known facts, viz.: 1. If through a transparent medium of some primary color we look at an object of the same color, the object will appear almost colorless; and 2, if we look at the same object through a transparent medium of its complementary color, the object will appear almost black. By the combination of these two facts, Mr. du Haumont evolved the anaglyph.

The colors used have, for good reasons, been changed somewhat from the true complementary shades.

In the present anaglyphs, the picture corresponding to the view of the right eye is printed with red ink, and will appear almost black when seen through the blue glass, which will be in front of the right eye, when the "anaglyphoscope" is held before the eyes; but this red picture will be invisible to the left eye, which is covered by the red glass of the instrument. In like manner the superimposed blue picture, which corresponds to the view of the left eye, will be visible to this eye only. Thus, each sees only one, its respective picture, and the two pictures, being superimposed in printing, require no prisms to produce the stereoscopic effect of binocular vision.

The instrument containing the media for looking at these pictures (and which has been given the name "anaglyphoscope") consists principally of two pieces of plane glass of different colors, which may be mounted either in eyeglass or spectacle frames, or in boards with hoods, like the familiar stereoscopes. It makes no difference how the glasses are mounted, for, provided only that the colors are of the right quality and shade, the pictures can be seen as well through the eyeglasses, which can easily be carried, as through the hooded scope, although the latter possesses the advantage of shielding the eyes from extraneous light.

The anaglyphs, like the half tones, are not entirely the products of photography, but require the aid and skill of the printer for their production; but the negatives from which the anaglyphs are produced can be made by any amateur or professional photographer. To enable all to understand how these negatives and pictures are made, a short description of the modus operandi is herewith given.

As before stated, it requires two negatives to produce stereoscopic pictures. Heretofore all stereoscopic negatives and pictures have been limited to the size with which you are well acquainted, and which rarely exceeds $3\frac{1}{2}$ inches each in width, because the pictures are printed side by side, and the centers or corresponding points of the pictures could not be placed much further apart than the distance between the axes of the eyes of the observer.

In the anaglyphs, the two pictures are printed one almost on top of the other, which makes it possible, therefore, to produce stereoscopic pictures the size of the largest camera or enlargement. In making these negatives, the camera is mounted on a sliding base on the tripod head, a specimen of which is here for your inspection. The camera is placed first at one end of the slide, from which point one exposure is made; then the camera is moved along the sliding base from 3 to 9 inches to the right or left, depending on the object, and another exposure is made of the same view from this second point, and on another plate. By giving equal exposures to both plates, a pair of matched stereoscopic plates is obtained, from which the half-tone plates are made with which the anaglyphs are printed in colored inks on the typographic press.

As stated before, the pictures are printed one over the other, not exactly superimposed, or in register, but so that one print shall be a little to the right or left of the other, the lateral edges overlapping. The two impressions are printed far enough out of register to produce the desired stereoscopic effect, and near enough to avoid double vision.

Recently, anaglyphic lantern slides and transparencies have been perfected, but I regret that, at present, I am unprepared to show them.

In conclusion, I wish to mention that the anaglyphic process can be applied also to objects and articles which are not either direct or indirect results of photography. This process is applicable, for example, to painted, woven and stenciled articles, such as ceilings, carpets, wall papers, floors, etc.

This process was patented August 20 of the present year, and may, in the future, find useful applications in many of the arts and industries.

DISCUSSION.

Mr. John Carbutt asked if it were not necessary to make both negatives in the same horizontal line or plane?

Mr. Watch explained that, inasmuch as our eyes usually are in the same horizontal plane, the negatives should be made so. There being no parallax in the vertical direction of the human vision, two negatives for stereoscopic pictures, made from two different points of elevation or in two different horizontal planes, would produce in the pictures the effect of vertical strabismus.

Mr. Carbutt remarked that, in one or more of the pictures exhibited, the two prints seemed to be out of register vertically as well as horizontally.

Mr. Watch explained that this was due to the careless manner in which the half tone plates had been trimmed.

TUBULAR PRISMATIC CRYSTALS.

By LYMAN F. KEBLER.

MONOBROMATED camphor furnishes us with crystals of at least two particular habits, prisms and scales. Exactly what it is that determines the habit of a crystal is not known. Experiments appear to indicate that impurities exert a powerful influence on the forms of crystals developed. The presence of sodium hydroxide in a solution of sodium chloride may cause the latter to crystallize in octahedra instead of the usual cubes, and the presence of the same agent in a concentrated solution of common alum conduces to the formation of cubes instead of the customary octahedra.

It frequently happens that a well developed crystal can be seen within a larger crystal, both being of the same form and composition. Occasionally we meet one form of crystal enveloping another form. Prof. Williams, in his admirable work on crystallography, cites a crystal of calcite of rhombohedral habit, in the center of which can plainly be seen a darker scalenohedron (Fig. 1).

The cavernous crystals (Fig. 2), or "hoppers," as

they are sometimes called, present another singular form of crystallization. These skeleton forms tend to develop when the crystals grow rapidly. Halite, galena and potassium iodide are commonly met with in this form. Mr. Foote, of this city, also showed me a shallow, cup-like crystal of vanadinite, which was, indeed, phenomenal. Irregularities of surfaces are often produced by corrosion subsequent to the formation of the crystals.

Hollow crystals of the following nature are occasionally met with: A crystal develops around a foreign substance of a less resisting nature. This foreign substance, in process of time, is removed by chemical or

FIG. 1.

FIG. 2.

physical agents, leaving a hollow crystal. Quartz crystals of this nature have been found.

Thus, we have examples of one crystal developing around another, crystals whose faces are cavernous, irregularities caused by corrosion, and hollow crystals, formed as described above; but, to my knowledge, no geometrical, tubular crystals—crystals that have developed around a void or their mother liquor—have ever been seen, at least never reported.

In the course of some investigation, I obtained a growth of hollow crystals of monobromated camphor. I have often crystallized the above substance, but never before nor since have tubular crystals been formed. To me they were full of curiosity, having in all my crystallographic studies never seen or heard of hollow crystals. Prof. Petree, in charge of mineralogy

FIG. 3.

at the University of Michigan, to whom some crystals were sent, reported that the specimens sent him were without parallel for hollowness.

The tubular crystals were obtained as follows: A given quantity of crude monobromated camphor was dissolved in an equal weight of hot benzine, one-fourth as much animal charcoal added as there was monobromated camphor, boiled on the water bath for about fifteen minutes, removed, vigorously rotated, so that the charcoal accumulated, cone-shaped, in the center of the bottom of the flask, allowed to cool and crystallize overnight. The crystals radiated in all directions from the cone-shaped charcoal (Fig. 3).

The tubular structure was observed by the mother liquor retreating from the hollow of the crystals while drying them on filter paper.

The prismatic crystals belong to the monoclinic

FIG. 4.

system; vary in length from 2.5 to 4.2 centimeters; in width, from 3 to 4.6 millimeters, and in thickness, from 1.5 to 3.1 millimeters. The cross sections of the crystals, as well as the cross sections of the orifices, are rhombs. The free ends of the crystals are terminated by single planes, inclined about 45°. A few crystals are terminated by two planes, one large and one small plane, forming, nearly, a right angle with each other. The supporting ends of the crystals are somewhat constricted, on account of the crystal aggregate, tapering, in several instances, on the narrow sides, for several

centimeters. This distortion of the crystal destroys the symmetry of hollow as well as that of the crystal.

Fig. 4 represents the various crystals in cross section and side views.—*Am. Jour. Pharm.*

[FROM THE SANITARIAN.]

THE THERMAL AND MUD BATHS OF ACQUI, ITALY.

By C. W. CHANCELLOR, M.D.

Mud baths and sulphur waters do not appeal to the imagination as anything extremely delightful, but the excellent although somewhat primitive arrangements of the establishments at Acqui, together with the care and experience of the attendants, serve to reduce these disagreeables almost to nil; and seeing that the methods of treatment now in use have been carried on here with great benefit to sufferers for centuries, and were indulged in by those excellent pioneers, the Romans, one is drawn to the belief that the advantages would greatly outweigh the drawbacks which the American valetudinarian must necessarily encounter in visiting this distant point.

The town of Acqui is situated in Piedmont, 550 feet above the level of the Mediterranean Sea, on the banks of the River Bormida, readily accessible from all parts of Europe, one hour from Alessandria, three from Turin, four from Milan and three from Savona, which is the principal junction between Nice and Genoa. It is convenient to Americans who winter in Italy on the Riviera, or in France, at Nice, during the winter season or in the spring, and also to those who spend the summer at the Italian lakes.

The great reputation of the thermal springs of Acqui dates from a very remote period, the Romans at the very commencement of their rule in Northern Italy having sought to turn them to good account. To this end they erected one of those superb public baths in which they delighted. This monument of Roman splendor was entirely destroyed by the iconoclastic hordes who ravaged the peninsula when the power of Rome had declined. That Acqui has in modern times been reinstated in the foremost rank of popular watering places is sufficient evidence of the value of the curative properties of the waters.

Owing to its situation in one of the great valleys of the Apennines, the air of Acqui is refreshed during the summer heats by cool breezes from the mountains and from the sea, which serve to moderate the temperature of the atmosphere during the summer. It thus possesses special advantages seldom found together—a warm temperature in the winter and a bracing air and genial climate during the summer months. The effect of a change to such a climate, on comparatively healthy people, is exciting and invigorating, promoting circulation, appetite and digestion and increasing the buoyancy of the spirits and the general energies of the system.

In the instance of the invalid, exhausted by organic disease, the probability of such excitement, the degree of which may be increased by the mobility which so often attends severe or long-continued action, may render inadvisable the removal to such an air as that of Acqui. This observation is, moreover, likely to be applicable to those who are suffering from the more acute morbid states, especially when attended by great mobility of circulation and great susceptibility of tissue. On the other hand, the mere debility and relaxation which are so often consequent upon the removal or mitigation of acute disorders, and the mixture of debility and congestive torpidity which often accompanies protracted convalescence, and which also attends indispositions of a chronic character, are much relieved by removal to the thinner and less oppressive atmosphere of this district.

The physical character of the country around Acqui may help to explain the comparative immunity which is enjoyed by the inhabitants from epidemic and endemic diseases. The dry and absorbent soil, assisted as this is by the somewhat elevated position, must conduce greatly to this result, by diminishing the amount of stagnant water and other sources of miasmatic impurities.

The town of Acqui, with a population of 12,000, is well drained and sewered, impurities being quickly removed from houses, streets and drains. It would be well if a security of this important kind could be obtained for every town and village in the United States; and it would be especially desirable if every watering place in Europe and America, the resorts of the toil-worn for recreation, or of invalids in search of health, were compelled to present such a diploma for the security of visitors. It were at least wise and prudent that no watering place or health resort should be visited until after such inquiry as to its sanitary character had been made and replied to satisfactorily.

There is no doubt that one effect of change of air is to increase the sensitiveness of the animal system, to render it more susceptible to all external influences, whether morbid or otherwise; and it is, therefore, more important that there should be no poisonous taint in the atmosphere of the place resorted to for change of scene and air or the use of a mineral water, than that there should be no such condition in the air to which use may have habituated the individual system. We read that the wretched prisoners who breathed, during weeks or months, the mephitic air of the jails in the mediæval times often escaped an attack of the infectious germs which they carried with them in their clothes, to spread disease and death through the courts where they were tried, or the houses to which they returned after their acquittal; and we know, moreover, that sailors have often escaped malignant fevers, to the risk of which they had been exposed during a voyage in an impure ship, to carry pestilence to the inhabitants of the town at which they had landed.

It cannot be disputed that a remarkably high average of health is enjoyed by the inhabitants of Acqui and the surrounding country; the generally healthy appearance of the children is the subject of frequent observation, and the large number of people who live to an advanced age has always been noticed. Such popular statistics, however, if not founded on precise data, are not to be received with implicit trust; but that there is an important degree of exemption from epidemic and endemic diseases, that they are generally

of comparatively mild character when they do occur, and that all diseases throughout the district are commonly of a very mild and simple type, is the universal experience of the medical residents.

The mud treatment at Acqui is quite different from that at Hamburg, Baden-Baden, Carlsbad, Marienbad and other places where one gets into a bath containing mud and water.

Here the mud, in a very hot and quite tenacious form, very much of the consistency of the clay of which bricks are made, is applied locally to those parts of the body which are affected. The patient lies on a straw bed, on which is placed a sheet, and the attendant, having ascertained the suffering parts, daubs them to the thickness of several inches with the mud or "fango," as it is here called. The invalid, covered with a hot sheet and blankets, lies for half an hour perspiring most freely, then gets into a hot sulphur bath, is thoroughly cleansed, rubbed quite dry and returns to his bed, artificially warmed in readiness for him, where he lies for an hour, perspiring freely. This is repeated every morning during the cure or about twenty days. Besides the baths there is an excellent cold sulphur water which every one drinks, and a boiling spring, "La Bollente," which gives out 165,000 gallons a day of sulphurous water at a temperature of 165° F.

There are four bathing establishments in Acqui. Two of them are State institutions—one for the treatment of military patients and one for the poor. The other two are, first, the old municipal establishment, a splendid group of buildings for the reception of persons of means, who will find it replete with all the comforts of a first-class hotel; second, the new building in the city, also under the direction of the municipality. While the government has constantly endeavored to increase the efficiency of the State hospitals in Acqui, the Municipal Council has not been idle, but with praiseworthy zeal has met the requirements of the ever increasing number of visitors by providing increased accommodations for their reception.

The municipal establishments, as at present conducted, occupy the foremost position among such establishments in Italy, and are on a par with the highest class thermal resorts in Europe, and this not only owing to the superior curative properties of the waters, but because of the comfort vouchsafed to visitors.

The hotels are furnished throughout with elegance, the service conducted by a numerous, attentive and efficient staff of servants; replete with everything essential to physical comfort; possessed of a natural supply of drinking water of the greatest purity; situated amid shady avenues, brilliant flower gardens, cool fountains and surrounded by a lovely panorama of hills covered with flourishing villages and picturesque villas.

The hot springs of the municipal establishments carry in solution a considerable quantity of mineral-vegetable matter, which, when precipitated, forms the mud that, applied to the human body, performs those well-nigh miraculous cures which have made Acqui famous. The treatment is of great value in all manifestations of rheumatism, whether of the joints or muscles, in strumous diseases, in obesity, in rheumatic gout, sciatica, lumbago, neuralgia, affections of the joints due to injury, and in diseases of the skin, especially those of gouty origin. The mud application promotes the absorption of exudations due to rheumatic gout, which cause stiffness and swelling of the joints. In addition to the deposit from the hot springs, the same character of mud is dug out of a mountain a few miles from Acqui, brought to the establishment, and allowed to soak for several years in tanks of boiling sulphur water until required for use. Its principal chemical constituents are salicylic acid, oxide of aluminum and subcarbonate of lime.

For hydropathic purposes, there are at present one hundred and forty comfortable bath rooms for the use of visitors, even though not residing in the hotel of the "Establishment Thermal." They are used for mud and other baths, and in an adjoining portion of the building hot and cold douches and natural sulphurous steam baths are administered by means of the most approved modern apparatus. There are no resident English-speaking physicians, but M. Guida, the director of the hotels, speaks English very well, and Dr. Cavaliere de Alessandri, the medical director, speaks French perfectly, and is specially competent to assume the medical care of visitors. The attendants and servants all speak French, and are most obliging.

Acqui contains a very ancient cathedral, with handsomely carved white marble pulpit and magnificent high marble altar, a fine organ extremely well played. Other interesting features are the remains of a lofty Roman aqueduct and a fine statue of Victor Emmanuel. The hotel accommodations are very satisfactory, the feeding excellent; there are two large hotels belonging to the same Italian company. The new Grand Hotel des Thermes, open all the year, is situated in the town and connected with the new bath establishment by a covered way. The old Grand Hotel des Thermes is on the other side of the river in a well-wooded park, adjoining the Casino and a very large bathing establishment.

To the melodic American tourist seeking health in Europe, a fresh inducement to travel in Italy may be afforded by the recent announcement that there exists somewhere in this region a village exclusively populated by retired organ grinders. On withdrawing from a profession in which they have acquired affluence, they have returned from foreign parts to their own dear native country, where they have settled down "among the sweet Italian hills." These peripatetic minstrels, it is stated, have retained possession of the instruments which materially aided them to amass wealth in the land of the stranger. Hence, it is probable that they live in melody, if not in harmony with one another, for some sort of a tune may always be ground out of a hand organ, even of the most tinkling variety, while the accompaniments, regarded from a sanitary point of view, leave almost everything to be desired. Like the wandering sheep of the nursery rhyme—making due allowance, of course, for poetical license—"when they came home they brought their tails behind them;" for if tails are not organs, what are they?

It must be admitted that a mountain village populated by affluent Italians is something altogether out

of the common. Those musical supersensitives, native to our soil, who have suffered cruel torment and nervous prostration at the hands of alien organ grinders, year after year, knowing scarcely any "surcease of sorrow," will experience some difficulty in believing that these prosperous industrials, in their hilly retreat, can enjoy happiness unalloyed by pangs of conscience; that their moral withers can be unwrung by penitential remembrance of the agonies they have inflicted. But the Italian organ grinder is as incapable of feeling remorse as his contrapuntal monkey, or the "next-door pianist," or the blood-sucking mosquito, whose solos "make night hideous." All these torturers of humanity believe themselves to be purveyors of public entertainment, and as such, benefactors of the human race; while, in fact, their dreadful performances distress the invalid, distract the student, harass the man of letters, and madden the true musician.

Acqui, Italy, October 15, 1895.

MUSCLES MOST USED IN CYCLING.

THE Chicago Times-Herald recently published the annexed diagram, which shows the muscles most used in cycling. The places where cyclists feel the greatest fatigue are indicated by an X.

Fatigue at the wrists may be relieved by changing the grip, so as to catch the handles with the palms up, also by raising or lowering the shoulders, so as to change the angle at which the wrist is bent. This, as well as changing the grip, will relieve pain on the outer side of the arm. Sometimes pain is felt at the elbow joint, especially when the arm is bent at the joint and the road is rough. This is relieved by sitting up straighter and thus straightening the arm. Fatigue

MUSCLES MOST USED IN CYCLING.

of the pectoralis major (chest muscle) is almost always due to bending the back over, thus keeping the pectoralis major in a permanently contracted condition. Straighten the back, and the fatigue will disappear. Pain in the back from riding is due to jolting and, generally, to leaning over. Fatigue of or pain in the rectus femoris is due to the double work that muscle has to perform in cycling. It not only straightens the leg when the foot goes down, but pulls the knee up in the next movement. No other muscle does so much work on the wheel. It is the great "push" muscle in cycling. Fatigue in the tibialis anterior is relieved by changing the gearing of the wheel so as to work the ankle as little as possible. It is the same fatigue felt in fast walking for a considerable time. Fatigue at the ankle joint is relieved by changing the gearing. The muscles are not drawn exactly true to nature, but so as to show them best.

SALT AS A REMEDY FOR RINGWORM.

F. J. REILLY, M.R.C.S., states in the British Medical Journal for November 23 that he has used common salt as a remedy for ringworm for the past seven years. Children, he says, who are suffering from tinea tonsurans are sent to the seaside and almost invariably improve in the salt air. This improvement has hitherto been ascribed to the general favoring influence of the open air life and improved hygienic conditions under which children live at the seaside. But, says the author, when we remember the fact that the air near the sea is impregnated with minute particles of sea water containing in solution as it does a large proportion of sodium chloride, may we not reasonably ascribe the disappearance of the skin disease to this circumstance? This fact, he says, arrested his attention and led him to think that common salt might prove a valuable remedy in ringworm. Accordingly he prepared a solu-

tion and used it in the next three cases which he was called upon to treat, applying it to the diseased scalp every night for five nights and washing it off the following morning with ten per cent. boric acid soap. In less than four weeks a cure was effected in each case.

WHY ARE NEGROES BLACK?

THE Province Médicale for October 19 contains an abstract of an interesting article on this subject which was published in the Médecine Moderne. Buffon the elder, says the writer, attributed the black skin of the negro to the influence of climate, heat causing the color. Orgeas agreed with Buffon. He had observed the feeble development of the pilo-sebaceous system among negroes, who are less hairy than the whites. Eijkmann enveloped vessels with human skin taken from Malays and whites, and found that the radiation of heat passing through a black skin was not more intense than that which passed through a white skin. In this, says the writer, he agrees with Melloni, Desains, Masson, and others, whose researches show that the color of an object or of a tissue has no influence on the obscure heat rays. On his carefully separating the fat from the skin, however, the natural conditions were changed. In the second place, the negro possesses a more developed vascular sudoriparous system than we do. He perspires more freely, and loses heat as an alcazara does. There is evidently, says the writer, a close relationship between the influence of cutaneous pigmentation and the sudoriparous glands, and the two should be studied together.

The skin of the negro becomes black after birth. Le Cat noted, in 1765, that the new born negro was of a reddish color, the root of the nails and the scrotum alone being black. Two or three days after birth the skin began to turn black. Darwin also observed that the new born Australian was of a brownish yellow color. The Hindoo child at its birth is white, although its parents may be perfectly black.

The adult man's skin varies according to the race to which he belongs. Aside from heat, which has been especially spoken of, we must, says the writer, recognize other causes of equally great importance. Light seems to favor pigmentation of the skin. In uniform heat the light rays seem more active than the dark ones. The sun tans, and women use parasols and gloves to protect themselves from it; darkness, on the contrary, induces pallor. Aristocrats who do not expose themselves to the air have a light transparent skin. The Japanese of distinction rarely expose themselves to the air without being veiled, and their skins are almost as white as those of Europeans. In Siam the high classes also have a light, transparent skin. The drawings of the ancient Egyptians, of the Etruscans, and of the Mexicans represent their women with light skins. A very brilliant light browns the skin even in cold countries. For instance, the Eskimos are brown. The luminous intensity of the long days is such that they are obliged to protect their eyes with glasses.

In India the difference between the color of skins is more marked than among us, and Pariahs black as negroes may be seen side by side with Brahmans white as Europeans. The following type is very generally seen. Tall, straight, and slender: with long heads, a long face, and an aquiline nose. The Brahman is especially distinguished from the Pariah by his haughty bearing. The castes are very numerous, says the writer, and among them may be observed all the coffee-colored tints, the purity of which is not absolute. Among the Brahmans occasionally there may be two children in the same family one of which may be white and the other black. The same is seen among the Pariahs, although the white skin is more frequently observed among the former than among the latter. Certain castes which are held in slight estimation, such as the Moukhis, and the Chamars, who live in the shade of the great palm trees, have an extremely white skin.

Humidity favors pigmentation very distinctly. The countries where there are both great heat and great humidity contain the blackest people. The natives of Barbary are very much less deeply colored than the negroes of the Soudan, yet the uniform degree of heat there is 86°, instead of 78.4° F., as it is on the coast of Guinea. The Egyptian has remained white notwithstanding a constant mixture with the black Nubians. The people who live in the dry section of the Nubian Desert have a red skin; other races that are brown or that vary from a white to a chamois color also live in a dry country. The Abyssinians, however, in whose country the plateaux are well irrigated, are blacker. The blackest negroes in Africa are those who live in Guinea, where the greatest amount of rain falls.

In Asia, says the writer, it is the same as in India. There is a close relation between the fall of rain and the color of the people. The more moist the climate is, the darker the skin of the natives. As one goes up the Ganges the climate becomes drier and the skin of the natives whiter. The Bengalese are black, but the Sikhs and the Rajpouts are of a dead white color. In America it is the same. The Brazilians are generally darker than the inhabitants of the Andes. The Portuguese, who come from a rainy country, settled in Brazil, while the Spaniards inhabit the Andes and the dry La Plata section. Spain is very dry as compared with Portugal, and the Portuguese in Europe have the darkest skins of all Europeans.

Heat, light and humidity, says the writer, are then all causes of pigmentation. In dealing with these three causes alone and their relative influence, he says, the question of pigmentation of the skin is a very complicated one. For instance, persons inhabiting a mountainous district, where the climate is cooler, have a lighter skin than those who live on the plains, although it has been seen that the Abyssinians are an exception to the rule. The native of Abyssinia is darker on the plateaux and lighter on the plains. In Peru the inhabitants on the coast have a lighter skin than those on the mountains. D'Orbigny observed that, in America, in the impenetrable forests the savages were lighter; the darkness evidently prevented pigmentation. What, asks the writer, causes the difference between the negro laborer exposed to the sun and the Brazilian savage who lives in the forest? The latter is more or less chocolate colored, but not black. Are these facts, he asks, sufficient to prove absolutely Buf-