ently not active. Areca also contains fourteen per cent. of fixed oil, much tannin, and some resin. Although the tænicidal properties of areca reside in the arecoline, which is given to horses for this purpose in doses of 0.03 to 0.06 gm. (gr. ss. to i.), this dose acting also as a cathartic, it is too poisonous for use in human practice. A solution of one-per-cent. strength is instilled into the human eye as a myotic.

Powdered areca is frequently given as a tænicide, in doses of 8 to 12 gm. (ʒ ij. to iij.). It also acts as an astringent, so that the usual accompaniment of a cathartic must be resorted to. *H. H. Rusby.*

ARGEMONE.—*Mexican Poppy.* Of these plants the most important thing that can be said is that they are eminently worthy of careful investigation. They were formerly regarded as constituting but a single species, but are now known to represent several. Of these, it is not certainly known which supplied the material upon which previous studies were based, so that we are able to speak only of the group in general. They are very widely distributed through the tropical and warm parts of America, as well as widely introduced into Africa and tropical Asia. The plants are of striking appearance, two or three feet high, with large, broad, glaucous, prickly-toothed leaves, large poppy-like white or yellow flowers and prickly capsules. On being wounded, they exude a thick yellow juice. They grow in great abundance in waste places and over dry sterile soil. They have been used medicinally in the form of an extract of the whole plant, of the expressed juice, of the seeds, and of the oil expressed from the seeds. The juice has been ignorantly used in venereal diseases, and instilled into the eye for conjunctivitis. This juice contains in very small amount an alkaloid which is believed to be morphine. The fixed oil of the seeds, yielded to the extent of about thirty-six per cent., has received the most attention. It has been clearly shown to be mildly cathartic, without bad effect, in doses of four to five grams, and to form a tasteless and not unpleasant substitute for castor oil. Taken in larger doses it and the seeds are emetico-cathartic, with the symptoms of local irritation. *H. H. Rusby.*

ARGYRIA, ARGYRISM, ARGYROSIS, ARGYRIASIS—the terms applied to the discoloration of the skin and certain other tissues of the body resulting from the long-continued medicinal use of soluble silver salts, and caused by the deposit in the affected tissues of metallic silver, or some of its lower compounds, in a state of minute subdivision.

Clinically the condition is characterized by a slaty or grayish-brown, or in the most severe cases, by a bluish discoloration of the skin, conjunctivæ, and visible mucous membranes. The internal organs, with the exception of the central nervous system, suffer a similar pigmentation. The discoloration of the skin appears to vary in different regions, being less intense where the horny layer is thick, as in the palms of the hands and soles of the feet; and of greater intensity where the horny layer is thin. The hair and nails are not affected, but the bed of the latter is usually deeply pigmented. Scars formed before or during the period when the silver was taken are pigmented, but those formed after the cessation of its use remain white. The apparent intensity of the pigmentation also varies with the temperature of the surface of the body, being most marked in the cold, and greatly decreased when the skin is warm and flushed.

The pigmentation increases as long as the internal use of the silver salt is kept up. Its degree and extent are in direct proportion to the amount used and the period of time through which its administration is extended. It is essentially a chronic process. The discoloration never disappears, and it is doubtful if the silver deposit is ever removed from the body, though it has been claimed in a number of instances that after the lapse of years a decrease of the color has taken place. (See author's case mentioned below.)

The condition has been known since the alchemistic period when the internal use of silver salts was very popular, and descriptions which undoubtedly refer to argyria exist in the literature of that time. The first case mentioned in medical literature is the one observed by Schwediauer and reported by Fourcroy in 1791. In the early part of the nineteenth century numerous cases were described, and the number of these increased greatly about the middle of the century when the use of silver nitrate in epilepsy and tabes reached its greatest popularity. At that time a generation of individuals affected with argyria may be said to have arisen, and frequent examples of the condition came to the post-mortem tables of the great European hospitals. That generation has now practically disappeared, and cases of general argyria resulting from long-continued use of silver salts are to-day of very rare occurrence. The present cases of argyria are for the greater part localized discolorations resulting from local medicinal applications of silver nitrate, or from absorption through the skin or respiratory tract of silver dust, as in the case of workmen who file, grind, or polish the metal. Three forms of argyria may be distinguished clinically: *argyria universalis, argyria localis circumscripta, argyria localis disseminata.*

Argyria Universalis.—The condition of universal pigmentation of the skin and mucous membranes is caused by the long-continued internal use of silver nitrate. The discoloration develops independently of any pre-existing condition of the skin or body tissues, and its intensity is in proportion to the amount of silver absorbed and the period of time covered by its administration. As a rule the pigmentation appears several months after the use of the silver is begun, and develops slowly. As the discoloration is usually not observed until it has reached a certain degree of intensity, it is impossible to speak with certainty of the exact course of the pigment deposit. It has been claimed that a blue or violet line on the gums is the earliest symptom, but this does not occur in all cases. The degree and extent of the pigmentation of the skin varies in different cases: the face, thorax, and abdomen may show it earliest and to the greatest degree, while the extremities may remain unaffected. The mucous membranes may show no discoloration in intense argyria of the skin; while on the other hand a marked degree of pigmentation may exist in the internal organs without any great change in the skin. A metallic odor of the breath accompanied by a stomatitis with or without salivation has been described, but the occurrence of these symptoms is very rare or doubtful. There are no symptoms coincident with or following the condition that can be said to be the direct result of the deposit of the pigment.

The total amount of silver nitrate which must be taken in order to produce a well-marked case of argyria varies greatly, the lowest limit being placed at 25 to 30 gm. The administration of the metal must be extended through a considerable period of time. Large doses given within short periods produce symptoms of poisoning without the deposit of pigment, while minute doses administered for many months or years produce the most intense discoloration. Liouville reported a case in which the total amount of silver nitrate used was only 7 gm., but there resulted an intense argyria of the internal organs, the skin over the abdomen alone being slightly discolored. The same writer also claimed to have seen in another case the appearance of the blue line on the gums after the use of thirty pills each containing 0.01 gm. of silver nitrate. The skin in this case was not affected. It is, of course, evident that it is the amount of silver absorbed and not the amount taken into the body that influences the degree and extent of pigmentation. With the minute doses of silver nitrate now given and the relatively short periods of administration there is but little danger of the production of argyria; but if the salt is given for any considerable period, the possibility of its occurrence must always be borne in mind and the patient duly informed.

A general argyria may also be produced by the local absorption of silver nitrate, as in the long-continued use

of applications of the salt in affections of the throat, eye, and urethra. Lavage of the stomach and large intestine with dilute solutions, when continued for long periods of time, may also lead to general pigmentation. These cases are very rare. Neumann observed a case in which after twelve lavages of the stomach with a solution of 1.45 gm. of silver nitrate to 90 of water, an intense argyria of the skin of the face, head, neck, thorax, and back was produced. The skin of the extremities was but slightly discolored, and the mucous membranes remained normal. In a case observed by the writer the daily irrigation of the colon with a one-per-cent. solution of silver nitrate led in eighteen months to a very marked grayish-brown discoloration of the entire skin, which was most intense over the face and extremities. The patient was a lad of fourteen years, suffering from a chronic ulcerative colitis following measles. At the beginning of the treatment there was present a severe grade of anæmia with very marked pallor of the skin, the condition having persisted for about two years. There were also very severe nutritional disturbances with stunting of growth and delayed puberty. After six months he had so improved that he was allowed to go home. At this time no discoloration of the skin was noticeable. The treatment was continued during his stay at home, and when he returned three months later the pigmentation of the skin was the first thing noted, although neither the patient nor his friends had observed it. The visible mucous membranes, especially those of the anus and rectum, were also discolored, but no line could be seen upon the gums. The treatment was continued for about nine months longer. During this time the discoloration of the skin increased. He was then discharged as cured. Six years after, he had become very stout, having matured rapidly. The pigmentation while still present had so decreased in intensity that the patient declared that it had entirely disappeared. It is probable that the total amount of silver in his body had not decreased, but that the increase of tissues made it less prominent. Continual exposure to atmosphere laden with silver dust, as in the case of silver grinders and polishers, may lead to a general argyria through absorption from the lungs (see below).

There are no other pathological changes associated with general argyria that can in any way be said to be secondary to it. Œdema of the skin and degenerative changes in the kidneys have been thought to be caused by the deposit of the pigment, but there is no definite evidence to this effect. Large or frequently repeated doses of silver nitrate may lead to a severe gastritis or even to ulceration of the stomach. Death may result from very large amounts, as in a case reported by Scattergood of a child whose death was caused by the accidental swallowing of a portion of a stick of the nitrate which had been used for painting the throat.

Argyria Localis Circumscripta.—The local absorption of silver may result from the continued use of nitrate of silver applications in solution or in the solid stick to mucous membranes or to a wound surface. The single application of the salt leads usually to a precipitate, which is cast off with the superficial slough; but after repeated applications the salt penetrates more deeply into the subepithelial tissues, where it is chemically changed and precipitated in the form of minute black granules, which, according to their number, lead to a greater or less pigmentation. The discoloration is confined to the seat of application and is as permanent as that of general argyria. Such local pigmentations may occur in the conjunctivæ, urethra, throat, gums, tongue, etc. In very rare cases the local condition has been followed by general argyria. This is most likely to occur in the treatment of chronic affections of the mouth and throat, where some of the silver application may be swallowed and absorbed through the stomach.

Argyria Localis Disseminata.—In workmen who are engaged in cutting or polishing silver there may appear in the exposed portions of the body, most frequently in the hands and arms, grayish or bluish spots. These may also appear in the face. The spots are pale in the beginning, but gradually increase in intensity and remain unchanged throughout the life of the individual. The pigmentation develops from small particles of silver which either penetrate or are rubbed into the skin. The condition is said to be not so frequent in silver polishers as in workmen who cut or grind the metal. Long-continued exposure to an atmosphere laden with silver dust may lead to absorption of the metal through the respiratory tract and to a general argyria. Such an occurrence can be explained only by the assumption that the silver particles taken up by the lung are dissolved, and passing into the general circulation are precipitated in other parts of the body in the shape of fine black granules. As a support to this view is the fact that silver cannulas, when kept in tracheotomy wounds for long periods of time, show signs of gradual dissolution.

Microscopical Appearances.—In general argyria the pigment appears microscopically as very fine black granules which are deposited in the connective-tissue stroma near the walls of the capillaries; and may be found in the dermis, mucosa of the mouth, larynx, and intestine, kidney, intima of the larger vessels, adventitia of the smaller ones, mucous glands, peritoneum, testicles, bone marrow, liver, spleen, lymph glands, and choroid plexus. The epithelial structures, brain, cerebral vessels, muscle fibres, cartilage, bone, hair, and nails are not affected.

In the skin the deposit of the pigment is most marked in the stroma of the papillæ just beneath the rete, and around the glands. Toward the subcutaneous tissues the pigmentation decreases in intensity. In the intestine the basement membrane of the mucosa, the connective tissue of the mucosa and submucosa, together with the lymphadenoid structures, show the pigmentation in the greatest degree. In the kidneys the deposit is greater in the glomeruli, especially about the afferent vessels, and occurs to a much less degree in the intertubular connective tissue. In the liver the pigment is found in the connective tissue about the blood-vessels and bile ducts and in the intima of the larger branches of the hepatic veins. Of the other organs, the mesenteric glands, the spleen, and the testicles show the greatest intensity of pigmentation.

The microscopical sections of the spots found in the skin of silver workers present a somewhat different appearance from that of general argyria. The process is analogous to that of tattooing: the small particles of silver which have been rubbed into the skin become surrounded by a connective-tissue capsule. As a rule the silver granules are larger than those found in general argyria. In the neighborhood of the larger particles smaller granules are found scattered throughout the connective tissue, and the elastic tissue of the papillæ and corium is colored brown or black by a very fine precipitate of silver granules similar to that found in general argyria. As in the latter condition, these granules are most abundant just underneath the rete. Fig. 273 shows a section taken from such a silver spot. The elastic tissue network of the papillæ and corium contains throughout a fine precipitate of silver granules, while coarser granules are seen at the periphery of the papillæ and scattered through the corium.

With the exception of the connective-tissue increase found in silver spots the presence of the pigment granules does not seem to lead to any secondary pathological change. It has been claimed that interstitial nephritis has followed the deposit of the pigment in the kidneys, but it is much more probable that the two processes were coincident or wholly unrelated.

The problems of the pathogenesis of argyria remain at the present day unsettled. Animal experiments have aided but little in the solution of the question, as the artificial argyria produced in animals differs very greatly in its localization and intensity from the argyria of the human body. Concerning the pathogenesis of the latter various views are held. The oldest of these is the one introduced by Kramer and supported by Frommann, which holds that the silver nitrate taken into the body is

changed by the stomach and intestinal juices into a soluble silver albuminate, which is absorbed from the intestines into the circulation and is ultimately passed with the lymph through the walls of the blood-vessels into the tissues, where it is precipitated in the form of fine granules.

Opposed to this view is the theory supported by Virchow and Riemer that the silver nitrate is reduced in the intestinal tract and taken up from the latter place in the shape of fine granules, partly through the lymph and partly through the blood, into the general circulation, where by metastasis these are deposited in various parts of the body. Jacobi showed that the reduced particles of silver cannot penetrate the epithelium of the intestine,

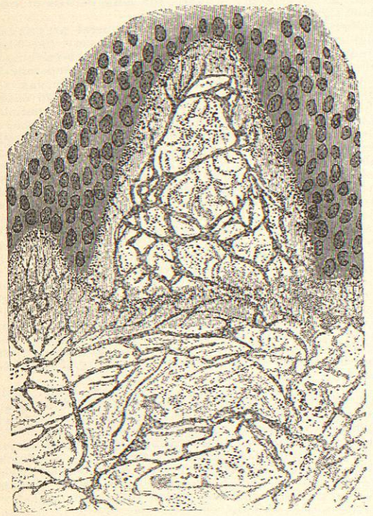

Fig. 273.—Section of Silver Spot of Skin from Case of Disseminated Argyria (silver-workers' argyria). (After Lewin.)

and further proved experimentally that the greater part of the silver nitrate taken into the body is not reduced in the intestine, but is changed to silver chloride and albuminate, and absorbed as such, the reduction taking place in the tissues. Loew held that the reduction of the silver held in solution in the circulating blood is the result of the action of living cell-protoplasm, most probably that of the endothelium. On the other hand, Kobert holds that the reduction takes place only in certain organs—the liver, kidneys, papillæ of skin, and intestinal wall—and that the reduced silver is carried elsewhere by leucocytes, for the greater part to the spleen, lymph glands, and bone marrow, where it is ultimately deposited in the connective tissue. Through the agency of the wandering cells containing silver granules a part of the silver may be removed from the body. The reduction in the wall of the intestine he holds to be due to the absorption by the intestinal wall of certain gases, hydrogen and hydrogen sulphide, which are formed in the intestinal tract by the growth of anaërobic germs, the hydrogen leading to a reduction of the silver, and the hydrogen sulphide to the formation of a silver albuminate suphide. The reduction of the silver in the papillæ of the skin Kobert holds to be due to or associated with the process of cornification, which he regards as a reduction process. He explains the fact that argyria in human skin is of so much more constant occurrence than in the skin of animals by the assumption that the process of cornification takes place to a much greater degree in human skin. This theory, however, does not receive the support of the actual facts.

In the light of our present knowledge the most reasonable hypothesis is that the silver is absorbed from the intestine into the general circulation in the form of a soluble albuminate which is taken out of the blood and reduced by the protoplasm of the endothelial or perithelial cells, and secreted by these cells into the neighboring connective tissue, where it may remain or be further transported by means of wandering cells. The deposit of the silver in certain parts of the body cannot be explained by the theory of simple metastasis, and as it has been established beyond doubt that the endothelium in different parts of the body has a selective action, it seems to the writer that the best hypothesis for the explanation of the pathogenesis of argyria is the theory of endothelial-cell activity.

The chemical nature of the fine silver granules in the tissues has not as yet been definitely determined. According to Kobert, the pigment is a loosely held organic compound of silver and presents the following reactions: the granules are insoluble in acetic and dilute mineral acids, fixed alkalies and ammonia; they lose their black color but do not vanish in strong nitric acid and in moderately strong solutions of potassium cyanide; the black color may be restored by means of hydrogen sulphide. Substances which decolorize the organic pigments have no effect upon the silver granules. If a piece of tissue heavily pigmented with silver is warmed with nitric acid until it loses its color and the acid then filtered off, the filtrate will contain no silver, the metal remaining in the decolorized tissue. Other investigators hold that the pigment is metallic silver or a low oxide (AgO_2 or AgO_3).

The amount of silver deposited in the tissues is very small compared to the amount taken into the body. Experimental analyses of tissues showing a high degree of argyria have yielded only minute quantities of silver. Frommann obtained from 760 gm. of liver which had been preserved in alcohol only 0.009 gm. of silver chloride, equalling 0.0068 gm. of metallic silver. Versmanns found the same amount of metallic silver in 14.1 gm. of dried liver, and in 8.6 gm. of dried kidney 0.053 gm. of the metal.

Since the silver pigment is deposited in the connective tissue outside of the vessels, its complete removal during the life of the affected individual is very improbable. Through the agency of wandering cells a very slow removal may take place, but it is doubtful if in well-marked cases this leads to any noticeable decrease in the degree of pigmentation. Cases of recovery have been reported, but they are doubtful. Rogers affirms that blistering will lighten the color very much, and Eichmann claims to have produced a cure by means of potash baths. Yandell has reported two cases in which large doses of potassium iodide were given in connection with mercurial vapor baths for several months in the treatment of syphilis with complete cure of the existing argyria, the pigmentation fading very gradually. In spite of these reported cures the great majority of cases are unaffected by treatment, and the affected individual carries his pigmentation to the end of his life. In cases similar to the one reported by the writer in which the argyria is produced at an early period of life before puberty, the later increase of tissues may lead to an apparent decrease in the intensity of the pigmentation.

Aldred Scott Warthin.

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ARISTOL—$C_{20}H_2O_2I_2$, is the registered trade name of dithymoldiiodide. The pure drug has been introduced to the profession under the title *Thymol Iodid* to escape the registered name. It is prepared from thymol, $C_{10}H_{13}HO$, by substituting two molecules of iodoxyl, IO, for two of hydroxyl, HO. It contains forty-five per cent. of iodine. A moniodide and a triiodide have also been prepared. The latter has been called *annidalin*, and is used for the same purposes. Aristol may be made as follows: one and a quarter drachms each of thymol and caustic soda and one and a half drachms of potassium iodide are gently heated with enough distilled water to make one ounce four and a half drachms, and then cooled. This solution is added to eight ounces of a concentrated solution of hypochlorite of soda and agitated. The solution is then filtered, and the precipitate washed with water and dried.

It is a light, reddish-brown powder, with a very faint odor, insoluble in water and glycerin, slightly soluble in alcohol, soluble in ether, collodion, and oils. It should be carefully preserved, as it is decomposed by light and heat.

Therapeutically it is recommended for the same purposes as iodoform, but it is less active and not so reliable as an antiseptic in surgical work. Its advantages are that it is devoid of the disagreeable odor, and does not possess the toxic properties of the latter drug. It has been used in the treatment of eczema, psoriasis, scabies, chronic inflammation of the mucous membranes of the nose and pharynx, erosions of the os uteri, condylomata, granulating wounds, and ulcerating surfaces. It possesses the power of causing rapid cicatrization in a marked degree, and has proved of greatest service in the latter class of cases, particularly in the treatment of burns and varicose ulcers. In lupus, tuberculous and syphilitic ulcerations it was supposed to possess specific powers, but experience has not supported this view.

The powder is best applied by dusting on the part, or by insufflation; it may be used as an ointment, one part in ten, or dissolved in ether or collodion.

As it is partly eliminated through the lungs, it has been used in phthisis by hypodermic injections of a one-per-cent. solution in sterilized oil of sweet almonds. It is said to lessen the cough and night sweats.

Beaumont Small.

ARISTOLOCHIACEÆ.—(*The Serpentaria Family.*) A small family of some five genera, widely distributed over the warm parts of the earth. A species of aristolochia produces one of the largest of known flowers, some five feet in length. Many species have been ignorantly reputed as antidotes to serpent poisons. Medicinally, the family, rich in volatile oils and resin, is well represented by Virginia, Texas, and Canada snake roots. Many species are used in native practice as vulneraries.

H. H. Rusby.

ARIZONA.—The climate of Arizona, being influenced both by the Rocky Mountains and by the Pacific Ocean, has some of the attributes possessed by the climate of New Mexico and also some of those belonging to the climate of Southern California; and, moreover, it has distinct climatic advantages different from those of any other State. The plain country of Arizona has not inaptly been called the Egypt and sometimes the Persia of America. The great continental divide traversing the western boundaries of New Mexico, along the 108th meridian of longitude, passes almost in a straight line from north to south. Westward of its summit the streams flow toward the Pacific Ocean, and the land drops down to the southwest corner of the Territory of Arizona by a series of steps with wide intervening plateaux.

A second great divide separates the waters of the Gila and Colorado rivers. Its main direction is along latitude 35°. Starting from the point where latitude 34° meets the New Mexican boundary, it crosses the territory till the San Francisco Mountains north of Flagstaff are reached. The main direction of the mountain axis of Arizona is from northwest to southeast. "The axis of the mountain system of Arizona is remarkably well defined and appears with the utmost distinctness, not only in the general trend of the main mass of the elevation, but also in minor ranges and notably in detached spurs, often widely separated from the plateau system, to which, on the score of altitude, they may claim to belong." *

From the valley of the Rio Santa Cruz, starting from a mesa 2,000 feet high, no less than fifteen peaks ascend to an altitude of upward of 3,000 feet. In the Gila valley, springing from benches of 1,000 to 3,000 feet elevation, are a dozen buttes from 1,000 to 2,000 feet in height. From a plateau of 5,000 feet mountains rise from 7,000 to 9,000 feet in height, the highest being a group called the San Francisco Mountains with its three peaks—Humphrey, Agassiz, and Humboldt—which approximate an elevation of 13,000 feet above sea-level.

The air of Arizona receives its humidity almost entirely from the Pacific Ocean. The prevailing southwest winds, laden with moisture from this vast expanse of salt water, strike the broadside of the elevated land at a right angle, because of the uniform trend of the mountain axis, so that "the passage of the rainy winds across Arizona is by no means an easy gliding over an inclined plane, but the laborious ascent of a flight of steps" (Captain W. A. Glassford).

The variations in the meteorological conditions of Arizona are much influenced by its topography, which is conveniently arranged under three divisions: the plain, the pro-plateau, and the plateau.

The Plain.—"This embraces about one-third of the territory which lies to the south and west below the level of 3,000 feet, and includes most of the desert country that has given Arizona its unenviable reputation for heat and discomfort. On this low plain the rainfall is only from two to six inches during the year, and, including the desert on the California side of the Colorado River, the records approximate the absolute minimum of rainfall of the world." †

Here we have a striking resemblance to the valley of the Nile: rivers with rich alluvial soil along their bottoms, where under irrigation all kinds of crops and fruits will grow; while on their borders is the dry, sandy, soil of the desert. This plain country is too hot in summer save for those who in their habits resemble the salamander. In winter, on the other hand, the genial warmth, the brilliant sunshine, the rainless skies, and moderate elevation give a climate as delightful as that of the far-famed countries of Egypt and Persia.

The pro-plateau stands at an elevation of from 3,000 to 5,000 feet. "It closely follows the axial inflection of the mountain system, although its continuity is somewhat interrupted by the more or less detached spurs of its higher neighbor. Across the central portion of the Territory it preserves, with considerable uniformity, a mean width of less than 100 miles. Widening at the cañon of the Gila, it covers the whole southeastern corner of the Territory" (Captain Glassford). In this latter portion of the pro-plateau are mountains which rise to a height of 2,000 feet above it, and which exert a powerful influence upon the precipitation. In this region the country is greener, more picturesque, with mountain cañons and valleys, and a greater rainfall than in the plain country. The plateau covers more than half the Territory, having

* Report on the climate of Arizona by Captain W. A. Glassford, Signal Corps, U. S. A., 1890.
† "Handbook of Climatology," S. E. Solly, M.D. Lea Brothers, Philadelphia, pp. 288–289.

an average elevation of 5,000 feet. On account of the two mountain systems near which it lies, this division is the one in which the rainfall is heaviest, being from ten to twenty inches.

Arizona differs from New Mexico and Colorado in that it has two rainy seasons. The summer rains which fall during July, August, and September are local in character, due to the influence of the mountains; they usually occur in the form of heavy afternoon showers, during which an inch of rain will not infrequently fall.

In October and November the rains do not altogether cease, but are light and infrequent. The winter rainy season begins in December and terminates in February.

"These rains are caused by the proximity of approach of great storms in low-pressure areas which form a part of the storm system of the country at large. . . . They are moderate in force and are interrupted by the anticyclonic types of high barometer and cloudless skies which are distinctive of the Pacific coast weather" (Captain Glassford).

Most of the precipitation on the mountains comes in the form of snow, and it remains there till summer; but on the plains it usually manifests itself as rain.

March, April, May, and June form the one dry season. This is in marked contrast to the spring weather of New Mexico and Colorado, which is comparatively moist. The winter rainfall is less than one-half of that of the summer season.

The number of cloudy days throughout the year, especially in the autumn, is about equal to that of New Mexico and Colorado, but in the plain country the number is decidedly less.

The wind movement is very small, especially on the plain.

"The belt of 50° F. or less mean annual temperature includes the northeast corner of the Territory above Fort Defiance. In the southern half of the Territory the mean temperature of 60° F. or more shades into the heat of the desert, with a mean annual temperature of about 70° and a monthly mean for July of 90° F."*

The night temperatures in the plain country are high, increasing the objectionable features of the summer climate for most invalids; and the dust which is irritating and abundant, is more particularly so in the summer, so that throughout the territory of Arizona the summer heat is peculiarly trying, except at an elevation of 7,000 feet and upward, when the altitude exerts more influence upon the temperature than does the latitude. It is not, however, fair to estimate the effect of the heat entirely by the height of the thermometer, because what Prof. M. W. Harrington has happily termed† "sensible temperature" has to be taken into consideration.

"The published temperatures for the different weather stations are the readings of the ordinary dry-bulb thermometer. The influence of evaporation is shown by what is called the wet-bulb thermometer, the bulb having a covering of cotton or muslin which is kept moistened. The consequent evaporation from the surface of this wetted bulb is similar to that of the human body from which the perspiration is evaporated, thus causing coolness. The temperature shown by the wet-bulb thermometer is called the 'sensible' temperature, and is supposed to be the temperature felt at the surface of the skin. As a matter of fact, it is probably lower, because the cloth covering the wet bulb is continuously saturated with water, while the surface of the skin is usually but slightly moistened, and is not subjected to such rapid evaporation. The wind is an important factor in sensible temperature, because if the air is in motion that portion which is in contact with the human body is continuously replaced by dry air, while if the air is stationary it becomes slightly warmed and more humid from heat and moisture of the body, and the amount of evaporation from the surface of the skin is necessarily less. The amount of the reduction or cooling of temperature is in direct ratio to the dryness of the air. It will be greatest where the air is driest, least where the air is most moist. The greater the depression of the dew point below the ordinary or shade temperature, the less the relative humidity; the drier the air, the more rapid the evaporation and the greater the consequent reduction of temperature. . . . This is true of all arid regions, where the difference between the dry and wet bulbs during the warmest and driest portion of the day will range from 20° to 40° F. or more."*

The great drawbacks to the present use of Arizona by invalids are the scarcity of the resorts and the generally indifferent character of the accommodations. The chief resorts at present available are given in the order of their elevation above sea level:

Yuma, elevation 140 feet, population 1,200, lies in the great Arizona desert on the banks of the Colorado River, some sixty miles from the Gulf of California. The winter climate is peculiarly mild, dry, warm, and pleasant, and it is here that the benefits of desert air are best exhibited; but, unfortunately, the accommodations and resources are at present not worthy of the climate. The summer climate is far too hot for most invalids.

Phœnix, elevation 1,100 feet, population 10,000, is placed about two miles from the Salt River and is the largest and most important city in Arizona. It has good hotels and accommodations and the general resources of a prosperous Eastern city. The broad streets are shaded by trees and the houses are surrounded by grass lawns. It has an agreeable winter climate, with the least wind movement, perhaps, of any resort of like elevation. Being a little higher, it is not quite so hot as Yuma, and also is not quite so dry, because of the extensive irrigation which goes on in the Salt River valley in which it is situated; but it is admirably adapted for winter residence for patients to whom a warm dry climate without altitude is suited.

Tombstone, elevation 2,300 feet, population 2,500, is situated on a high bench overlooking the San Pedro River. Its winter climate is good; its accommodations are only moderate.

Tucson, elevation 2,400 feet, population 6,000, being higher is more bracing and cooler than Phœnix, and combines the advantages of desert air with slight altitude. It is a thriving city with fair accommodations.

Castle Creek Hot Springs, elevation 2,300 feet, is a small settlement with good accommodations and fine bathing facilities. It lies in a spur of the Bradshaw Mountains and is a four hours' ride from the Santa Fé, Prescott and Phœnix Railway. Its winter climate is said to be very agreeable, but weather reports are not at present available.

Oracle, elevation 4,500 feet, is a small settlement of a few ranches where boarders are taken, and the accommodations are plain but good. It is a forty miles' stage ride over a good road from Tucson. The pine-clad mountains afford shelter from the north. It is free from dust and cooler and more bracing than Tucson, and is a beautiful country which is pleasant to ride through.

Prescott, elevation 5,300 feet, population 3,000, lies sixty miles from Ashfork upon the Santa Fé, Prescott and Phœnix Railway. It is surrounded by beautiful mountain scenery, and has adjacent high benches with pines and sandy soil where the residences should be; but the town is unfortunately situated on adobe soil in the river valley, and the accommodations are indifferent. The climate, however, is excellent, resembling that of Denver, combining the advantages of upland air with the warmth which comes from its low latitude. The temperature range and wind movement are much greater than at the places previously mentioned.

The appended tables are abstracted from the author's paper on the "Comparative Merits of Resorts in New Mexico, Colorado, and Arizona," presented to the American Climatological Association.† *S. E. Solly.*

* "Handbook of Climatology," Solly, pp. 292.
† Prof. M. W. Harrington: Transactions of the American Climatological Association, 1894.

* "Handbook of Medical Climatology," pp. 62–63.
† Transactions of the American Climatological Association for 1897.

ANNUAL AVERAGES.

	Elevation.	Latitude.	Soil.	Normal air pressure.	Temperature. Annual.	Temperature. January.	Temperature. July.	Humidity. Relative humidity.	Humidity. Absolute humidity.	Humidity. Dew point.	Humidity. Rainfall.	Number of cloudy days.	Mean monthly wind movement.
Colorado Springs, Col	6000	38.51	Gravel	24.03	47	26	69	50	1.84	29	14.4	57	6666
Prescott, Ariz.	5300	34.33	Sand and adobe	24.76	53	34	74	51	2.31	35	16	51	4898
Oracle, Ariz.	4500	32.50	Gravel	..	63	45	80	32*	....	26*	17.7	..	....
Las Cruces, N. Mex.	3800	32.17	Adobe	26.11	58	39	77	65*	....	47*	7	20	4948
Tucson, Ariz.	2400	32.14	Sand and gravel	27.45	69	50	87	42	3.25	44	12	57	3735*
Phœnix, Ariz.	1100	33.28	Adobe	28.77	69	49	90	45	3.5	42	7	52*	3379
Yuma, Ariz.	140	32.44	Sand	29.02	72	53	92	46	3.19	43	2.9	15	4317
Cairo, Egypt	90	30.31	Sand	....	72	54	86	61	5.42	58	.53	..	....

*1896.

	Spring Seasonal Averages. Seasonal temperature.	Night temperature.	Relative humidity.	Absolute humidity.	Rainfall.	Number of cloudy days.	Hourly wind movement.	Summer Seasonal Averages. Seasonal temperature.	Night temperature.	Relative humidity.	Absolute humidity.	Rainfall.	Number of cloudy days.	Hourly wind movement.
Colorado Springs, Col	49	32	46	1.81	4.5	20	11.8	67	51	50	3.62	7.2	11	8
Prescott, Ariz.	51	36	44	1.86	3.1	7	8.4	70	56	48	3.83	6.1	9	7.2
Oracle, Ariz.	60	48	..	....	1.5	..	....	78	68	..	....	6.5	..	....
Las Cruces, N. Mex	58	..	..	....	.4	18*	....	76	..	..	....	4.7	21*	....
Tucson, Ariz	62	47	37	2.27	1.2	5	5.3	82	69	40	4.65	5.4	12	5.1
Phœnix, Ariz.	67	..	33	2.23	.3	7	5.6	87	..	41	5.55	2.7	10	4.8
Yuma, Ariz	70	54	43	3.43	.3	4	5.7	89	..	43	6.18	.5	3	6.6
Cairo, Egypt	74	..	52	4.94	.13	..	....	86	..	51	6.84	..	..	....

*1896.

	Autumn Seasonal Averages. Seasonal temperature.	Night temperature.	Relative humidity.	Absolute humidity.	Rainfall.	Number of cloudy days.	Hourly wind movement.	Winter Seasonal Averages. Seasonal temperature.	Night temperature.	Relative humidity.	Absolute humidity.	Rainfall.	Number of cloudy days.	Hourly wind movement.
Colorado Springs, Col	48	34	54	2.05	2.0	13	8.2	29.0	17	50	0.94	0.7	13	8.4
Prescott, Ariz.	53	37	49	2.21	2.7	4	5.9	35	27	57	1.4	5	8	6.3
Oracle, Ariz.	65	54	..	....	5.6	..	....	45.2	37	..	....	4.1	..	....
Las Cruces, N. Mex	59	..	..	....	1.5	12*	....	43	..	43	1.37	1.17	11*	....
Tucson, Ariz	68	51	43	3.22	2.4	4	5.1	49	35	48	1.89	3	11	5
Phœnix, Ariz.	69	..	56	4.4	1.7	7	4.4	51	..	53	2.2	2.6	11	4.4
Yuma, Ariz.	73	57	46	4.04	.7	3	5.1	56	43	47	2.36	1.6	6	6.1
Cairo, Egypt	73	..	70	6.32	.3	..	....	58	..	70	3.57	....	..	....

*1896.
The wind and humidity of Phœnix are based on one year only.

ARM, THE.—The *arm* begins at the lower anterior margin of the axilla—the lower border of the pectoralis major muscle—and ends at the elbow joint, where the joint capsule joins the humerus before and behind.

The *skin* of the arm is similar in structure to that of other uncovered skin surfaces of the body, is thin, especially at the front and sides, loosely attached to underlying structures, and is free from large hairs.

The *superficial fascial layer* contains fat tissue that rounds out the contour in the well-nourished, and especially in the female and female art figure.

The *brachial fascia* (deep fascia) is derived from the deep fascia of the pectoralis major in front, and from the insertions of the teres major and latissimus and their sheaths behind; from a prolongation of the deltoid fascia on the outer side, and, through the axillary fascia, from the deep fascia of the serratus magnus, upon the inner side of the arm. Coming together from these origins these fasciæ join to form a thin but firm sheath from shoulder to elbow. Arising from the external condylar ridge of the humerus and passing outward to meet this sheath is the external intermuscular septum, which extends from the condyle to the deltoid tubercle. Arising from the internal condyle and the internal condylar ridge, and extending from the coraco-brachialis insertion to the elbow, is the internal intermuscular septum. These two septa divide the arm into two regions, the *front* and the *back*.

The *front compartment* of the arm contains biceps and brachialis; the coraco-brachialis being added at an upper-third arm section, and the brachio-radialis, and to a certain extent also the extensor carpi radialis longus, at a lower-third arm section.

The *back compartment* contains triceps and anconeus.

These compartments contain also their respective blood and nerve supplies. The musculo-spiral nerve passes backward, downward, and outward, with its accompanying superior profunda artery, through the interseptal space between the internal and external heads of the triceps, from a point high up in the back compartment. The musculo-cutaneous nerve passes forward, downward, and outward from the brachial plexus in the axilla, through the coraco-brachialis and between the biceps and brachialis above in the front compartment, the brachial artery supplying this compartment throughout. Still lower down in the arm, above the elbow, we have practically in the external intermuscular septum, the musculo-spiral nerve and the superior profunda artery, and within the enfolding of the internal intermuscular septum, the ulnar nerve and the inferior profunda artery.