springing forward to success unparalleled in the history of scientific discovery.—*The Operator.*

IMPROVEMENT IN THE CONSTRUCTION OF FENCES AND POSTS.

The engravings illustrate several forms of iron fence and railings, together with constructive details of the fence fastenings, which have been patented by Mr. J. B. Wickersham, of 505 Cherry street, Philadelphia, Pa., who is manufacturing and has pretty thoroughly introduced the various forms, which have proved highly satisfactory wherever used.

Figs. 1 and 2 show different forms of railing and fencing. Fig. 5 shows a double fastening for holding the two rods forming the rail of an ornamental iron fence, the fastening being effected by nails, which are broken off and do not show after the fence is finished. The wrought iron bars project through the cast iron ornaments of the railing, as shown in detail in this figure, thereby strengthening the cast iron portions of the iron railing, preventing them from being broken off by mischievous persons. Fig. 3 shows a farm fence on a level, also on an incline, supported by Mr. Wickersham's improved iron post. The fastening of the fence rods is effected by driving nails through holes in the overlapping ends of the rods on opposite sides of the post, as shown in Fig. 4. The rods are grooved longitudinally, so that nails may be driven in at every post through which the rod passes.

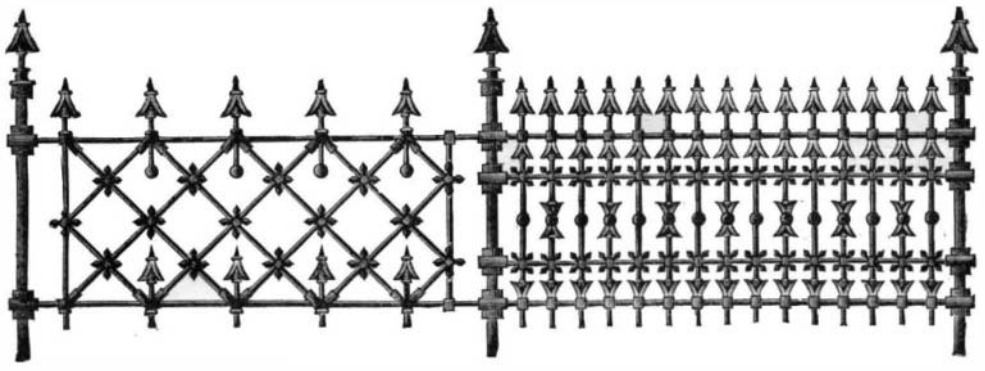


Fig. 1.—ORNAMENTAL IRON RAILING.

Fig. 6 shows the method of fastening flat bars in the posts, also fastening the pickets to the bars. The bars are grooved upon one side to receive the fastening nails.

This iron fence is suitable for farms, lawns, and country places, as a substitute for the barbed wire fences; at the same time it is a more visible fence than strands of wire produce, enabling horses and cattle to see it and avoid injury.

Fig. 9 shows in perspective and in section a fastener for securing a picket to an angle-iron rail by means of an eye, a washer, and a nail.

Fig. 2.—IRON FENCE.

Either wrought or cut nails are used for fastening the parts of the fence together, the portions being nailed together as readily and easily as pieces of hard wood. The process might properly be termed keying, but the inventor has appropriately named it "nailing iron to iron." Key-seats are formed in the iron to receive the nails; a hammer and nails are all that are required, with the several parts of the work, to form and erect handsome and durable iron railings and fences of either heavy or light patterns.

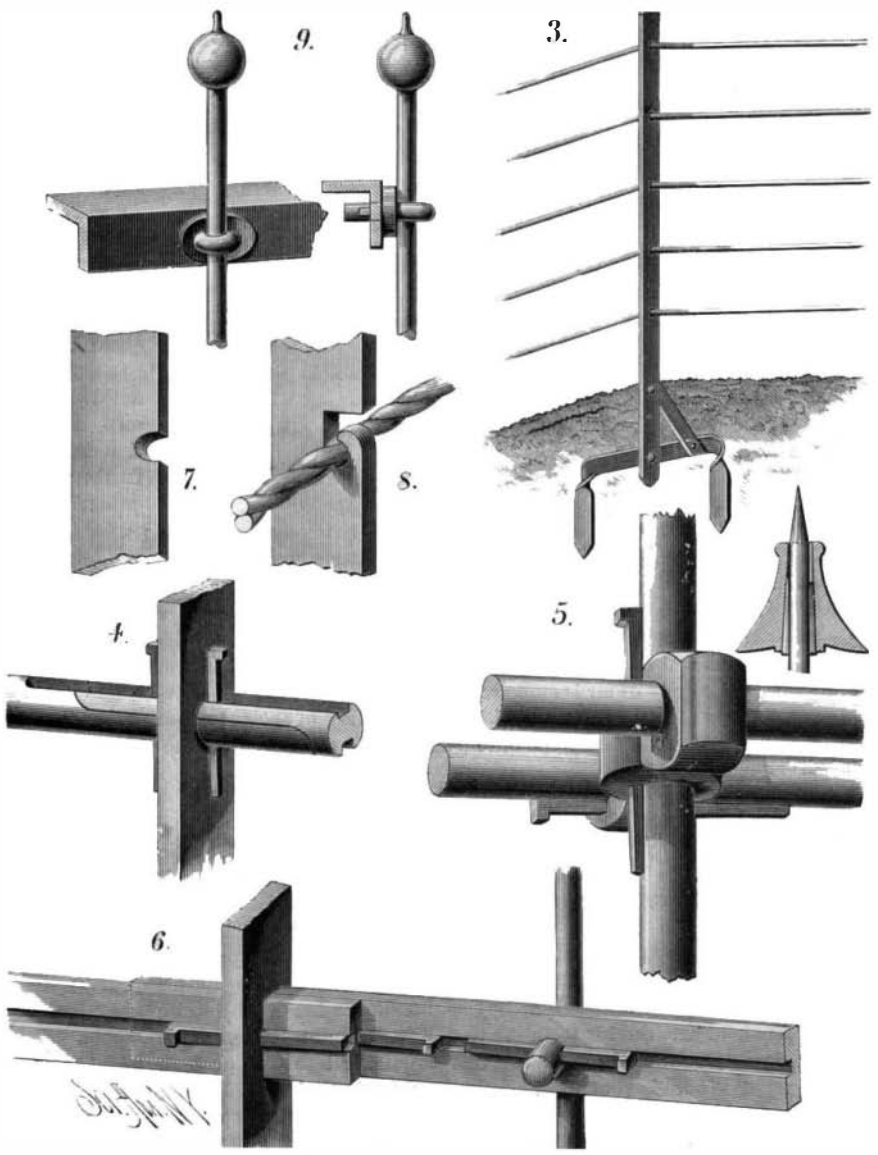
Fig. 7 shows a post with a semicircular notch for receiving barbed wire or wire cable, and a hole for receiving the fastening wire. In Fig. 8 is shown a post having a square notch for receiving a fence wire rod or cable.

The improved posts, shown in Fig 3, have been adapted for round, flat, or square iron, also for barbed and plain wire, to meet the requirements of cheapness, combined with strength and durability. By the method illustrated, the parts of the fence and posts can be quickly and strongly fastened together.

In the manufacture of plain fences composed of horizontal bars or rods for farm purposes, the joints of the rails at the intersections with the posts are secured by various ways in lapping of the rails and by nailing the parts securely together, at the same time allowing the rails and pickets to grade to any inclination of the ground or to expand and contract under changes of temperature. An important feature is the construction and planting of the improved iron post for farm purposes. The object has been to make an iron post which will resist the action of the frost, being so constructed that when planted the parts act in the same capacity as the roots of a tree in sustaining it in an upright position. The brace at the lower part of the post is buried under the ground, and assists in holding. It has been shown that where these posts have been in actual use for several years past they keep their vertical position.

We are informed that these iron posts cost no more than wooden posts. Being of iron they cannot burn in times of fire, or float away in a freshet, and will outlast any post made of wood; besides, there is always an intrinsic value in the old iron.

A large industry has been developed under these patents, and we are informed that this fence is largely coming into public use, supplanting fences of the English and other styles. Furth information may be obtained by addressing the inventor and manufacturer as above.



PARTS OF FENCE FASTENED BY NAILING.

A New Hospital.

Mr. George I. Seney has given the handsome sum of $270,000 for another general hospital, to be located in the southern section of Brooklyn, N. Y. An entire block of ground has been secured. The plan of Mr. Seney contemplates the erection of a number of small buildings rather than a single large one, so that particular diseases may be located and treated apart. Possibly one of these buildings may be made a lying-in department. for which there is ample room; another may be devoted to contagious diseases, for which at present there is absolutely no provision within the city limits. The plans will be matured and work begun within a few months.

The Channel Tunnel.

Close to the western entrance in the Abbot's Cliff, near Folkestone, are the Channel Tunnel works, now progressing under Colonel Beaumont, R.E., by which it is hoped ultimately to realize railway communication between France and England—distance 22 miles. The project, both in design of plan and mode of execution, is practical and ingenious. The chalk strata of England and France are geologically continuous, and the dip of the beds is the same, namely, toward the east, on both sides of the English Channel. The lowermost portion, known as the "gray chalk," is of more clayey nature than the other portions of the chalk formation, and is sufficiently impervious to water to render perforation feasible. The plan proposed is to follow by a descending tunnel the natural dip of the gray chalk towards Dover, until a depth of 200 feet below the sea bed of the Channel is attained. The Channel Tunnel will then be driven horizontally right across from shore to shore. A similarly inclined tunnel on the French side, rising along the direction of the dip of the strata, will make communication again with the upper surface of the land. The gray chalk is thus entered and followed throughout along its natural position—from daylight on the one side, and in its subterranean and submarine depths, to daylight on the other side of the Channel. The works at Abbot's Cliff consist of a short drift-way from the sea front of the "Warren" to the commencement of the trial tunnel, which is circular, 7 feet in diameter, and runs parallel with the existing line of the South-Eastern Railway. It has already attained a length of 300 yards. The chalk is drilled by a circular disk of iron cutters, worked by a compressed air engine by means of a shaft with bevel wheel gearing, the shaft and engine extending for a length of 30 feet. The cutting disk makes two revolutions per minute, and is fed forward a quarter of an inch at each revolution. The total advance of the whole face of the boring is half an inch per minute. The *débris* cut out by the revolving disk is received in a sort of large iron tray, which is hauled back every now and then by a chain worked by an auxiliary air engine, and the water which percolates the chalk is easily kept under by a small donkey pump. The promise of success so far seems good, but the 7-foot tunnel has not yet been driven much, if anything, below low-water tidal level, and we have yet to learn whether any powerful jets of water may get in through fissures as the subterranean depth is increased. Trial shafts have been driven vertically down a considerable distance both on the English and French shores, and there have been no signs of extraordinary difficulty from such sources. Nevertheless, the question of a possible fissure or deep crack in the continuity of the gray chalk itself in mid channel, along a line passing between the "Varne" and the "Ridge," can only be actually settled when the Channel Tunnel itself solves it, and ends, once and for ever, all discussions upon the subject.—*Building News.*

Coal in Venezuela.

In a report by Mr. Plumacher, of the United States Consulate, at Maracaibo (Venezuela), some information is given concerning coal deposits in that country. It is stated that those parts of the country lying between Rio Zulia and Rio Gantatumbo and the Cordilleras, abound in asphalt mines and fountains of petroleum, and generally what is described as a large coal formation. Beyond the Rio Zulia, in the upper part of the department of Colon—that does however not extend to the foot of the Cordilleras—there are stated to be no coal mines, but Mr. Plumacher states that he has been informed by persons of truth and respectability, that the valleys of Cucuta, and the territories of the State of Tachira, abound in coal mines. Near San Antonio, in the ravine called "La Carbonera," exist some of considerable size, from which is frequently dug coal for the use of the smiths' forges in that place; and at the foot of the Cordilleras, on the northern side, there are a considerable number of coal mines, asphalt deposits, and also some fountains of petroleum. In the territory of the department Sucre, just opposite Gibraltar, at the foot of the mountain line, a large quantity of coal and asphalt is found. Mr. Plumacher states that among the samples of coal which he has examined during his

residence in the State of Zulia, he has only met with one true specimen of lignite. This specimen was found near the Cordilleras and in the direction of the Rio Torondoy, and its quality greatly interested those who examined it. It was ultimately sent to Caracas to be thoroughly examined and tested. The northern basis of the Cordilleras is not much known, and Mr. Plumacher reports that he is not aware whether it contains any coal; but between Escuque and Bettijoque, in the town of Columbia, petroleum wells of an inferior quality are abundant. Reporting generally on the coals which have been so far discovered in this district, Mr. Plumacher states that the driest and most compact of all is that of Tule, and after the many trials to which he has submitted it, he is able to place it among the coals of the best quality, serviceable for all those purposes for which the best lignites are advantageously employed. We further note that, however great the riches manifest on the surface of this region may appear to be in the innumerable fountains and deposits of petroleum, bitumen, and asphalt, such riches cannot be compared with those contained in the immense coal deposits from which those substances proceed. This conviction, which is derived from the nature and circumstances connected with the inexhaustible fountains of petroleum, asphalt, bitumen, and coal already mentioned, supports the opinion that few countries possess the mineral wealth that abounds in the regions around the lake of Maracaibo; and the opinion is expressed that if these coal deposits, which really form the greatest wealth of the State, have not yet been discovered, it is owing to the fact that by far the greater part of its territory is at present in the wild and desert condition in which it was found at the conquest. The government has never interested itself in an exploration of the district, neither have individuals done so, although many may have possessed the means and the knowledge adequate to such an undertaking.

A Big Load of Cotton.

On Saturday, April 2, there arrived in New Orleans the Mississippi River steamer Henry Frank, with the largest cargo of cotton ever brought into the Crescent City—9,223 bales. Other freight brought this cargo up to an equivalent of over 10,000 bales. The Frank is a stern-wheel steamer of not unusual size, but specially designed for the transportation of baled cotton. Of this tremendous cargo, only 2,500 bales were stored in her hold, the balance being built up over the entire steamer, so that her appearance was that of a floating fortress. Only her smokestacks, escape pipes, pilot house, and wheel were visible. Here and there port holes were located to admit air to the furnaces, or ingress and egress to and from the cabin. The bales were tightly packed, fourteen tiers high, the joints being broken as in brickwork. A force of twenty men were constantly on the alert with appliances for quenching any fire that might break out. The cargo was insured for $400,000, and the average weight of each bale was 450 lb. The Henry Frank's cargo was picked up between Memphis and New Orleans, and its arrival safely at the latter city evoked great interest. When it is remembered that 4,000 bales of non-compressed and 6,000 bales of compressed cotton is considered a large cargo for an ocean-going steamer, the size of the Frank's load of the non-compressed article becomes more apparent. The freight would average $1.25 per bale, and the money advanced shippers by the boat on account on this trip was over $20,000.

A Cracked Volcano.

Within the space of ten months Mount Etna had five abundant eruptions of smoke and sand, without any subsequent flow of lava. In one instance, after profound subterranean rumblings and numerous earthquake shocks, there appeared on the eastern side of the mountain a great cloud of vapors and ashes, which escaped by a crevice nearly three miles long. The snows melted suddenly around the summit of the mountain, jets of hot vapor escaped at many places, and the small muddy craters of the western declivity became very active, as is usually the case on the approach of a great eruption. But to the surprise of all observers, within thirty-six hours afterward the volcano had returned to a state of perfect calm. Such a phenomenon has never before occurred within the memory of man. Vicenzo Tedeschi di Ercole attributes it to the existence of an immense opening, which appeared upon the mountain at the time of the eruption of May 26, 1879. He concludes that a very strong pressure is required for the formation of lava, and that a great tension of gas is indispensable in order to raise the lava to the surface of a mountain. It appears probable, therefore, that there will be no reason to fear any further eruption in the cone of Etna as long as the present crevice is open.—*Ann. de Chim. et de Phys.*

Diphtheria.

Dr. Gauthier, of St. Paul, Minn., tells in the Chicago *Medical Review* of his success in an epidemic of diphtheria by the use of iodine. He has treated 200 cases with but two deaths, while before adopting this method he lost one-third of all his cases. The treatment is as follows: The patient is ordered tincture iodine in ten to twelve drop doses every hour, well diluted with water, so long as the fever lasts, subsequently reducing to ten drops every two, and finally every three hours. Local applications are made use of at the same time. These latter should be made by the physician at least twice a day. For internal use the decolorized tincture is used. Bread and starchy articles of diet are used in abundance.

Trial of a Fire Nozzle.

A trial was lately had in Boston of the Monitor or Universal Nozzle, the patent of Andrew J. Morse. The nozzle is of the same pattern as that used upon the fire boat Flanders, and this exhibition was given to demonstrate its value for street service, whether operated by steam engines, or by a powerful pump in the basement of stores. The trial was given under the directions of District Engineer William H. Cunningham, of the third district, and a detail from Engine No. 25, under Captain George W. Frost. Mr. Morse, the inventor, was present, as well as District Engineer Regan and Chief Green, who expressed himself more than satisfied with the results attained. The nozzle, which was securely fastened to a heavy section of plank, was bolted to the pavement, and the power was furnished by the engine in the basement of the Mechanics' Exchange, on Hawley street. The pressure, each trial, was 160 pounds. The first trial was with a 1⅜ inch nozzle, through a single line of hose; the second with a 1½ inch nozzle and a single line of hose; the third with a 2 inch nozzle and three lines; and the last through a 1⅝ nozzle and two lines. The stream in each case was more than expected. Upon the level a tremendous volume of water was thrown for a distance of at least 250 feet, and when played in a vertical direction, the water was thrown completely over the five story buildings on Franklin street. The handling of the pipe was conducted by one man, who had not the slightest trouble in directing the torrents of water that came from the nozzle. It is the inventor's idea that for street service the nozzle should be mounted on a four-wheeled hose carriage, which could be separated at will, the rear wheels having the nozzle and the front wheels the hose.

Orchid Hunting along the Rio Negro.

In a recent letter to the *World*, written at the little settlement of Tauapassua, Rio Negro, Brazil, Mr. Ernest Morris corrects the statement made in a previous letter, that the prince of cattleyas, *C. El Dorado*, is a habitat of high forests. It is a native of the lowlands only, the error now corrected having arisen from his mistaking a schomburgkia for the cattleya. Cattleya El Dorado, he says, is found only on the Negro, but *C. superba* has an immense range, being found not only throughout the whole Rio Negro region, but up the Amazon as far as Teffe and at the mouth of the Japaru. There are several varieties of *C. El Dorado*. The most beautiful has sepals and petals of a clear rose, with lips of a most beautiful crimson and throat of deep orange. The flowers are large and delicately fragrant, and bloom in January or February. Among other orchids collected (and the first that I have seen) was a tall growing epidendrum (?) which produces its flowers from the top of the stem. Six specimens of this plant were found near Tauapassua, every one growing in an ants' nest.

Speaking of his collections, Mr. Morris says: "Besides the orchids I brought with me numerous twigs and branches which were covered with cauchy (a sediment deposited by the water, and very common in low forests), which has poisoned my hands and face. I propose to distribute among the orchid growers at home specimens of this cauchy. It should be found in every hothouse, and it would show the lover of orchids, did he but touch it, what a collector undergoes."

New Method of Packing Fish Eggs for Shipment.

Under the supervision of Professor Baird, U. S. Fish Commissioner, a shipment of 40,000 eggs of the whinnish, or land-locked salmon of Maine, was recently made to Germany, by Mr. Fredrick Mather, of this city. Half the eggs were consigned to the Berlin Fishery Association, and the rest to the Société d'Acclimatation, of Paris. Mr. Mather has recently adopted a mode of packing for shipment which differs materially in detail from that employed last year, in the course of which he shipped 700,000 eggs with a loss of only 7 to 8 per cent. It was the earlier practice to place the ova in shallow trays composed of a wooden frame with a bottom of canton flannel. The trays were placed one upon another in a vertical position in a compartment directly beneath an ice box, from which water a little above the freezing point and well charged with oxygen constantly percolated. In the new method the trays are put into tin boxes one upon the other until each box is full. A well fitting cover is then placed over them, and the boxes, thus nearly hermetically sealed, are packed in ice. There is no percolation of water upon the eggs in this mode of packing. But as the box detains and condenses all moisture arising from the trays, and the supply of air is sufficient for a number of days, it is believed that it will save a larger percentage of the eggs than was possible under the old method, besides occupying somewhat less space.

Climbing Trees for Fish Bait.

In his search for orchids in the forests along the Rio Negro, in Brazil, Mr. Ernest Morris was surprised to see his native rowers run his canoe ashore and proceed to climb a low tree covered with bromelias and large tillandsias. "Those are not orchids," he said. "No matter, patron," replied the Indian; "we want *iscal* (bait)." Wondering at this Mr. Morris watched the boy as, hand over hand, with knife held between his teeth, he passed from limb to limb. Soon a large tillandsia, several feet square, fell to the ground. "Where is your bait?" said he. "Look," said the Indian, who was cutting the leaves close at the base, where the explorer saw between the leaves a mass of worms resembling our common ground worm. How they got there puzzled him. The Indian said they climbed the tree, but this he doubted. At all events, there was bait. What a blessing it would be considered by the American small boy if, instead of digging up flower-beds or turning over old boards, thus losing much valuable time, he could fill his can of bait by climbing a tree? Mr. Morris adds that he has caught fish with the fruit of the tucuma (*Astrocaryum tucuma*), but this was the first time he ever found actual live bait in the trees.

RECENT DECISIONS RELATING TO PATENTS.

United States Circuit Court.—District of Maryland.

EMIGH *vs.* BALTIMORE AND OHIO RAILROAD COMPANY. STEVENS *vs.* SAME. STEVENS, USE OF EMIGH, *vs.* SAME.—PATENT RAILWAY BRAKE.

Bond and Morris, Judges:

1. The question in controversy is, "What saving did the defendant derive from the use of the Stevens brake for the period covered by that patent above what it would have derived from the like use of the Hodge brake during that period?"

2. The difficulties of proving the exact money value of this saving are exceptionally embarrassing.

3. Although this rate may possibly be less than the defendant's actual gain, in the absence of more exact means of computing what that gain was, the court determines upon twenty-five dollars per car per year as the proper rate of profits to be decreed to the complainants in all three of these cases.

4. On these sums the court does not allow interest.

United States Circuit Court.—District of Massachusetts.

ROOT *et al. vs.* LAMB.—SPIRAL TUBES.

Lowell, J.:

1. Where an invention relating to the method of forming spiral tubes was described in terms used in the art of making welded tubes, it not appearing that sheet metal tubes could be made in the manner described: *Held*, that the invention is thereby limited to the making of spiral welded tubes.

2. In describing his invention a patentee may misuse words, but in seeking his meaning the ordinary signification of the words he uses must have weight.

3. A patentee's invention cannot be given a broad construction, so as to cover later inventions, when it appears from the state of the art that there was no opportunity for a great original discovery and the claim is properly limited to the specific improvement.

Bill dismissed.

Mexican Pyramids.

On his return from his tour of antiquarian research in Southern Mexico, M. Charnay reported the discovery of a ruined Toltec city in Tabasco, near the Gulf coast, a city which covers a wide area and must have been in its day a place of considerable importance. The long forgotten town is surrounded and dotted over with small hills, and the builders had utilized these natural elevations by erecting thereon a number of temples, pyramids, and palaces, and had connected their sites by bridges. The largest of the pyramids is 500 feet in height and a second is fully 300. Nature had had more to do with these monuments than art, as the builders had merely shaped the hillocks into pyramidal form and afterward faced them with stone, and steps were also cut in the sides, paved with a mixture of cement and pebbles. From a careful study of the remains of this ancient city M. Charnay is inclined to believe that it was founded between 1150–1180, and that it was in a perfect state of preservation at the time that Cortez invaded Mexico. This opinion was strengthened by a conversation with two well-informed Spaniards whom the explorer encountered in San Juan Bautista, who declared that there were to be found in ancient Spanish records statements to the effect that this city was not destroyed until after the town of Vera Cruz was laid out. M. Charnay is satisfied from indications he observed that there are remains of at least two other Toltec cities further up in the adjacent mountains, but further investigation is postponed for the present.

The Moquis.

In the history of the aboriginal races of this country little is said regarding the Moquis, a branch of the Pueblos, living, where possibly they have lived for a thousand years, in a rocky stronghold in a sandy desert of Arizona. This people number about two thousand five hundred, and occupy six villages, with houses built of stone cemented with sand and clay. These villages, says Dr. Loew, of Wheeler's surveying expedition, are built on the tops of four sandstone mesas, which are separated from each other about eight miles. They occupy the entire width of the mesas, and, standing immediately before the houses, one may look vertically down a depth of three hundred feet. In many places the sides of the mesas are terraced, being used as sheep corrals. In appearance the Moquis come rather nearer to the Caucasian than the rest of his race. These Indians are well clad, and the females especially so. Indian corn is the principal food—the sheep are raised for their wool rather than for the table. From the wool a good blanket is made. The seed corn is planted about one and a half feet from the surface, at which depth sufficient moisture is found to develop and sustain the plant. The Moquis have neither church nor any other place of worship, and the Spanish Jesuits were unable to gain a foothold among them.