness, hardening, and gryphosis.

Raynaud's Disease.—Mild cases of this condition may exist without changes in the nails, but in the severer examples we find vertical ridges and furrows, increase in convexity and thickening, hyperæsthesia, and possible loss. When the disease is accompanied by panaritium, then we find the usual results of shortening, bending, vertical ridges, and gryphosis.

Erythromelalgia is often accompanied by nail changes, among which have been recorded transverse furrows, yellow discoloration, thickening of the bed at distal end, bending and thickening of the plate, and loss.

Spinal Diseases.—*Tabes Dorsalis.*—A very frequent concomitant of this disease is loss of the big toe nail, which may fall repeatedly. This phenomenon is caused by trophoneurotic changes and by the invasion of blood between the bed and the plate. Other nail changes are possible, and examples have been recorded of brittleness, thickening, hardening, and transverse and vertical depressions.

Syringomyelia.—The almost constant presence of paronychia and of panaritium in this rare affection accounts for the frequent and severe involvement of the nails. Here we find brittleness, lack of lustre, cracks, thinness, exfoliation, and after panaritium gryphosis, atrophy, loss and stumps of nails growing at various angles.

Anterior Poliomyelitis.—In this disease instances of softening and loss of the nails have been recorded.

Injured Spine.—After such an accident I have noted transverse depressions and ridges and hyperkeratosis subungualis.

Multiple Sclerosis.—The nail changes in this affection are very similar to those observed in locomotor ataxia: namely, brittleness, pain, and invasion of blood between bed and plate, causing the loss of the nail.

Brain Diseases.—*Apoplexy.*—The possible deformities of the nail resulting from strokes of paralysis are vertical ridges, transverse furrows, increased arching, thinness and greater transparency, smallness, brittleness, koilonychia, ecchymosis of bed with subsequent loss, and gryphosis.

Psychoses.—*Dementia Paralytica.*—The changes occurring in this disease are quite similar to those following apoplexy, and may consist of increased transparency, vertical and transverse furrows, subungual hemorrhage, transverse ridges, yellow or brownish discoloration, and gryphosis.

Melancholia.—In the course of this disorder different observers have noted transverse furrows, increased thickness, and slowness of growth.

Functional Neuroses.—*Hysteria.*—Nail changes are seldom met with in this condition, but instances of lack of lustre, vertical and transverse furrows, exfoliation, thickening and roughness of surface, and final loss have been recorded.

Epilepsy.—Another disease in which nail disorders are rare, but when present they may include thinness, brittleness, deep transverse furrows, roughness of the plate, and subungual hemorrhage.

Neurasthenia.—In this disease I have observed discoloration and transverse ridges.

Nervous Shock.—As a result of such accidents patients have come to my notice with transverse depressions and ridges, thinning, discoloration, and subungual hyperkeratosis with its usual results.

Trophic Neuroses.—*Myxœdema.*—In my experience the only changes in the nails in connection with this disease have been those of vertical ridges and subungual hyperkeratosis and its resulting deformities.

Diseases of the Bones.—Fractures are often followed by discoloration, which varies from yellow to black, by transverse furrows and by slowness of growth of the nails.

Acromegaly.—This interesting process is almost always accompanied by onychauxis where the nail is enlarged transversely and vertically and appears flat, brittle, and lustreless with vertical ridges upon its surface. In addition to these symptoms I have observed discoloration and subungual hyperkeratosis, but have not observed the usual sequelæ of this condition.

Arthritis Deformans.—In this disease I have recorded vertical ridges and depressions, transverse ridges and depressions, discoloration, thinning, and brittleness and koilonychia.

Acro-arthritis.—In this somewhat allied condition nails have been shown me bearing round punctate depressions, vertical and transverse ridges, discoloration and hyperkeratosis of the bed with subsequent elevation of the plate.

Nails in Connection with Youth and Old Age.

The sucking of nails renders them soft and small, while advancing years produce vertical ridges and a tendency toward increase in size.

Keratosis senilis.—In conjunction with this disease I have seen round, punctate, and transverse depressions, leuconychia, and subungual hyperkeratosis with increased convexity of the bed.

Intoxications.

Heller records the following changes in connection with the use of poisons:

Arsenic may cause pain, yellow or brown discoloration, raising of plate from bed with eventual loss. Brooke and Roberts observed in the recent English epidemic of arsenical poisoning from beer abnormally rapid growth of the nails with transverse ridges and subungual hyperkeratosis.

Mercury rarely produces changes, but transverse furrows, blackness, thickening, and loss of the nail have resulted from the abuse of the drug.

Nitrate of silver may be deposited in the tissues and discolor the nail bed blue or gray. I have recently observed a very marked example of this condition.

Lead has been known to destroy the nails.

When one has read the facts enumerated and described in the preceding paragraphs, I think one must be greatly impressed by the similarity of symptoms resulting from the many diseases which may induce changes in the nails. This is the effect produced upon the writer, who at the end of three years' special study of these affections feels more than ever that the physician who states that he can make a positive diagnosis from the nails alone is making a rash statement. In closing this article the writer wishes to acknowledge his great indebtedness to Heller, whose unique book, "Die Krankheiten der Nägel," has been the model upon which he has based this article.

Charles J. White.

NANTUCKET, MARTHA'S VINEYARD, AND CAPE COD.—The islands of Nantucket and Martha's Vineyard and the southern district of Cape Cod are climatologically

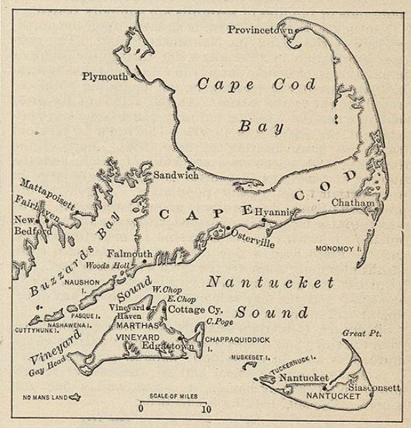

Fig. 3481.—Nantucket, Martha's Vineyard, and Cape Cod, Mass.

and structurally so similar, and are grouped in such close proximity to each other that it has seemed best in the present description to consider them under one head. Nantucket, as being situated farthest away from the mainland, is to be taken as the climatological type, its climate resembling most nearly the climate of the ocean as experienced on shipboard, of any island on the Atlantic seaboard from Old Point Comfort to the Grand Manan. The climatic attributes may be briefly summed up as follows: (*a*) as being at the ocean level the air contains the maximum amount of oxygen, aqueous vapor, and ozone; (*b*) it contains saline particles, *i.e.*, iodine and bromine; (*c*) it presents the most regular variations of barometric pressure; and (*d*) it presents the minimum diurnal variation of temperature. Other stations included in this article resemble it more or less nearly, according to their proximity to the sea and to modifying local conditions subsequently to be considered.

The Island of Nantucket (41° 15′ North Lat., 70° W. Long.) lies in the Atlantic Ocean twenty-five miles due south of the metacarpal joint of the beckoning finger of Cape Cod. It is of a long-horned crescentic shape, and, roughly speaking, is fourteen miles long and four miles wide. It comprises in its entire extent about twenty-nine thousand acres. It is the most easterly of the group of islands known as the Elizabeth Islands, in which are also included Martha's Vineyard, Tuckanuck, Muskeget, and Naushon. It is almost exactly one hundred miles from Boston.

Structurally considered, it is a vast mound of sand lightly covered with vegetable mold, gently undulating in surface, and presenting a series of high bluffs to the sea. At different points its surface is dotted by fresh-water ponds of varying size. The soil is of a light, porous, sandy nature. Rocks are so rare that it would be easily possible to count those worthy of the name upon the fingers of the hand. There are, practically speaking, no trees. The flora is large and varied. Five hundred varieties of species are described as growing without cultivation. The botanic range is wide; heather grows upon the moors; cactus is to be found freely flowering in the month of July, while in August a visit to a vast field of hollyhock-like blossoms of the pink hibiscus is a favorite excursion. A large variety of birds pause at the island upon their semi-annual pilgrimages; black duck and quail live there the entire year, and the neighboring island of Muskeget is a breeding place upon which thousands of families of sea-gulls are annually reared.

Nantucket, the chief town, is situated upon the northern side of the island, on Nantucket Sound. The resident population in 1894 was 3,300, though the summer population is, of course, largely in excess of these figures. In that year 16,306 passengers, not including children, were brought to the island. At the height of its prosperity, when the whaling industry flourished, the population of the island was 10,000. The town is very old (the oldest house bearing the date 1686). Many of the dwellings and warehouses are built of brick, and the number of buildings in general is surprisingly large in proportion to the present population. A general impression of size and antiquity is given to the town. The streets for the most part are paved with stone and asphalt; outside the town clay roads extend in many directions, and the State road, a fine piece of macadamized road, eight miles long, connects the town with Siasconset. At a greater distance from the town the roads consist chiefly of "ruts," and one may ride or drive in almost any direction at will over the moors.

Siasconset, formerly a small fishing village, eight miles from the town and connected with it by a narrow-gauge railroad, is now an exceedingly popular summer resort. It is situated on the ocean and is possessed of several hotels and boarding-houses, a casino, and a fine golf course. The surf bathing is excellent.

NANTUCKET, MASS., FIVE YEARS, 1897–1901.

Climatic Data.	June.	July.	August.	Sept.
Average maximum	67.1° F	73.9° F	73.9° F	69° F
Average minimum	55.7°	63.1°	63.2°	58°
Average daily range	11.3°	10.9°	10.7°	10.4°
Absolute maximum	78°	86°	87°	85°
Absolute minimum	44°	54°	56°	46°
Average number of clear days	7.6	7.8	10.2	11
Largest number of clear days	11	10	12	13
Smallest number of clear days	4	1	5	9
Average number cloudy and partly cloudy	22	23	20.8	19
Largest number cloudy and partly cloudy	26	30	26	21
Smallest number cloudy and partly cloudy	19	21	19	17
Average number rainy	8.6	10	9.6	8
Largest number of rainy days	10	13	11	11
Smallest number of rainy days	8	8	7	4
Average total rainfall	1.45	2.45	2.22	1.75
Average relative humidity for four years	86.5	89.2	88.3	81
Average hourly wind velocity for for years	10	9.5	8.2	10.2

The preceding table, compiled from statistics prepared for me by Mr. A. W. Crosby of the weather bureau in Boston, shows climatic data for the five years 1897–1901.

From the foregoing table it is seen that the average number of rainy days for the four summer months, for five years, was nine per month. This number represents the days during which it rained at some portion of the day. The number of days in which an invalid could not exercise out of doors was of course much smaller. In 1894, for the months of July, August, and September, there were ninety-two consecutive pleasant days.

The prevailing direction of the wind is westerly, blowing, as will be seen by the map, over miles of ocean. One of the most remarkable meteorological phenomena of the island is the rarity of electric storms. Thunder storms are exceedingly rare, passing north or south of the island. In the twenty-one summers I have passed at Nantucket I have known the lightning to strike but on three occasions. Fogs are a more variable feature, their prevalence differing in different years. As a rule it is not more foggy than at other seashore resorts.

The average temperature of the water for the summer of 1894 was 72° F. At the bathing beach it is somewhat higher. The cause of this high temperature of the water is a much-discussed question. It is believed by some to be due to the proximity of the gulf stream, but this theory is not borne out by fact. Any one interested in the matter is referred to Dr. Peterman's charts.

The water supply of the town is derived from a large fresh-water pond. It is between two and three miles from the town, and is in an isolated position so far as dwelling-houses are concerned, the house of the engineer being the only human habitation within the water-shed. It would be difficult to conceive of its ever sustaining dangerous pollution.

The sewerage of the town has been greatly improved in recent years by the construction of a sewer to the deep waters of the outer harbor.

The average velocity of the wind for the three months of the summer of 1894 was nine miles.

From its isolated position Nantucket is particularly free from contagious diseases. In the ten years 1890–1900, there have been forty-four deaths from tuberculosis, or eleven per ten thousand; and fourteen deaths from diphtheria, or about four per ten thousand. In 1901 one case of typhoid fever was reported. It was, however, an exceedingly doubtful case, and did not give the Widal reaction. Contagious diseases, when present, are for the most part imported, and are generally so managed as to reduce to a minimum their further dissemination. This is the more readily accomplished because of the intelligent and energetic co-operation of the Board of Health.

The amusements afforded the summer visitors are unusually varied. Boating is excellent. Large cat-rig boats, under the charge of experienced skippers, are provided in abundance. Those preferring still water may sail in the landlocked waters of the inner harbor, eight miles in extent. More accomplished sailors can pursue their excursions upon the rough waters of the Sound. A daily trip by sailboat and by launch is made to Wauminet, about seven miles up the inner harbor. Still water for rowing is always found in the inner harbor, and excellent light boats may be hired by the hour. It is particularly safe for women and children because of the shallowness of the water. The fishing is excellent; blue fish abound in the season; scup and plaice fish (the latter a large species of flat fish) are found in great abundance, as is also the English turbot. Lobsters, clams, quohogs, and oysters are also abundant. Pickerel and fresh-water perch are found in the ponds. There is some shooting. Marsh birds are present throughout the summer, plover and snipe are frequently killed during their respective flights, and black duck and rabbits are numerous. Driving is very agreeable; the moors are for the most part unfenced and level, and it is the custom to ride and drive across them in any and every direction. Bicycling is also excellent. The State road is a perfect piece of macadam; the clay roads are fair, and there are several agreeable bicycle paths. Golf is the principal amusement. The course is particularly fine, and in many respects an exact counterpart of the Scotch links. It consists of eighteen holes, is about six thousand yards in extent, and extends over gently undulating ground, in which neither a tree nor a stone interferes with the pastime. The turf is excellent, and fine views of the sea are to be had from many of the trees and greens. Afternoon teas and tournaments are held every week during the season.

From twenty years of summer practice on the island the writer feels able to recommend the climate as especially suited for the extremes of life, the very old and the very young; the smallness of the diurnal range being a most important factor. The absence of contagious diseases also renders it a highly desirable locality for children. It is well suited to those suffering from functional nervous affections, neurasthenia, insomnia, and neuralgia; for valvular diseases of the heart, for convalescence from diseases of the respiratory organs, for chronic dysentery and diarrhœa, and especially is it specific for the enterocolitis of children. Cases of tuberculosis and of the scrofulous diseases of children also do exceedingly well at Nantucket.

Nantucket possesses an excellent public library; a museum, containing many objects of interest; the valuable and interesting collection of the Historical Society; an old mill; several light-houses and life-saving stations; churches of nearly every denomination; gas and electric plants. There is an excellent hot salt-water bathing establishment.

There are several hotels, among which may be mentioned, The Sea Cliff Inn, owned by a syndicate, and the largest hotel on the island, The Ocean House, Point Breeze, and Springfield House.* Prices vary from $10 to $35 per week. There are also a large number of excellent boarding-houses. A. T. Mowry, real estate agent, solicits correspondence upon all matters pertaining to Nantucket, and has a list of available cottages. Rents of the latter vary from $150 to $1,000, average about $400. An eminent Boston surgeon and an equally well-known oculist from Philadelphia are among the summer residents, and can be called on for special service.

MARTHA'S VINEYARD.—Twenty miles west of Nantucket and ten miles south from Wood's Hole lies the island of Martha's Vineyard, an island considerably larger than Nantucket and similar to it in climate, its chief differences consisting in its nearer approximation to the mainland and in the fact that it is comparatively thickly wooded.

At the easterly end of the island Edgartown is situated, a small and very picturesque town with a resident population of about eight hundred persons, and a summer population much in excess of these figures. Bathing, fishing, sailing, and driving are excellent, and there are well-arranged golf links.

Nearer the centre of the island and on the northerly shore is the town of Cottage City, probably the most populous summer resort of the cape district. The resident population is about the same as that of Edgartown, but the summer population is estimated as being about twenty thousand.

Vineyard Haven, situated on the north side of the island, lies about a mile to the west of Cottage City, and is an exceedingly popular summer resort. The resident population is about one thousand; the summer population is largely in excess of these figures.

West Chop is a small summer colony northwest of Vineyard Haven. The hotel, casino, and the major portion of the land are owned by a syndicate of Boston gentlemen. The bathing and boating are excellent and the views are particularly attractive.

Similar in climate and in the configuration of land are the summer resorts situated upon the southern border of Cape Cod. Among these resorts may be mentioned Wood's Hole, Falmouth, Cotuitport, Osterville, Hyannis, Yarmouth, Harwichport, and Chatham.

Harold Williams.

* Not intended to be a complete list.

NAPA SODA SPRINGS.—Napa County, California.

POST-OFFICE.—Napa Soda Springs. Hotel and cottages.

ACCESS.—Take Oakland Ferry (from San Francisco) at 8 A.M. for Napa City, forty-six miles distant, arriving at 10:10 A.M. Then take stage to springs, five miles distant. Spring, summer, and autumn are suitable seasons for visiting the springs.

The resort is charmingly located on the southwestern slope of the Coast Range, at an elevation of about 1,000 feet above the level of the sea. From the Rotunda Hotel many beautiful views are spread before the eye in all directions. Looking southward over the beautiful valley of Napa County one sees a landscape seldom surpassed for loveliness, and which always remains fresh in the memory. The climate is warm, dry, and salubrious, uniting the advantages of mountain air with breezes direct from the sea. The mineral springs here are among the most noted in the State. They number twenty-seven in all, with an average daily flow of about four thousand gallons. The temperature of the water ranges from 65° to 68° F. The main spring, the Pagoda, from which most of the commercial Napa soda is obtained, is an alkaline-chalybeate water, strongly charged with carbonic anhydride. It is delightfully clear and sparkling, and has an agreeably pungent taste. Following is Dr. Anderson's analysis:

PAGODA SPRING (NAPA SODA SPRING).

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Sodium chloride	7.14
Sodium bicarbonate	12.95
Sodium carbonate	1.10
Sodium sulphate	1.62
Potassium bicarbonate	Trace.
Magnesium bicarbonate	3.04
Magnesium carbonate	21.76
Calcium bicarbonate	.78
Calcium carbonate	9.55
Ferrous carbonate	7.90
Silica	.74
Alumina	.57
Organic matter	Trace.
Total solids	67.15

Free carbonic acid gas, 143.62 cubic inches. Temperature of water, 67.7° F.

Over this spring is a beautiful pagoda, supported by solid stone pillars, and, resting upon a tessellated marble floor, a natural stone basin has been artistically arranged, through which sparkling soda bubbles in all its freshness. There are many other important springs at Napa, including the well-known Iron Spring and the Lemon Spring. The former was analyzed by Professor Lanzwurt in 1870, with the following result:

IRON SPRING (NAPA SODA SPRING).

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Sodium chloride	5.20
Sodium bicarbonate	13.12
Sodium sulphate	1.84
Magnesium carbonate	26.12
Calcium carbonate	10.83
Ferrous carbonate	7.84
Silica	.62
Alumina	.60
Total solids	66.17

Free carbonic acid gas, undetermined. Temperature, 68° F.

The waters of all the springs have the same general characters—alkaline-chalybeate, clear, and sparkling. Napa soda water is highly esteemed as a beverage. It is sold in every city and town of the coast, and is one of the pleasantest summer drinks to be found. The water is an efficient aid to digestion, being antacid and tonic. When taken early in the morning before breakfast its action is gently aperient. The ferruginous salts, held in solution by the carbonic-acid gas, are valuable in anæmia and chlorotic conditions, malarial toxæmia, and many disorders requiring iron for the constructive metamor

phosis of red corpuscles. The grounds at Napa Soda Springs cover over a thousand acres of hill and valley. The place is thoroughly improved, and the visitor will find every arrangement provided for his comfort and recreation while sojouring there. Among the attractive features should be mentioned the excellent bathing facilities, both tub and plunge. There is also a swimming bath measuring one hundred and fifty feet in length by fifty feet in width, and with a depth of water varying from four to ten feet. *James K. Crook.*

NAPHTALIN.—Under the title *Naphtalinum*, Naphtalin, the United States Pharmacopœia makes official the hydrocarbon *naphthalene* ($C_{10}H_8$), known also by the common name of "tar camphor." Naphtalin (to use the pharmacopœial spelling), like benzene, is the fundamental member of a series of aromatic compounds. Naphtalin is a common constituent of tars, and is obtained from coal-tar by fractional distillation. Naphtalin, when purified, presents itself in large, colorless, crystalline, rhombic plates of a pearly lustre and an unctuous feel. It has a burning taste and a faint peculiar odor. It is insoluble in water, but dissolves in alcohol, ether, benzene, oil of turpentine, glacial acetic acid, and warm oils, both fixed and volatile. It melts at 80° C. (176° F.) and boils at 218° C. (424.4° F.), but yet sublimes at a much lower temperature than that of its boiling-point, and, mixed with boiling water, rises in vapor with the steam. Even at ordinary temperatures a gradual sublimation occurs. It should be kept in well-stoppered bottles.

Naphtalin is, locally, but slightly irritant, and constitutionally is not ordinarily poisonous—probably because of incomplete absorption due to its insolubility in aqueous fluids. Yet naphtalin is decidedly "antiseptic" in the common medical sense of the word. Taken internally, some absorption certainly occurs, since naphtalin, swallowed, reappears in the urine. Naphtalin has been used in medicine to prevent decomposition of the urine in cystitis, by administration, by the mouth, of an aggregate of five grains daily; but its main use internally has been for local antiseptic purposes in the intestinal canal, as in diarrhœa and dysentery, and as a vermifuge. It has been vaunted also as an expectorant in bronchitis and as a constitutional remedy in typhoid fever. The ordinary dose ranges from 0.13 to 1 gm. (gr. ij. to xv.), and, because of the disagreeable taste, the medicine is best given in capsule. A case of poisoning—an exceptional circumstance—has been reported from the taking of a dose of eight grains; and it is certainly risky to give much of the drug if there be any kidney disease or weakness. As an anthelmintic for the "seat-worm," naphtalin may be given by enema, in sweet oil (1 gm. in two or three tablespoonfuls of the oil). For ordinary internal uses naphtalin has been largely supplanted by naphtol.

Externally, naphtalin has been used for the making of antiseptic dressings in surgery. In this application naphtalin combines the features of a fair degree of efficiency on the one hand, and freedom from irritant or poisonous effects, and from offensive smell, on the other. The only untoward effects charged against naphtalin so far have been that the sharp points of the crystals may wound tender granulations, and that the powder may cake with fluid exudates, and so tend to obstruct the free drainage of discharges. Most reporters upon the use of naphtalin in surgery, however, have failed to observe either of these effects. Naphtalin may be applied in bulk, in fine powder, to wound surfaces, or by means of gauze or wool charged with the substance, by the device of steeping the dressing in a strong solution of naphtalin, and then permitting the solvent to evaporate. By this means a porous material becomes thoroughly impregnated with a fine powder of the hydrocarbon. A common solution for the making of such dressings is a twelve-and-a-half-per-cent. solution of naphtalin in a mixture of alcohol and ether in equal proportion. [See also Naphtalin in the article on *Antiseptics in Surgery.*] *Edward Curtis.*

NAPHTO-CRESOL is an alcohol-soluble substitue for creolin. *W. A. Bastedo.*

NAPHTOFORMIN is a condensation product of alpha- and beta-naphtol with formaldehyde and ammonia. It is an insoluble powder, and, being readily split into its components, is a powerful antiseptic for use in surgery. *W. A. Bastedo.*

NAPHTOL.—By the substitution, in the molecule of the hydrocarbon *naphthalene*, of a molecule of hydroxyl (—OH) for one of the atoms of hydrogen, a derivate, $C_{10}H_7.OH$, is obtained, bearing precisely the same relation to naphtalin that common phenol ("carbolic acid") does to benzene. Such derivate is styled *naphthol*, and according to the position in the naphtol molecule of the hydroxyl substitution, two distinct naphtols are obtainable, known respectively as *α-naphthol* and *β-naphthol*. Of these two bodies *β-naphthol* is the more easily made, and is the article used in medicine. It is official in the United States Pharmacopœia under the title and spelling *Naphtol*, Naphtol.

The common naphtol of the markets is an impure article, occurring in reddish or deep violet-brown crystalline masses of a disagreeable, pungent smell. Such a naphtol, because of the poisonous nature of some of the impurities, needs purification for medicinal use. Properly purified, naphtol presents itself in beautiful silver crystalline scales, nearly or entirely odorless, but of a sharp, burning taste. The crystals are very slightly soluble in water (in about one thousand parts of cold, and in seventy-five parts of boiling water), but dissolve freely in alcohol, ether, chloroform, benzol, and oils. Gently heated, naphtol sublimes, and may be distilled with steam. It should be kept in dark amber-colored bottles, well stoppered. Naphtol is locally distinctly irritant, exciting upon tender surfaces redness, smarting, and even inflammation, and, upon the healthy skin also, if in *alcoholic* solution, acting occasionally with sufficient energy to develop an eruption resembling nettle-rash. Solutions in oils or fats, however, are said to be without effect upon the sound skin, although acting energetically upon an eczematous surface (Kaposi). *Constitutionally*, naphtol, in therapeutic doses, produces but little derangement. Some experimental dosings of animals have been followed by hæmoglobinuria, with convulsions and death, and, in one instance in the human subject, an external application of naphtol produced hæmaturia, ischuria, unconsciousness, and eclampsia (Kaposi). But since these effects are exceptional, it is likely that the samples used in the cases cited were not pure. Ordinarily doses of from 0.20 to 0.32 gm. (gr. iij. to v.), given a number of times daily, are innocent of harm beyond some possible disturbance of the stomach. The medicine therefore ranks among the non-poisonous, and its value lies in the fact that while it is thus non-poisonous to the human system it is yet quite potent to arrest the development of many micro-organisms. It is said to be five times as powerful in this regard as carbolic acid. Naphtol is accordingly used as an internal medicine to disinfect the alimentary canal, as in cases of diarrhœa, dysentery, intestinal dyspepsia, and especially in typhoid fever, in which disease its efficacy was first proclaimed by Bouchard. The doses are those already mentioned. The article is also used as a local application in many skin diseases, notably *scabies*, *psoriasis*, and *eczema*. It is commonly applied in ointment ranging in strength of naphtol from one-half to ten per cent., or even fifteen per cent. The remedy should not be used upon denuded parts, and weak applications only should be made to irritated parts such as so commonly present themselves in eczema.

For *iodonaphtol*, see under the caption *Di-iodo-beta-naphtol*, in Vol. III. *Edward Curtis.*

NAPHTOL ARISTOL. See *Di-iodo-naphtalin.*

NAPHTOL BENZOATE is benzonaphtol (*q.v.*).

NAPHTOL BISMUTH, orphol, basic beta-naphtol bismuth $[(C_{10}H_7O)_3\,Bi]_2 + Bi_2O_3$ or $(C_{10}H_7O)_3\,Bi + 3H_2O$, is a neutral, non-irritating, light-brown powder of very slight odor and slightly aromatic taste. In the intestines and to some extent in the stomach orphol is split up into its components, bismuth oxide and beta-naphtol, and so acts as an intestinal sedative and antiseptic in diarrhœa, dysentery, and intestinal putrefaction. The dose is 0.5 to 1 gm. (gr. viij. to xv.), usually given in capsule. Chaumier gave 5 gm. (gr. lxxv.) a day to young children without ill effects. In such large doses probably most of the drug passes through unchanged. Orphol is also applied externally as an antiseptic dusting and drying powder for impetigo, herpes, etc., and has been used locally in gonorrhœa and other mucous-membrane inflammations. *W. A. Bastedo.*

NAPHTOL CARBONATE, $(C_{10}H_7O)_2CO$, is a di-naphthyl ester of carbonic acid prepared by acting on beta-naphtol sodium with phosgene gas. It occurs as shining colorless scales which are insoluble in water. Recommended as a non-irritating intestinal antiseptic in dose of 0.12 to 1 gm. (gr. ij. to xv.). *W. A. Bastedo.*

NARCEINE. See *Opium.*

NARCOTINE ($C_{22}H_{23}NO_7$).—Narcotine is, next to morphine, the most abundant alkaloid of opium, varying widely in percentage, both in different varieties and in different lots of the same variety. The amount has been reported as low as one per cent. and as high as ten per cent. It occurs in colorless, shining, acicular or prismatic crystals, melting at 176° C. (349° F.), almost insoluble in water, soluble in 100 parts of alcohol, 35 parts of ether, 2.7 parts of chloroform, 22 parts of benzene, and rather freely in hot acetic acid, by which it is usually extracted. It is only faintly basic and its salts are not crystalline. It is not bitter, but its salts are so, and are at the same time acid. Sulphuric acid turns it, after a time, to a yellow, changing to orange and red; the same, mixed with nitric acid, turns it blood-red. It is decomposable into meconin and *cotarnine* ($C_{12}H_{13}NO_3$), the latter far more strongly basic than narcotine itself. Various other substances are obtained from it by different methods of treatment, but they are not of importance except from a chemical standpoint.

Crawford and Dohme (Proc. Amer. Phar. Assn., 1902) report experiments on warm-blooded animals, showing that it produces a fall in blood pressure and slowing of the heart, accelerated but weakened respiration, diminished saliva by small doses, increased by large doses, an anodyne effect upon the intestine, prompt and marked diminution of the urine, and a diminished size of the kidney. Partial elimination through the kidneys and stomach was observed, but none from the bowels, at least not as narcotine. Similar symptoms have been observed in man, together with profuse diaphoresis. The alkaloid, if pure, is in no sense a narcotic, for which reason the name "anarcotine" has been proposed for it, though it does not seem wise to introduce this element of confusion.

Therapeutically, narcotine is an antiperiodic, recognized as of considerable value in five-grain doses. Fortunately, since it is used in such large doses, its weakly basic character renders it easily freed from the associated active alkaloids, a character to which careful attention should of course be given. It is a valuable stomachic and digestive tonic in one- or two-grain doses three times daily.

Narcotine has been considerably employed as a secret remedy for the cure of the alcohol and other narcotic habits. Ebert reports many such cases cured or benefited through its use, and his results are confirmed by Schulte. The form of administration in these cases was a grain hourly. No harm resulted from the use of a gram or more per day, beyond the temporary loss of the appetite for food, followed later by an increase of appetite, and by weakening, amounting in some cases to semi-prostration, from the profuse perspiration. *Henry H. Rusby.*

NASAL CAVITIES: ANATOMICAL RELATIONS AND RHINOSCOPY.—I. Anatomy.—The nose forms the commencement of the air tract, and is composed of two large air channels in the centre of the face. The lower portion of this tract is used to convey air; the upper portion has distributed throughout its mucous membrane the terminal filaments of the olfactory nerve; while the whole cavity is employed in voice production.

The nose is divided into the external nose and the nasal cavities. The nasal cavities are separated from one another by a thin partition of bone and cartilage, called the septum. Each nasal cavity is surrounded by a set of accessory cavities, all of which communicate with the nasal cavity. In considering the anatomy of the nose, we find that three divisions may readily be made: (1) The external nose; (2) the nasal cavities; (3) the accessory cavities of the nose.

1. *The External Nose.*—The external nose forms the pyramidal projection in the centre of the face, extending from the brow to the upper lip. It is directed downward and forward. It is composed of bone, cartilage, and muscles which are covered externally with the facial epidermis and internally with the nasal mucous membrane.

The apex of the pyramid—the root of the nose, the radix nasi—joins the forehead; the lateral walls form by their junction the dorsum nasi, or back of the nose, which extends from the tip, the apex nasi, to the root of the nose; the lateral borders slope outward to form two wing-like leaflets, which are known as the alæ nasi or wings of the nose; the free edges of the alæ nasi form the outer borders of the two nasal orifices, known as the anterior nares, which are separated by a median pillar, or columna, the ponticulus nasi. The two anterior nasal orifices open downward and communicate with the vestibule of the nose, which is composed of that portion of the nose which is contained within the cartilaginous framework and extends from the anterior nasal orifice to the commencement of the osseous framework.

The walls of the nose proper are composed of the nasal bones and nasal spine of the frontal bone, the nasal processes of the superior maxilla, the premaxillary portion of the upper maxilla, the pars incisiva, and the lateral cartilages of the nose. The nasal bone articulates above with the frontal bone; its outer border articulates with the nasal process of the maxilla; while along their inner border, by their union, the nasal bones form a crest for articulation with the nasal spine of the frontal bone, the perpendicular plate of the ethmoid and the triangular cartilage of the nose. The outer surface of this bone is smooth; its inner surface presents a longitudinal groove for the nasal nerve. Lying external to the nasal bone is the nasal process of the maxilla, which articulates along its anterior border with the nasal bone, above with the frontal, and posteriorly with the lachrymal bone. Its external surface is smooth, while its inner surface presents two crests for the attachment of the middle and inferior turbinate bones. The pars præmaxillaris of the superior maxilla unites with its fellow below to form the lower rounded portion of the apertura pyriformis, the pear-shaped opening of the osseous nasal cavity. To the apertura pyriformis is attached the lateral cartilage of the nose, thus completing the outer portion of the external nose. The cartilages of the nose are the septal cartilage; the triangular, or superior lateral cartilages; the alar, or inferior lateral, cartilages; the accessory, or sesamoid, cartilages; and the accessory quadrate cartilages.

The cartilage of the septum is the most anterior structure of the septum, and is irregularly quadrilateral in form. Its anterior inferior border is unattached, and lies above and behind the inner plates of the two inferior lateral cartilages, extending to the anterior nasal spine, which it embraces. Its anterior superior border is attached to the crest on the under surface of the nasal bone, and below the nasal bones the sides of its border are continuous with the superior lateral cartilages. Its posterior superior border is in contact with the perpendicular plate