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WAR DEPARTMENT,

SURGEON GENERAL'S OFFICE,

WASHINGTON, DECEMBER 5, 1870.

CIRCULAR NO. 4.

BARRACKS AND HOSPITALS.

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WASHINGTON, DECEMBER 5, 1870.

A REPORT

ON

BARRACKS AND HOSPITALS,

WITH

DESCRIPTIONS OF MILITARY POSTS.

WASHINGTON.
GOVERNMENT PRINTING OFFICE.
1870.

DEPARTMENT OF ARIZONA.

POSTS DESCRIBED.

Camp Whipple, Arizona Territory.
Camp McDowell, Arizona Territory.
Camp Lowell, Tucson, Arizona Territory.
Camp Grant, Arizona Territory.
Camp Mojave, Arizona Territory.
Camp Verde, Arizona Territory.
Camp Colorado, Arizona Territory.
Camp Bowie, Arizona Territory.
Camp Crittenden, Arizona Territory.
Camp Date Creek, Arizona Territory.
Camp Cady, California.
Fort Yuma, California.
Drum Barracks, California.

EXTRACTS FROM SPECIAL REPORT OF ASSISTANT SURGEON CHARLES SMART, UNITED STATES ARMY.

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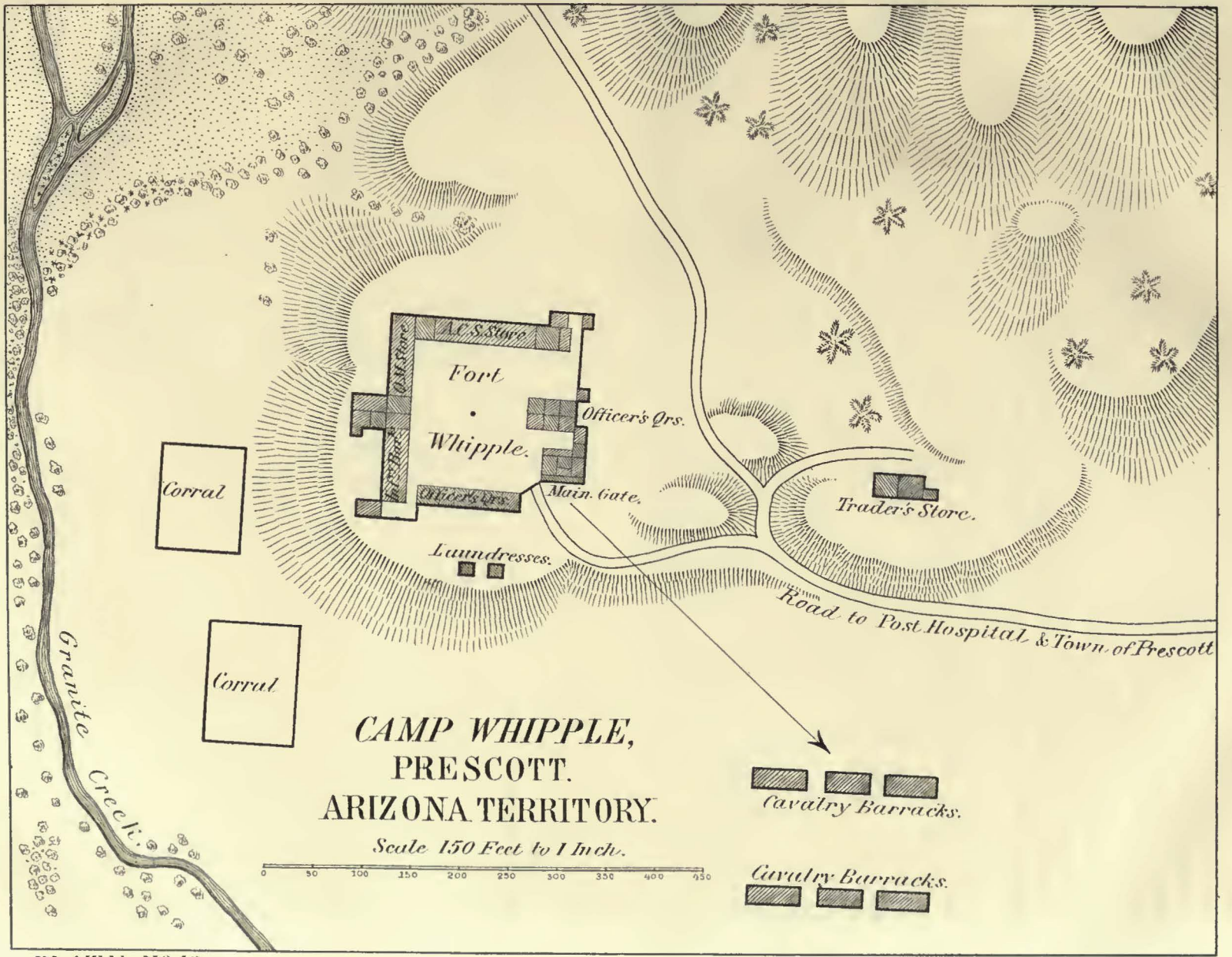
The posts in Arizona at present in existence have, with the exception of Fort Yuma, been established during or since the war of the rebellion. Most of those in the south were intended mainly for the protection of agricultural settlements, and to guard the main roads running through the Territory; those in the north as points from which to carry on operations against the hostile Indians. With few exceptions they are built of adobe, the buildings being arranged along the sides of a square parade ground. Soldiers' labor has mostly been employed in their construction. The site having been selected, the men commence work by digging a large hole or adobe pit in the ground near by. The earth thus obtained is broken down, and sifted to free it from coarse gravel; the resulting mixture of fine gravel, sand, and clay has some chopped straw or grass added to it, and is then formed into a thick paste, with water, which is packed into molds, allowed to set for a few minutes, and then turned out to dry in the sun. Two or three weeks' exposure usually suffices. The bricks are generally 16 by 12 by 4 inches. By the time that a sufficient number of adobes have been formed for the erection of the proposed buildings, those first made are dry enough for building purposes. The walls are then raised, adobe mud being used to cement the layers of bricks. The height varies from 10 to 12 feet, but one wall is raised a few inches higher than the other, that the flat roof which is to cover them may have inclination to carry off the rain-fall. Ridge roofs are generally avoided, as they are apt to leak at the ridge, and much slope impairs durability by permitting the rapid washing away of the mud covering. Cottonwood timbers are then laid across from the front to the rear wall, and upon them is packed a layer of willow branches, or square ribs; some coarse grass is then laid in adobe mud over these, and the whole plastered thickly over with successive coatings of the adobe mud, and a finish of sand or lime mixture. The roof is made to project a foot beyond the face of the wall to carry the rain clear of the building and prevent its influx through the interval left between the top of the wall and the under surface of the roof. This interval of 6 to 8 inches, depending on the thickness of the cottonwood beams, extends along both sides of the building. It is closed in by bricks, if the house is to receive a finish of adobe plaster and whitewash on the inside, but in most instances it is left open, and answers the purpose of ventilation admirably. Pine timber has to be used for the door and window-frames, as the cottonwood, though much more easily obtained, is so lax in its tissue and saturated with moisture that its warping in drying unfits it for such use. Indeed, it is employed for roof beams only on account of the difficulty of obtaining other timber. Frequently the beams in progress of time curve upward at the ends, converting what was originally a flat roof into a shallow reservoir, from which the rain finds its way by many apertures into the interior of the building. The ground forming the floor of the house is then cleared out and firmly stamped.

Most of the buildings are long, and divided into rooms by transverse adobe partitions. They are generally insufficiently lighted, and this remark more specially applies to the barrack buildings or men's quarters. The cause of this is probably the fear of weakening the wall by the insertion of many windows. In such as have the interval between the wall and roof closed up, and no other special means of ventilation provided, the ventilation is very inefficient. The bunks are built of cottonwood saplings, with slats of old packing boxes or stout willow branches. With few exceptions they are arranged in two tiers, like the berths of a ship. On account of the superficial incapacity of the barrack, none of the company buildings are large enough for the accommodation of the command, if of full strength, and many have by far insufficient cubic space for the number of men actually quartered in them. But the great objection found by the troops to quarters of this kind is the character of the roof. None are free from leaks. At one post during a continued rain such men as could procure shelter tents pitched them over their bunks in order to keep themselves dry, at least during the hours of their sleep. Tent flies and wagon covers were made use of to protect the worst points in the roof, but notwithstanding all that could be done the earthen floor of the room became a mud-puddle, and, for want of sufficient sunlight and ventilation, remained damp for many weeks afterward, while the sick-list was crowded with bronchial attacks and rheumatic affections, attributable to the condition of the quarters. Nor was the hospital at this time in better condition. Beds occupied by dysenteric patients almost in *articulo mortis* had to be moved from one position to another to avoid the muddy water flowing through the leaks in the roof, until at last no dry spot could be found, when they had to be protected by rubber blankets and gutta-percha bed-covers. The roofs continue water-proof much longer at some posts than at others, which may in part be accounted for by differences in the percentage of clay in the adobe mud; but as the roofs at the same post vary much in their power of withstanding the weather, the fault in bad cases is chiefly due to want of care in construction. However, with shingled roofs, ample air space, and sufficient lighting and ventilation, the adobe house can be made a most comfortable resting place for the soldier after the exposures and fatigues he is frequently called upon to endure on service in this Territory. * * * * * *

The ration of the soldier in this Territory is deficient in nothing except vegetables. A large cattle herd is usually guarded at each post, and the beef killed as required. It is destitute of fat, and usually tough, as the cattle before reaching the post have to undergo a most fatiguing march, and on their arrival may find very indifferent grazing grounds, or none whatever. On account of the poor quality of the fresh meat its ration was at one time increased to one and three-quarter pounds. The full ration of flour baked into bread has often been issued by commanding officers, when hard service was or had been exacted of the men. The bread is usually of good quality. A common complaint against that made from Sonora flour is its grittiness. This arises from the softness of the stone used in the Sonora flouring-mills. The want of vegetables is not so severely felt now that the subsistence department has on hand at each post a supply of canned fruits and vegetables for sale to officers and men. This, with the produce of post gardens and purchases from farm settlements and traders by company funds, enables the troops to pass the winter and spring free, except in individual cases, from any symptoms of scurvy. It may be said that with few exceptions post gardens in Arizona have proved a failure. This is partly owing to want of knowledge and attention on the part of the men detailed for duty in the garden, partly to want of interest in some cases on the part of commanding officers, but chiefly to the nature of the garden produce. Green corn, radishes, melons, cucumbers, tomatoes, and beets can be raised with facility, but their season lasts only for a few weeks. In some places cabbage heads well, but no post has been successful in raising a supply of potatoes and onions. In cases of necessity for vegetable food, as in scurvy, occurring on scouting expeditions, the mescal plant can be had recourse to, and a chenopodium and portulaca, which are frequently boiled and used with vinegar by the Mexicans as greens. Several species of lepidiæ grow along the rivers. Grapes are found in many places, currants and gooseberries at Date Creek, and the cuniga and mulberries at Skull Valley and a few other points. Although the soldier is often called upon to bear with deprivation of vegetable food and the continuance of a salt ration, all such deprivation increases the company fund, and permits of larger purchases for the improvement of his diet on his return. Yet when, as in this country, the pound of potatoes sells for 25 cents, great results cannot be expected from company funds.



PLATE, No. 12.

Fredk. Langran & Ogilvie, Lith. Washn.

The ration usually carried on the mountain scouts consists of pork, flour, coffee and sugar. The flour is eaten as flapjacks fried in pork fat. Very seldom are the men enabled to improve their diet by the killing of deer, antelope, or turkeys, on account of the scarcity of large game and the want of time and opportunity for hunting while engaged on these expeditions. On one occasion pinole, sugar, and dried beef were the only provisions carried on a six days' scout. The pinole was prepared from a mixture of wheat and corn, by roasting, and then grinding it coarsely; the beef by being cut into thin strips and hung up in the sun to dry. The smoke or light of the soldiers' cooking fires have frequently discovered their presence to the Indians, and led to the failure of the expedition; as no fire was required in the preparation of the pinole ration, it was considered peculiarly adapted to scouting service. It dispensed also with the necessity for a pack train. Each man carried behind him on his saddle his six days' rations and a quart tin cup. On arriving in camp a handful of the pinole and sugar was placed in the cup, water added, and the thick paste eaten as supper. Breakfast was a repetition of this. The dried beef was generally chewed on the march to stave off hunger until camping time. Colics were common as a result of this diet. Great satisfaction was felt by all at a return to pork, flapjacks, and warm coffee at the end of the six days. The experiment was not repeated. * * * * *

CAMP WHIPPLE, ARIZONA TERRITORY.

INFORMATION FURNISHED BY ASSISTANT SURGEONS P. MIDDLETON AND CHARLES SMART, UNITED STATES ARMY.

This post is on the left bank of Granite Creek, one of the radicles of the Rio Verde, half a mile above the town of Prescott, Arizona Territory. The valley of this creek is one of the many to be found around the base of Granite Mountain, the northern extremity of the Sierra Prieta. Its whole extent is covered with pine timber, and as the small plateau on which the post and town are built is receded from, the ground, still timbered, becomes much broken by ravines, and finally rises to the bare mountain peaks of grayish granite. But on the northwest, beyond the immediately surrounding hills, the country is open and rolling, covered with bunch grass and dotted with spreading juniper, until the Bill Williams and San Francisco Mountains break through and interrupt its undulations. Prescott, formerly the capital of the Territory, is a small town, the center and supply depot of a large but sparsely settled mining and agricultural district. The numerous valleys within a radius of 30 miles have rich but limited bottom lands, many of which are cultivated, and yield all the produce of temperate climates; the mountains are rich in free gold and gold sulphurets. It is reached from San Francisco by way of Los Angeles to Fort Mojave and Willow Grove, which lies west from it about 100 miles, or along the southern road from Los Angeles and San Bernardino, by way of La Paz, on the Colorado River. There is no direct eastern route from Prescott, communication being effected by way of Camp Date Creek, 60 miles southwest to Maricopa Wells, and thence eastward, by way of Tucson, to the Rio Grande. Letters travel to San Francisco in about fifteen days; to Washington in twenty-five to thirty days. The mails are frequently attacked by hostile Indians.

The climate of this district is mild during the spring and summer months, there being none of the long continued and scorching heats which, in the southern portion of the Territory, kill all vegetation except that on the margin of the streams. Frequent rains fall in the autumn, and during the winter the mountains are covered with snow, which, in severe seasons, may lie even in the valleys for two or three weeks at a time.

The post was established in 1864 as the then headquarters of the District of Arizona. The site selected was on a small plateau, half a mile above the town, and 70 feet above the level of the creek, to which it inclines, yielding a good natural drainage. The plan of the post is shown in Plate No. 12. It originally consisted of a rectangular stockade, the wall of which formed the outer wall of the various buildings inclosed in it. It was built of strong undressed pine logs, the crevices being filled in with mud, and the roofs of all the buildings shingled. Ventilation was imperfectly effected, as most of the doors and windows opened on the inclosed parade ground. The men's quarters, kitchen, and bakery occupied one side, with the officers' quarters opposite. The storerooms another, with the guard-house, adjutant's office, and laundresses' quarters opposite.

One company of infantry at the present time occupies this stockade. The dormitory is 80 by 20 feet, giving scarcely 300 cubic feet air space to each man of its average occupancy. The cavalry quarters, which were erected in 1867 for temporary shelters to the scouting troops, are about 100 yards lower down, and nearer the creek. They are log huts, each 53 by 19 feet, giving 400 cubic feet air space per man, of an occupancy of twenty men. For a long time they were without floors, windows, or bunks, but recently have undergone repairs and improvements which will contribute much to the preservation of the health of the men. All are heated by open fireplaces. Kitchens and mess-rooms for these troops are about to be constructed. The officers' quarters are similar in construction to those of the men, and in very poor condition. The guard-room is 16 by 20 feet, with three grated windows and no fireplace, and affords scarcely 300 cubic feet air space per man.

The corrals are stockades near the cavalry quarters. The water is of excellent quality and supplied from wells by means of a force-pump. The building used as a hospital was originally erected in 1864, as the quarters of the commanding officer, District of Arizona. It is a strong structure of hewn pine, floored, ceiled, and plastered, well lighted, with ridge ventilation, and warmed by open fireplaces and stoves. It can accommodate twenty-four patients, giving each 800 cubic feet of air space, but its average occupation is but fourteen. It has a kitchen, 12 by 12 feet, a mess-room, 12 by 16 feet, a dispensary, 16 by 16 feet, and store-room, 12 by 12 feet, with furnishings complete, and in excellent condition. The bath and wash room has the water supplied from tanks, and the waste water carried off by lead pipes. It is situated on an elevated ridge, about midway between the post and the town, with some shade trees around it. The drainage is natural, toward the bed of the creek. A garden of three acres adjoins the building, and is cultivated by the convalescents.

One great objection to this hospital is its distance from the post, and, among other things, the consequent labor required to keep the tanks supplied by the water-wagons. There is no ambulance at the post. One wheeled litter and Army wagons are the only transportation for the sick. Supplies are obtained yearly from the Assistant Medical Purveyor in San Francisco.

The ration issued is generally of good quality, and of the regulation allowance and variety. There are no company or post gardens, so that the vegetables obtained by the men are very limited in quantity, and mostly by personal purchases, as the company savings amount to little or nothing.

The market price of vegetables is 20 cents per pound. Milk, butter, eggs, and chickens are very rare articles of diet in this, as in other parts of the Territory, and are sold at high prices. It is expected that some of the land on the reservation will be laid out during the coming season as company gardens, so that scurvy, which has frequently appeared among the men, may be prevented in future. The cavalry companies have suffered considerably from sickness on account of the lack of fresh vegetables, their frequent absences from the post, placing them on a poorer ration, the hard riding, want of sleep, and exposure on scouts, and the poor quarters to which, until recently, they have had to return for rest. In addition to scurvy, and its frequent accompaniment, diarrhœa, intermittent and remittent fevers are the only diseases prevalent at the post and its vicinity.

The hostile Indians are tribes of Apaches on the east, and the Hualapais on the west. They are very active in their hostility, attacks upon settlements in the neighborhood or on travelers on the roads being of constant occurrence.

Statement showing mean strength, number of sick, and principal diseases at Camp Whipple, Arizona Territory, for the years 1868 *and* 1869.

Years.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Tonsillitis.	Venereal diseases.	Scurvy.	Rheumatism.	Phthisis.	Catarrhal affections.*	No. of deaths.
1868	183	353	87	60	1	20	31	39	4	40	1
1869	206.25	188	33	36	2	18	.....	24	1	18	.....

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP McDOWELL, ARIZONA TERRITORY.

INFORMATION FURNISHED BY ASSISTANT SURGEONS CHARLES SMART AND C. DEWITT, UNITED STATES ARMY.

This post is situated on the west bank of the Verde, about eight miles above its junction with the Salt River, in latitude 33° 40′ north, and longitude 111° 40′ west, at an elevation of 1,800 feet above the sea-level. It is 45 miles north of the Maricopa and Pimo villages, and the same distance southwest of Camp Reno. It is reached by steamer from San Francisco to San Diego, California, thence by mail stage via Yuma to Maricopa Wells, from which place a weekly mail is carried north to the post. The Indians have seldom interfered with this mail route, but the rising of the Colorado in Southern California frequently delays the transmission of the mails, and the floods of the Gila and Salt River have cut the post off from communication with the outside world for three and four weeks at a time. Letters usually reach San Francisco in fifteen days, and Washington, by the eastern route in twenty-five. This part of the Rio Verde basin is surrounded by mountains; the high line of the Mazatsal peaks on the east, 20 miles distant; a lower range, to which no name has been applied, 15 miles distant on the west; the numerous low peaks from which the river issues on the north, and the grotesquely abrupt mountains of the Salt River country on the south. On both sides of the Verde, near the post, the mesa rises almost from the water's edge, becoming more and more broken by deep and narrow ravines, until it blends with the foot-hills of the mountain ranges on the east and west. The river is thus well confined, and its bottom lands free from marshes. The strip of easily irrigated bottom land is very narrow, yet much good soil could be reclaimed by irrigation from large acequias. Cottonwood, willow, and elder grow along its banks, tangled frequently by grape-vines, which yield a small acid fruit. Mesquite, ironwood, palo-verde, artemisia, and species of *opuntia* and *cereus* cover the mesa, in some parts even rendering it impassable; the more open parts furnish indifferent grazing. Scrub and live-oak, and pine of large growth are found on the Mazatsal, but the building timber is almost all in inaccessible situations. Quail and rabbits are abundant on the mesa, and deer are found in the mountains, but less frequently than in the more northern portion of the Territory. Coyotes, rattlesnakes, scorpions, lizards, centipedes, and tarantulas, are to be met with here as in other parts. The soil is dry and porous, and well drained by its decided slope toward the ravines.

Some remains of Aztec civilization are found in this part of the country. The ruins of a large and complex structure existed on the site selected for the post, but it is now almost destroyed, as its stones were used by the troops in constructing temporary shelters and laying foundations for some of the post buildings. It was built of washed stones from the river bed, and although the highest portion of its ruined wall did not exceed three feet, the ground plan was perfectly preserved. Another such is situated on a knoll at the southern border of the reservation. Again, where the road to Maricopa Wells crosses the Salt River some large acequias are to be seen, which at a former period must have irrigated many miles of adjacent country. Another system of acequias which, in former times, irrigated the country near the mouth of this river, has recently been cleared out in part, and a thriving settlement, named Phenix, established by American and Mexican settlers. Stone hammers and hatchets, and washed rocks, with rude pictorial and hieroglyphic etchings, are sometimes discovered near these ruins. Fragments of painted pottery are very common.

The post was established in 1865, by five companies of California volunteers, as a point from which to operate against, or treat with, the Indians of the neighboring mountains. The reservation taken up measured, from the center of the parade ground, three miles north and south and two miles east and west. This included the greater part of the arable land in the immediate neighborhood. Building was immediately commenced and continued until early in 1866, when the essential part of the post was finished. One hundred and fifty acres of the bottom land were then cleared for cultivation, water being brought to it by an acequia from a point four miles up the river. This labor was performed by the garrison, then consisting of three companies of the Fourteenth Infantry, who had been sent to relieve the California troops, but the subsequent working of this "Government farm" was by employés of the Quartermaster Department. After this it was leased to certain

citizens, under contract to produce grain for the quartermaster and cavalry animals, and furnish the same to Government at a given figure. This system is still in operation. Of the grounds ten acres were reserved by the troops as a post garden. Corn, sorghum, beans, tomatoes, beets, radishes, and melons grew well, but potatoes and onions did not thrive. Grape cuttings from Los Angeles were placed in the soil, but proved a failure, possibly from imperfect preservation during their journey.

After the construction of the buildings and preparation of the grounds for farming, the military history of the post consists of a record of scouting expeditions against the Indians, occasional parleys concerning cessation of hostilities, and the escort, fatigue, and guard details necessary at an exposed frontier post. Some portions of the command, chiefly F, Fourteenth, and A, Thirty-second Infantry, were employed during the winter of 1867–'68 in building a wagon-road through a pass in the Mazatsal range to a point on Tonto Creek, where an outpost, Camp Reno, was established and held. This creek is also tributary to the Salt River, which it joins at the southeastern base of the Mazatsal. The valley is very fertile and affords good grazing, but no settlers have yet ventured into it. Many old ruins are found in it, and remains of acequias, marking its former cultivation.

The climate is warm and dry. Although the thermometer in the day-time in summer may show a high degree of heat, the nights are commonly not oppressive. Thunder clouds from the mountains drop a heavy passing shower once or twice a month. In winter the rains are lighter, though of much longer duration. Snow falls on the mountains, but not on the mesa. For the year ending June 30, 1869, the average temperature was 69.46° F., the extremes being 25° and 114°. Difference between wet and dry bulbs, 7.68°. The winds are variable and light, except when immediately preceding a thunder storm.

The post as planned and built in 1865 consisted of a parade ground, 525 by 435 feet, with its center one-third of a mile from the margin of the river, and 50 feet higher than its level. This height, attained by gradual rise of the ground, gives, with the aid of some shallow trenching, a very efficient surface drainage. The buildings were arranged along the sides of the parade ground as follows: On the west and furthest from the river the quarters of the commanding officer, a comparatively large square building, with a hall and two rooms on either side. The house is shaded by brush awnings, and has in rear, fenced in, a small yard as a site for the necessary outbuildings. On the south a line of quarters for officers; four houses facing the parade, each divided into four rather small rooms. A kitchen was afterward attached to the rear of each of these buildings. Two adjoining rooms in this line are used as a post adjutant's office. On the north, immediately opposite the officers' quarters, four sets of company barracks, with their gables toward the parade. Each is 187 by 24 feet, and is divided by transverse partitions into two dormitories and four smaller rooms, for use respectively as kitchen, mess-hall, office, and store-room for company property. The hospital was placed on the west, and the quartermaster's store, bakery, and sutler's store on the east of this column of barrack buildings, and separated from them by broad streets. On the east the guard-house, ordnance store-house, and house for the preservation of fresh meat for issue. Outside of these lines of buildings were the corrals, of high, close-set upright posts, on the southeast, and the laundresses' quarters, of primitive looking adobe huts on the north. The sinks, still further north, were deep trenches, inclosed by a thick wall of willow and cottonwood branches. Dry earth is used as a deodorant. At its establishment this post was intended to be the largest and most solidly built in the Territory. For ornaments and future shade a line of cottonwood saplings were planted at short intervals along the sides of the parade ground, and were watered assiduously for two years, during which time they flourished and promised well, but after this they showed signs of decline, in spite of the attention paid to them, and so came to be neglected. All the buildings were of adobe, with earthen floors, mud roofs, and open fireplaces. The roofs were flat, and had mud, sand, and lime cement laid over seguara ribs, which in turn were supported by cottonwood timbers. These timbers, or *vigas*, raised the roof from 8 to 10 inches above the wall, and so left ample space for ventilation. But, however carefully built by the California troops, the buildings proved unequal to the heavy washing showers of the summer, and the penetrating rains of the winter months. The roofs leaked almost from their first exposure, and the walls cracked and washed away in place after place, until, in spite of constant repairs, many of the houses became almost untenable. Three of the barrack buildings are now abandoned. The fourth is still occupied,

but much labor is required after every heavy or continued rain to keep it in repair. The other companies are in shelter-tents; brush shades have been erected over the tents, each of which is occupied by two men, and furnished with raised bunks. The kitchen and mess-room, in rear of each company camp, are built of brushwood and canvas. Cooking is done over open fireplaces. In addition to the buildings already indicated, there is a recently-built house, for some time occupied as headquarters District of Arizona, situated half way between the post and the river, and nearly in line with the north side of the parade ground. It is built after the plan of the commanding officer's quarters, and is now used as quarters by officers.

The guard-house consists of a guard and prison-room, the former 16 by 28 feet, the latter 30 by by 28 feet, affording ample space for the occupancy; ventilation good.

The magazine, 16 by 15 feet, is the only building at the post where the roof fits tightly down into the wall.

The quartermaster's and commissary store-house is 130 by 23 feet, and is divided into four rooms. It is in bad repair.

The bakery, 34 by 20 feet, is furnished with two ovens, and can turn out over five hundred rations in a batch.

A number of Americans and Mexicans connected with the Government farm have built adobe and brush huts between the river and the post.

The hospital is 120 by 23 by 12 feet, and is divided by transverse partitions into a kitchen, 15 feet, a mess-room 18 feet, two store-rooms, one 7, the other 19 feet, a ward 35 feet, and a dispensary 19 feet long. The ward is furnished with eleven iron bedsteads, to each of which it affords an air space of 750 cubic feet. It is heated by an open fireplace, lighted by four windows, and well ventilated by these and the interval between the wall and roof. The mess-room is separated from the ward by the store-rooms, so that, to reach it, patients have to go out and pass along the front of the building. The kitchen is well furnished.

The cemetery is distant about a quarter of a mile northwest from the buildings. It measures 75 by 60 feet, is surrounded by a temporary fence, and contains the graves of twenty-six soldiers and seven citizens.

The medical history of the post shows the prevalence of scurvy among the troops while occupied in building during the winter of 1865–'66, and its tendency to reappear as the end of winter or beginning of each succeeding spring approached. But careful cultivation of the post garden and the preparation of pickles for winter use, with the occasional purchase of potatoes and onions from Sonora, (25 cents per pound,) and the canned supplies on hand in the subsistence department, are deemed sufficient to keep the garrison free from scorbutic taint. The regular ration of the camp is fresh beef three times a week; but frequent absences from the post on scouting duty, by placing men on a salt ration and depriving them of vegetables, may produce slight cases of the disease at any season. The summer of 1866, during which the men were engaged in digging the ditch for irrigation and clearing the ground for cultivation, was characterized by an outbreak of dysentery and dysenteric diarrhœa. In the following years this disease did not reappear.

The water supply has been wagoned in barrels from the Rio Verde since the post was established. It is of excellent quality. An attempt was made to sink a well on the parade ground, but no water was struck. Cases of malarial disease did not occur among the troops until scouting was commenced, and the command exposed in malarious districts.

Although the Rio Verde contains an abundance of fish, the troops seldom have recourse to fishing as a pastime, the produce being soft and flavorless.

The post library, containing 200 volumes, and that of Company G, Twenty-first Infantry, of 100 volumes, mostly novels, are in much demand. Two papers only are received, although others have been written for by the post treasurer. A billiard table for the use of the officers is kept by the trader.

The inhabitants of the surrounding country are roving bands of hostile Apaches, dwelling in the mountains on the north and east. On the Gila River, south of the post, are the villages of the Pimos and Maricopas, two friendly tribes, who farm on the reservation assigned to them. Many of them have been enlisted as scouts for service with the expeditions from the post, and the tribes often send out war parties of their own against the Apaches, with whom they have been at war from time immemorial.

Statement showing mean strength, number of sick, and principal diseases at Camp McDowell, Arizona Territory, for the years 1868 *and* 1869.

Years.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Tonsillitis.	Venereal diseases.	Scurvy.	Rheumatism.	Catarrhal affections.*	No. of deaths.
1868	181.5	545	62	133	5	36	22	42	89	1
1869	220	492	177	101	4	14	1	28	62	1

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP LOWELL, TUCSON, ARIZONA TERRITORY.

REPORT OF ASSISTANT SURGEON CHARLES SMART, UNITED STATES ARMY.

This post is situated on the eastern outskirt of the old Mexican town of Tucson, Arizona Territory, at a height above the sea-level of about 2,000 feet. At a distance of a mile from camp, and separated from it by the town, the Santa Cruz River flows northward from the Santa Rita Mountains towards the Gila. To the west of the river is a long, low range of hills, which terminates abruptly 16 miles northwest of the post. North of the post, and 13 miles distant, is the south point of the Sierra Catarina, which range extends north and eastward until it becomes blended with the mountains on the San Pedro River, 30 miles distant on the east. The post is reached from San Francisco, California, by steamer to San Diego, in Southern California, and thence by mail stage by way of Yuma to Tucson. Mails run east and west twice a week, usually with great regularity, but liable to occasional interruption from Indian attacks and flooding of rivers. A letter will go to department headquarters at San Francisco, in from ten to fifteen days; to Washington, by the eastern route, in from fifteen to twenty days.

Tucson first became a military post during the late war, when the volunteer column from California advanced through Arizona Territory. On account of its situation it was made a depot for the supply of the posts in Southern Arizona, and on the relief of the volunteers by the regular troops in February, 1866, it was continued as such, a company of cavalry being stationed in the camp to guard the stores of the depot quartermaster and escort his trains to the various posts. Shortly afterward, however, as cavalry was required for scouting duty in the neighborhood of Tubac, on the Sonora line, this company was replaced by one of infantry.

The camp is placed upon a hard gravelly mesa or table-land, about 40 feet higher than the level of the water of the Santa Cruz River. This mesa is a part of the vast extent of rolling ground which extends from the Rio Grande westward beyond the Colorado into Southern California. Its soil is dry, and subsists only stunted specimens of mesquite, sage-brush, two or three species of acacia and various cacti. It is interrupted at long intervals by abrupt and very rugged sierras, and at intervals scarcely less long, by small water-courses, often dry during the greater part of the year, but in the rainy season overflowing their banks, and flooding the various strips of bottom land through which they travel, and which, in consequence of the annual overflow, bear a luxuriant vegetation during the remainder of the year. The Santa Cruz, one of these streams, runs northward from the Sonora line past the west side of the town and post, and continues its course to a point about four miles below, where its waters cease to run above ground, on account of the porous character of the soil. The dry bed of the river, however, can be traced for 100 miles further to its junction with the Gila below the Maricopa villages. For a distance of about three miles north and south, and on both banks of the river to the west of the town, are the fields which are cultivated by the Mexicans, producing yearly two crops, one of small grain, such as barley or wheat, sown in November and harvested in May, the other of corn, planted in June and harvested in October. As cultivation can only be carried on successfully by irrigation, it follows that more or less of the fields are constantly under water, which, combined with the heavy rains in July and

August, the tropical vegetation and its rapid decay, favors the development of the malarial poison, and accounts for the cases of remittent and intermittent fevers and diseases of the liver which prevail among the Mexican inhabitants during the months of August, September, and October. The camp, however, being separated from these fields by the town, and being on a somewhat higher level, is almost exempt from these malarial visitations.

The reservation has been well cleared of all the mesquite and sage-brush which at one time covered it. The ground is firm and smooth, so that it can be kept neat and clean with the expenditure of but little labor, and would be almost a dead level but for the shallow arroyos which drain off the heavy autumn rains. Other than the mesquite, so valuable as a fuel, the mesa presents no plant of any importance, but the river bottom furnishes a number of useful anti-scorbutics in species of portulaca and chenopodium, while the hills on the west are covered with the columnar seguara, the fruit of which during the months of June and July is collected by the Indians, and either eaten in its fresh state, preserved as a honey, or fermented into an intoxicating liquor. Silver and copper are found in the mountains to the west and south.

The water of the post and town is obtained from wells, which vary in depth from 12 to 35 feet; the well in camp is of the latter depth, and furnishes a supply of much purer water than any in Tucson, at least in its freedom from organic matter. Although it contains a large proportion of lime, (with some magnesia and the alkalies in combination with carbonic, hydrochloric, and sulphuric acids,) it exercises no evil effect on the health, even of those who have been unaccustomed to its use.

The year is divided into rainy and dry seasons. The spring rains occurring in February fetch up the first or small grain crop of the farmers. After this rain is a rarity until July, when the heaviest falls of the year take place. Even during this month, however, the rain-fall seldom exceeds two inches in Tucson, although on the surrounding mountains it may be such as to flood all the valleys leading down from them. Snow is occasionally seen during the winter months in the crevices on the northern slopes of the Santa Rita and San Pedro Mountains, but it seldom falls on the mesa. The winds are generally light and variable. The mean temperature for the year ending June 30, 1869, was 67.25° F., the hygrometric column being for the same time 62.07°, while the highest observed temperature was 111° F., at 2 p. m. June 15, and the lowest 22° F., at 7 a. m. of January 16, 1869.

The camp consists of two lines of A tents, with a street between them. These are the quarters for the men. They are shaded, like all the rest of the canvas shelters, with a brushwood awning. The tents each accommodate two men, and are furnished with roughly-built bunks, raised from 1½ to 2 feet from the ground. On the south side of the line of tents is the parade ground, and wall tents of the officers of the command, while on the north side is the well, and beyond it the kitchen, bakery, and mess-tents, and the tents of the company laundresses, two in number. The kitchen is an old adobe building, with crumbling walls and leaky roof. The food is cooked over an open fireplace. The mess-room consists of two hospital tents, roughly fitted up, with tables and benches. The bakery is small, but possesses a very good oven of burned bricks. The guard-house, until the summer of 1869, consisted of a frail structure of logs and brushwood, ventilated by its imperfect construction. In June of that year a new guard-house was built on the west side of the quarters of the men. It is a strong adobe building, consisting of a guard-room, prison-room, and five cells. The guard-room is ventilated by the windows and open fireplace. The prison-room, 22 by 15 by 12 feet, with an average occupancy of five men, thus affording an air space of 790 cubic feet per man, was originally ventilated by six loop-holes, but these proving insufficient, it was found necessary to add two iron-barred windows, each two feet square. The only other adobe building on the reservation is a solidly-built magazine and ordnance store-room, situated at the southwest corner, about 400 yards from the men's quarters. This apparently detached position was elected that the building might be in place should a permanent adobe barrack be erected. The sinks are built of brushwood, and are at a distance of 100 yards from the nearest quarters. There are no store-houses on the reservation, the garrison drawing all supplies direct from the depot at Tucson. The depot quartermaster rents from the citizens of the town a sufficient number of houses and corrals for the storage and shelter of his supplies and transportation.

The hospital is an old adobe building on the main street of the town, at a distance of about 1,000 yards from the camp. Even were this building in good condition, its position in the center

of the town, its proximity to the irrigated fields in the river bottom, its distance from camp, and the smallness of its rooms, render it undesirable as a hospital; but when, in addition to this, its leaky roof, worn-out floor, and rain-washed walls are taken into consideration, and the series of old sinks that are covered up in its inclosure, it is found to be totally unfitted for such a use. These facts have been appreciated by the post commander and medical officer, and application, accompanied with plan and estimate, was made for permission to build an adobe hospital of twelve beds on the reservation. The application was not favorably considered on account of the probable temporary character of the camp. There is no well attached to the building; all the water used in the hospital has to be carried from a well about 400 yards distant. Water could readily be found in the hospital inclosure, but the presence of the sinks forbids the sinking of a well in this place. Medical supplies are obtained from the Assistant Medical Purveyor in San Francisco, a year's supply being required for at one time.

The mean strength of the garrison for the year ending June 30, 1869, was four officers and ninety men. These troops were employed in scouting the neighboring mountains for hostile Indians, escorting trains through the country, holding the picket posts of the Cienega de las Pimas and the Tres Alamos, guarding the depot of the assistant quartermaster at Tucson, and performing the necessary guard, fatigue, and extra duties of camp. The constant active service required of the men did not admit of opportunity for drilling.

The picket post of Cienega de las Pimas, 30 miles east of Camp Lowell, was established in October, 1868, on account of repeated attacks made by hostile Apaches on trains and travelers near that point of the road leading from Tucson to the Rio Grande. The position selected was the highest point of the broken country in the vicinity of the cienega or marsh; this for reasons military as well as hygienic. A rude but commodious and weather-proof hut was built of cottonwood timbers, roofed with wagon covers, and furnished with raised bunks. The picket, consisting of a non-commissioned officer and ten men, was relieved every thirty days. The ration here could be supplemented by hunting, as quail, duck, and rabbits were plentiful in the neighborhood, and antelope were occasionally to be found on the mesa.

The picket post at the Tres Alamos was established in 1867 for the protection of agricultural interests on the San Pedro River, fifty miles east-northeast of Tucson. The valley of the Tres Alamos is settled by four American and several Mexican farmers, who raise corn, beans, and melons on the bottom lands, irrigating by means of acequias. The picket, consisting of a non-commissioned officer and ten men, was stationed on a rising ground at a little distance from the irrigated fields in an adobe hut, which was rather small and imperfectly ventilated. This party was also relieved once a month, and during their stay could improve their ration not only by hunting, but, at certain seasons, by farm produce. At both of these posts the water supply was good from a running stream. The suffering from intermittents was much less than one would imagine from viewing the character of the surrounding country.

The parties engaged in scouting after hostile Indians have had but little opportunity of improving on their salt ration, and scorbutic symptoms have been a not infrequent accompaniment of a return from a trip into the mountains, the more especially as even on their return to Camp Lowell fresh vegetables were found to be a rarity. The commissary recently has had a supply of canned vegetables, fruits, and jellies, which are sold to the men on the approval of the post commander. In town the nominal price of butter is $1 50 to $2 per pound; eggs, $1 per dozen; chickens, $1 apiece; and all vegetables 25 cents per pound; yet very great difficulty was found in obtaining these articles at any price.

Fever first showed itself in most of the men while out on scouting duty in unhealthy parts of the country, or on escort duty to some of the more sickly posts. Cases originating at Camp Lowell were rare. Cases of diarrhœa and occasionally dysentery occurred. Venereal diseases have been very rarely seen, although the dance-houses of the town are the chief resorts of soldiers on pass.

Connected with the post is a detachment of twenty tame Apache Indians, who have been enlisted as scouts. Two or three of them are sent out with every expedition from the posts in the southern district of Arizona. These men, when not on duty, live in the village of their own people, half a mile south of the reservation. They appear to be very liable to attacks of pulmonary disease on exposure during the winter.

In addition to the American and Mexican inhabitants of Tucson, about 2,000 in number, and the village of about 30 tame Apache families, Papagoe Indians are frequently found in the neighborhood of the post. They are friendly to the whites and peaceable in character, occupying themselves in raising corn and melons. Their nearest settlement is on the Santa Cruz, 10 miles south of Tucson, at the old Jesuit mission of San Xavier del Bac. No hostile Indians live in the vicinity of the post; the Apaches who murder and plunder on the roads radiating from Tucson dwell in the more northern mountain ranges.

Statement showing mean strength, number of sick, and principal diseases at Camp Lowell, Arizona Territory, for the years 1868 *and* 1869.

Years.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Tonsillitis.	Venereal diseases.	Scurvy.	Rheumatism.	Phthisis.	Catarrhal affections.*	No. of deaths.
1868	127.66	324	213	8	1	8	6	9	2	11	6
1869	103.25	227	144	27	3	6	6	6	.....	5	2

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP GRANT, ARIZONA TERRITORY.

INFORMATION FURNISHED BY ASSISTANT SURGEON CHARLES SMART, UNITED STATES ARMY.

Camp Grant is situated at the junction of the Aravipa with the San Pedro River. Its elevation above the sea is about 2,500 feet. It is distant east from Maricopa Wells 100 miles, north from Tucson 56 miles, and west from Camp Goodwin 60 miles. The mail route from San Francisco is by way of San Diego, Yuma, Maricopa Wells, and Tucson, whence a weekly mail is dispatched north to the post. But well-escorted trains and travelers may proceed from Maricopa Wells direct, without circling southward by Tucson, as there is a good road along the Gila River between the two places. On both roads Indian attacks are of frequent occurrence. Letters reach San Francisco in twenty, and Washington in twenty-five days, when there are no delays.

The post was established by the California volunteers with the view of restraining the Indians, and protecting the southern line of travel between California and the eastern States from the ravages of the Apache tribes living north of the Gila. It was originally built immediately on the bank of the San Pedro River, but in 1866 twenty out of twenty-six adobe buildings, composing the post, were swept away by the flooding of the stream. A new site was then chosen on a flattened knoll in the angle formed by the junction of the two streams. From this position, looking toward the southeast, the basin of the San Pedro is seen to stretch until it becomes almost lost on the horizon, with a range of abrupt and rugged mountains on the west, and a series of high rolling hills on the east. Toward the northwest are the mountain ridges and peaks among which the stream courses on its way to the Gila, twenty miles below, and beyond them the still higher ranges on the north of that river. The knoll is situated close to the base of the steep western mountain ridge, from which it is separated by the San Pedro.

The valley of the San Pedro varies in width from one-half to four miles. Many parts of the valley can be cultivated by irrigation. Several attempts have been made to reclaim the ground in the immediate neighborhood of the camp, but without success.

The Aravipa, which issues from a deep and narrow cañon on the northeast, sinks in traversing the San Pedro Valley, except during rains, when its shallow, sandy bed frequently overflows, and becomes unfordable.

The prevailing winds are from the southeast down along the course of the San Pedro, carrying with them the malaria from the marshes along its banks, and exposing the troops stationed on the knoll to its deleterious influence. The mean temperature of the year was 67° F.

The camp is composed of adobe, stockade, and reed buildings, supplemented by tents. All the roofs are liable to leak in rainy weather. There are three sets of soldiers' quarters; one is adobe, 120 by 24 feet, with the usual mud roof, earthen floor, and open fireplaces, ventilated by the doors and windows, and affording to its average occupation 400 cubic feet per man; two are rather open stockades, thatched with cane and reeds, and freely ventilated by the interstices in the walls. They are 103 by 20, and 140 by 22 feet, and give 470 and 450 cubic feet air space respectively. The bunks are rudely constructed, but single and well-raised from the ground. The mess-rooms and kitchens in rear of these are each about 50 by 18 feet; one is of adobe, a second stockaded, and the third a framework of reeds.

The bakery is furnished with a good oven, large enough for the supply of the three companies. The married soldiers are accommodated in wall tents.

The officers' quarters, adobe, consist of four sets of two rooms, each room 15 by 18 feet. There were six officers at the post during the year, two of whom had their families with them.

The store-houses are one adobe, the other a stockade, each about 70 by 25 feet, with the corrals in the rear.

The guard-house is of adobe, lighted and ventilated by the fireplace, doors, and windows. It is 34 by 17 feet, and affords 400 cubic feet to each man of its average occupancy.

The hospital at first consisted of a building 30 by 16¾ feet, which is the ward; but recently a wing was added to it, 18 by 18 feet, as a dispensary, store-house, and surgeon's office. The ward is furnished with eight iron bedsteads, and has an average occupation of eight, giving per man 650 feet. When, as is often the case, a larger number of patients require admission into hospital than this ward can accommodate, hospital tents are pitched adjoining, and furnished with iron bedsteads. There is a kitchen, 16 by 16 feet, of adobe, but no mess-room.

Vegetables are obtained from the subsistence department preserved in cans, but the main supply is from the company gardens in the river bottom. Onions and potatoes are sometimes brought up from Sonora, via Tucson, at 25 cents per pound. Chickens and eggs are scarce, having to be brought from Tucson or Maricopa Wells, while butter is almost unknown. The water of the San Pedro River is used only by the quartermaster animals and for washing. It is pleasant enough to the taste, and turbid only during heavy rains, but coming, as it does, through swampy country above the post, may be impregnated with malaria. A supply of excellent water is obtained from a well, 90 feet deep, sunk in the parade ground, worked by a wheel and axle, and well protected from surface drainage.

The diseases are all malarial, and prevail to such an extent during the autumn and winter months as to unfit the garrison for any active service. In 1868 intermittents were so general that the affected troops had to be moved from the post to a temporary convalescent camp, 28 miles south, on the road to Tucson. This was the nearest place which could be found at the same time supplied with water, accessible to wagons, and thoroughly free from any miasmatic influences.

A tribe of Apache Indians, the Aravipas, dwell in the mountains near the post. At one time, for a short period, they were friendly, at least in their professions, and received rations from the subsistence department. As many as 700 of this and neighboring tribes or families have been in at one time. But it is some distance from the post, north of the Gila River, that the greater portion of the hostile Apaches that infest Southern Arizona have their more permanent rancherios.

Statement showing mean strength, number of sick, and principal diseases at Camp Grant, Arizona Territory, for the years 1868 *and* 1869.

Years.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Tonsilitis.	Venereal diseases.	Scurvy.	Rheumatism.	Phthisis.	Catarrhal affections.*	No. of deaths.
1868	214.83	2,096	1,735	266	1	5	27	8	.....	11	2
1869	151.5	643	561	35	4	3	1	6	2	17	1

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP MOJAVE, ARIZONA TERRITORY.

REPORT OF ACTING ASSISTANT SURGEON F. S. STIRLING, UNITED STATES ARMY.

This camp is situated on a gravel bluff on the east bank of the Colorado River, near the head of Mojave Valley; latitude 35° 6′ north, longitude 114° 31′ west; altitude, 600 feet above sea-level, and 75 feet above the river. It was established in 1858 for the protection of emigration over the Southern Overland Route to California, the Mojave and other Indian tribes being then hostile, and having in the summer of 1857 committed depredations on parties of emigrants. The Indians remained hostile until severely defeated by the troops under Major Armistead, who encountered them in the valley below the fort and drove them back with great loss. They then sued for peace. The post was abandoned in May, 1861, and regarrisoned in May, 1863, by two companies of the Fourth regiment of infantry, California volunteers.

The plateau extends north and south about 40 miles, with an average width of 10 or 12 miles. There are two reservations, each three miles square. The camp is built on the upper one. The lower reservation is on the low bottom land, about six miles south of the post. Part of it is subject to overflow; the soil is fertile, and is covered with coarse grass, cottonwood, and mesquite trees, with a dense undergrowth of willows and arrow-weed. With this exception the country is a waste. The elevated plains are covered sparsely with a growth of greasewood bush, interspersed with varieties of the cactus family.

The mineral resources of this portion of the Territory are vast, though but partially explored. Immense mines of copper are found in the Sacramento district, 25 miles northeast of this camp. The ore is a red oxide, combined with a carbonate. Large deposits of argentiferous galena, assaying 60 per cent., are found in the same district, while in the Black Mountains, 10 miles in an easterly direction from here, rich lodes of gold and silver-bearing quartz are found. Several mills have been erected, and will, by their production of the precious metals, soon fill up the country with persons who will develop to the utmost the resources of Northern Arizona.

Rabbits and quail are found in large numbers; ducks and geese abound in the sloughs, and the river affords an abundance of fish of the salmon species. Deer, mountain sheep, and antelope are found in the hills. The mountains, on either side of the river, are barren and destitute of timber. But few springs of water are found in the adjacent mountains, and the country may be described as a sterile plain, broken by arroyos or dry gulches.

The climate is healthy, the winters pleasant, but the summers extremely hot. The extremes of temperature are 35° and 118° F. There is no rainy season, though thunder showers are frequent in July and August. The annual rise of the Colorado takes place in June. The prevailing winds in the summer are from the south, and, passing over the arid plains, the air is so heated that it scorches like that from an oven. The nights are so hot that no one can sleep in the house, and the whole garrison lie on the open plain, endeavoring to catch the faintest breeze.

The troops now occupy the new adobe barrack, erected during the past year, though the buildings are not entirely finished; the old stockade buildings formerly used as soldiers' quarters are being demolished for building material. The quarters afford an abundant air space to the men, are furnished with fireplaces, well lighted and ventilated by windows. Single bunks are used. Contiguous to the barracks are adobe buildings, erected and formerly occupied by citizens, now used as quarters for married soldiers.

The officers' quarters are two stockade buildings, containing four rooms each, much dilapidated. The new quarters are unfinished. Those now used have one window in each room, and a mess-room in rear. The adobe building now in process of erection is 40 by 50 feet, and intended for two officers.

The store-house for the commissary and quartermaster department is a new adobe structure, too small for the purpose.

The guard-house is an old stockade building, insecure and dilapidated, and entirely unsuited for the purpose for which it is used. It contains two rooms, poorly ventilated, and lighted only by

doors. Heating is effected by means of a fireplace. The average occupancy of the guard-house is six prisoners.

The hospital is an old, dilapidated stockade building, not worth repairs, with dirt roof and floor. A new building is much needed, and will be commenced as soon as possible, the work to be done by the troops. The present hospital is warmed by means of fireplaces, and lighted by windows. The ventilation is deficient. The ward, 28 by 25 by 10 feet, generally contains six beds, giving to each a cubical air space of 1,166 feet. There are no bath or wash rooms; a bathing-tub is used in the ward.

The supply of water is afforded by water-carts filled at the river, and that used for drinking purposes is cooled in "oyers," or earthen jars covered with matting. The water of the Colorado, although muddy, does not produce diarrhœa or other unpleasant effects. Natural drainage is good. All refuse, dirt, and litter are removed from the vicinity and carried off by the river.

Subsistence and other stores are received by light-draught steamboats on the river. Vegetables are scarce, and are with difficulty obtained from California. Several cases of incipient scurvy have occurred, but yield at once to vegetable diet. A large supply of canned fruit and vegetables for the use of the enlisted men is a great necessity here, as no post garden can be cultivated. Such articles can be obtained from the commissary department at low prices. Potatoes and onions are brought 250 miles from California. Milk costs $1 50 per gallon; butter, $1 per pound; eggs, $1 per dozen; potatoes, 12 to 15 cents per pound; and onions, 20 to 25 cents per pound.

The only means of communication is by wagon and horseback, with occasionally a steamer from Fort Yuma, California. Mails are received each week from the west, via La Paz, and from the east via Salt Lake City; the mail is carried on horseback, requiring sixteen days to department headquarters.

The Indian tribes on the river are peaceable; they cultivate corn, wheat, beans, and squashes, planting after the annual overflow. During the winter months, when their stores of provisions are low, they are furnished with small supplies of flour from the post. No depredations have been committed in the valley, and many of the hostile Hualhapais have surrendered and come in.

Statement showing mean strength, number of sick, and principal diseases at Camp Mojave, Arizona Territory, for the years 1868 *and* 1869.

Years.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Tonsillitis.	Venereal diseases.	Scurvy.	Rheumatism.	Phthisis.	Catarrhal affections.*	No. of deaths.
1868	84.08	263	26	35	2	61	11	16	3	25	3
1869	78.83	122	21	29	.....	21	1	3	1	8	.....

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP VERDE, ARIZONA TERRITORY.

INFORMATION FURNISHED BY ASSISTANT SURGEON CHARLES SMART AND ACTING ASSISTANT SURGEON W. H. SMITH, UNITED STATES ARMY.

Camp Verde, formerly known as Camp Lincoln, is situated on the east bank of the Rio Verde, about 50 miles east of Prescott, the nearest town, and by way of which it receives all its supplies and mails, and 90 miles north of Camp McDowell by trail along the Rio Verde. The Verde Valley, during the greater portion of its course from north to south, is extremely narrow, being little other than a cañon with rugged and barren hills on either side, but in this locality it is about seven miles wide, with a rich alluvial bottom, which, to some extent, has been farmed by settlers. When irrigated it is very fertile and yields fine crops of corn, which is the staple product. The

Black Mountains bound it on the west and the Mogollon range on the east. On the tongue of land formed by the junction of Beaver Creek with the Verde, three-quarters of a mile below the post, there is a considerable tract of low bottom, on which a rank vegetation springs up after the spring and autumn rains. This appears to be the chief source of the malarial diseases which affect the garrison, more especially at the latter season. The water of both these streams is of excellent quality, free from any marked amount of organic or inorganic impurities, and turbid only during floods. Cool water, even in the hot summer season, can be obtained from a small spring on Beaver Creek. There are rich grazing and fine timber in the vicinity of the camp, and game in abundance.

The spring rains occur during March, and, with the snow on the mountains, usually occasion floods, which inundate many of the bottom lands; similar floods are an accompaniment of the July rains; but the rapid current of the river, the sandy soil of the inundated lands, and the high winds which are prevalent during these stormy months, speedily drain and dry off all surface water.

The mean annual temperature for the year ending June 30, 1869, was 60.75° F.; the extremes being on September 2, 107° F., and December 15, 24° F.

The post was originally established by two companies of Arizona volunteers, mostly Mexicans who were in service during the late war. It was an outpost from Fort Whipple, and intended to protect the Prescott country and admit of its settlement. The shelters built by these troops were of the most primitive character; and even on the advent of the regular troops in 1866 they were but little improved, consisting of excavations on a hill-side, completed with logs and shelter tents. The hospital was a small log house, 15 by 13 feet, containing three beds. Its site was an elevated piece of ground one-quarter mile from the Verde, with excellent surface drainage and a porous gravelly soil. Better and more permanent quarters were commenced on the same site in 1868, but two sets of company barracks are the only buildings as yet completed. One set is unoccupied by troops, but is used in part as a quartermaster and subsistence store-room. Each building is 100 by 26 by 10 feet, with adobe walls, shingled roof, and earthen floor, and is partitioned off into two dormitories, 40 feet long, by an office in the center, 20 by 26 feet, which communicates with the former. Each dormitory has an open fireplace, four windows, a door opening on the parade, and another communicating with the office. But as these were found to be insufficient for satisfactory ventilation, a ventilator was opened in the wall of each room near the roof. The only fixtures or furniture is a double line of bunks, two tiers high, each 4 feet wide, and accommodating four men. But little over 300 cubic feet of air space is permitted to each man, of average occupation. All the other buildings of the post are irregular, being for the most part the remains of the old camp. There is no mess-room, the men eating their rations in quarters.

The officers' quarters are miserable hovels, that of the commanding officer being formed of rough boards, with gaping seams. Its size is 12 by 13 feet.

The guard-house is a small stockade, with canvas roof, lighted by the door and roof, and sufficiently ventilated by the crevices between the posts forming the walls.

After the log hospital of three beds mentioned above was disused, the sick were placed in a ward of hospital tents, with an adobe fireplace and chimney built at one end. Average occupation of this, seven men. Since the recent completion of the second set of company quarters the sick have been moved into one of its dormitories for treatment until such time as a hospital is built.

The post garden, situated six miles below the post where Clear Creek joins the river, is nominally cultivated by from three to five men detailed for that duty; but the supply is not such as the extent and fertility of the soil at command would yield with careful cultivation. It has produced, however, a small cart-load of onions, beets, corn, cabbage, melons, and cucumbers twice a week for four or five weeks during the season, and provided the garrison with sauerkraut during the winter; chickens, eggs, and butter are hardly to be obtained, but deer are sometimes shot in the mountain gorges. In this vicinity there are three or four small ranches farmed by German and American settlers.

The diseases which prevail are chiefly malarial, consisting of intermittents, hepatic affections, and diarrhœa. During the dryer seasons of the year most of this class of cases come from the men on duty at the post gardens and other low localities.

In addition to the few settlements on Clear Creek, there are some ranches on the Agua Fria,

about midway between the post and Camp Whipple. In the Agua Fria district there are also many auriferous ledges, mostly of free gold.

The hostile Indians, Tonto Apaches, occupy the mountains south of the post through which the Verde cañons its way toward Camp McDowell, and to the eastward the difficult country in the neighborhood of the Mogollon ridge.

Statement showing mean strength, number of sick, and principal diseases at Camp Verde, Arizona Territory, for the year 1869.

Year.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Tonsillitis.	Venereal diseases.	Rheumatism.	Catarrhal affections.*	No. of deaths.
1869	69.91	146	51	21	1	2	5	21	.....

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP COLORADO, ARIZONA TERRITORY.

INFORMATION FURNISHED BY ASSISTANT SURGEON CHARLES SMART, AND ACTING ASSISTANT SURGEON WASHINGTON WEST, UNITED STATES ARMY.

This camp is on the east bank of the Colorado River, on the Mojave Indian reservation, 322 miles from the mouth of the river, and 440 feet above the sea-level. La Paz is the nearest post office, and is 40 miles distant along the river. Letters require ten or fifteen days to reach San Francisco; twenty-five or thirty to Washington.

The camp was established in the latter part of 1868, in anticipation of trouble from the river Indians. It is placed immediately on the river bank, above overflow, on the low level bottom, which is about 250 yards wide at this point. Beyond this bottom to the eastward, a mesa or table-land rises with a gradual ascent to a height of 40 or 50 feet, and extends to the distant mountain ranges. It is almost destitute of vegetation. The country on the opposite bank is similar in character. Some of the fertile bottom lands along the river are cultivated by the Indians. Cotton-wood, mesquite, ironwood, willow, and arrow-wood grow along its banks. The climate is similar to that of Fort Yuma, California.

The camp is a temporary one, consisting of brush huts, which afford some protection from the rays of the sun, but none from the rains and violent sand-storms prevailing during the winter and early spring months. Their only furnishings are rudely-built bunks, raised a foot or more from the ground. The rations are cooked and eaten in the open air. There are no married soldiers in camp. The officers live in wall tents pitched underneath a brush shade at one end of the line of huts for the men. The bakery, of stone and adobe, is the only building of comparatively permanent materials. The hospital, ward, dispensary, and store-room is a hospital tent.

No post garden has been cultivated, but vegetables in their season can be obtained from the Indian settlements. Canned stores are also on hand in the subsistence department for purchase.

There have been no deaths at the post. Venereal diseases, contracted among the Mojave Indians on the reservation, constitute the majority of the cases on the sick report.

The Indians in the vicinity are large, muscular, and well formed, but without any tendency to civilization, their only object of existence being to satisfy the cravings of appetite and the animal passions.

Statement showing mean strength, number of sick, and principal diseases at Camp Colorado, Arizona Territory, for the year 1869.

Year.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Venereal diseases.	Scurvy.	Rheumatism.	Catarrhal affections.*	No. of deaths.
1869	73.41	191	37	30	26	6	13	7	.....

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP BOWIE, ARIZONA TERRITORY.

INFORMATION DERIVED FROM REPORTS OF ASSISTANT SURGEON CHARLES SMART, UNITED STATES ARMY, AND ACTING ASSISTANT SURGEON W. H. SMITH, UNITED STATES ARMY, 1870.

Camp Bowie is situated in a pass in the Chiricahua Mountains, known as Apache Pass, through which the road from Tucson to Mesilla penetrates, about 100 miles east of the former town. It is in latitude 32° 40′ north, longitude 109° 30′ west, and elevated about 4,826 feet above the sea. The post was established under the name of Fort Bowie, in August, 1862, by Company G, Fifth California volunteer infantry, as a protection to the road at this dangerous point, and as a guard to the important springs found here. It was placed on the summit of a hill overlooking the water supply, having high mountains on the north and south, and the broken rocky country constituting the pass on the east and west, beyond which, in these directions, the view becomes more open, and the scrub oak growth of the highlands gives place to grass.

Up to 1868 the post was a most irregular one, the houses, or rather huts, being built on and under the ridges of land on the hill summit and slope, but at that time a new post was commenced on an adjoining hill which afforded a better site.

The reservation includes about one square mile, and is in every part well drained by the irregularity of the surface. A ledge of gold-bearing quartz has been discovered within one-fourth of a mile of the reservation, and a ten-stamp mill erected, but so far its working has been unprofitable, and it now stands idle. It is generally supposed that a good mill erected at Bear Spring, about three quarters of a mile from the post, where a sufficient supply of water can be had, backed by sufficient capital, could be profitably employed in grinding ore from the Harris mine, the one spoken of. Large game, as turkeys, deer, and bear, is found in the mountain country.

The company barracks, an adobe building with mud roof, is 120 by 22 feet, and has a kitchen attached, 15 by 15 feet. It is warmed by open fireplaces, and ventilated by apertures in the wall near the roof; its air space to its average occupation is 400 cubic feet per man; it has no other furniture than the rough bunks constructed of poles, cut in the ravines near the post. Since the above description was obtained two new barracks have been erected, one on the east side of the parade ground, 156 by 30½ feet, containing two squad-rooms, one store-room, one office, and one library; the building is roofed with mud, its walls being of adobe; attached to it is a mess-room and kitchen, 56 by 16 feet, built in a like manner. The other set is on the north side of the parade ground, built of the same material, 118 by 24 feet, containing two squad-rooms, store-room, and office, with a mess-room and kitchen, 66 by 16 feet, attached to it. The sinks are open, on the edge of a ravine, from which deposits are swept away by the rains.

There are two sets of officers' quarters, each consisting of two rooms, 15 by 15 feet, with kitchen and mess-room adjoining. As, including the medical officer, there are six officers at the post, three of whom are married, some of the old buildings are made use of to supplement these quarters. The quartermaster's store-house, 88 by 22 feet, has two rooms for officers in one end, and an ordnance store-room in the other. A new hospital has been built, occupied, and vacated as inadequate,

and is now occupied by three bachelor officers; it has four apartments, with a kitchen and dining-room adjoining.

A new building has been erected containing the offices and store-rooms of the acting assistant quartermaster and acting commissary of subsistence. The building occupied as guard-house, adjutant's office, and quartermaster's store-house, is now the post hospital. The vacated commissary store-room, after having been used as a barrack room, is now a granary. A new guard-house, 36 by 16 feet, with two rooms, has been built in the rear of the present hospital.

A bakehouse has been erected on the east side of the parade ground; also, on the north side of the parade ground, a corral, with carpenter shop and blacksmith shop attached to it.

Vegetables are always scarce at this station, as none can be raised and few purchased anywhere in the neighborhood. The supply of canned fruits from the subsistence department was useful but inadequate, in view of the scarcity of fresh vegetables. As may be inferred, a scorbutic taint has at times affected the men, debilitating them, and rendering them prone to diarrhœa. Attacks of intermittent occur only in those who have received the germs of the disease away from the post.

The only settlers in this part of the country are the few men at work at the quartz mine. Frequently, however, emigrants from Texas to California, most of whom are in very destitute circumstances, call upon the post medical officer for assistance and supplies for their sick and wounded. Bands of hostile Indians, Apaches, are constantly in the neighborhood, watching for favorable opportunities to interrupt the traffic on the road.

Communication from San Francisco is effected by means of the mail route from San Diego, California, via Fort Yuma and Tucson. The mail coach arrives from the east on Thursdays, and from the west on Tuesdays of every week, but arrives very irregularly. Trains and mails are frequently attacked by Indians in this vicinity.

Statement showing mean strength, number of sick, and principal diseases at Camp Bowie, Arizona Territory, for the years 1868 *and* 1869.

Years.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Tonsillitis.	Venereal diseases.	Scurvy.	Rheumatism.	Phthisis.	Catarrhal affections.*	No. of deaths.
1868	80.75	131	48	27	1	.....	5	15	2	6	1
1869	115.16	255	106	70	.....	2	3	13	.....	15	1

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP CRITTENDEN, ARIZONA TERRITORY.

INFORMATION FURNISHED BY ASSISTANT SURGEON CHARLES SMART AND ACTING ASSISTANT SURGEON B. SEMIG, UNITED STATES ARMY.

Camp Crittenden is distant from Tucson south-southeast 56 miles, from Camp Wallen west-northwest 20 miles, and about 12 miles directly east of the peak of the Santa Rita Mountain. It is reached from San Francisco via Fort Yuma and Tucson. Letters eastward and westward, to Washington, and San Francisco, California, require about twenty days to reach their destination. Both routes are liable to interruptions from Indians and delay from floods. The mail is usually served weekly at the post.

The garrison of this place, on entering the Territory in 1866, were stationed at Fort Mason, a post established at Calabasas, on the Santa Cruz River, 13 miles south of Tubac; but as malarious fever, diarrhœa, and dysentery prostrated the greater part of the command, it was soon afterwards removed to a location which presented fewer of the causes engendering the paludal poison.

The new post, Camp Cameron, was situated on the northwestern base of the Santa Rita Mountain, 16 miles northeast of Tubac, and 45 miles south and a little east of Tucson. It was on a dry, rocky mesa, on the north bank of a clear mountain stream which sank at a little distance below the post. The men were quartered in A tents, the officers in huts, which were a conglomerate of stone, rawhide, planks, canvas, and logs. From this the troops were moved to Tubac, on account of Indian outrages committed there. A church and a number of adobe buildings were turned over by the citizens for their accommodation. In February, 1868, they were ordered to the position which they now occupy, for the purpose of promoting the settlement of the Sonoita Valley and continuing their protection of the Sonora frontier. The site selected was a high ground, surrounded by deep ravines, half a mile northeast of the remains of old Fort Buchanan, a military post which was abandoned at the breaking out of the war of the rebellion.

The surrounding country is rolling and affords excellent grazing. It is sparsely timbered with live-oak trees of small growth, but which become more luxuriant as the mountains are approached. Pine timber is plentiful in the gorges of the Santa Rita.

The soil is a reddish-yellow clay intimately mixed with a large proportion of coarse gravel, a compound which retains surface water in situations where there is no natural drainage. The camp, however, is well drained naturally by its slope, and this is aided by some superficial drains tending toward the ravines. One of the ravines on the southern aspect of the camp shallows out into a marsh, for the drainage of which no work has yet been attempted.

Southeast of the post, and a quarter of a mile distant, is the source of the Sonoita River, which, after a west-southwest course, empties into the Santa Cruz near Calabasas. Cottonwood, willow, sycamore, elder, and walnut are found along its banks. The valley widens out in many places into valuable agricultural lands, which can be irrigated with little labor. Each company of the garrison cultivates a garden about four miles below the post, near the now deserted settlement of Casa Blanca.

Southwest from camp, and one and a half miles distant, is a warm spring, the water of which is clear, inodorous, and tasteless, and of a temperature of 81° F. A mile beyond this, in the same direction, are the Monkey Springs, which cover all surrounding objects with deposits of travertin. A well in the center of camp furnishes water for drinking and cooking, which is clear, cool, and agreeable to the taste. That from the source of the Sonoita is employed for washing and bathing. Game is abundant in the surrounding country. The mean temperature for the year ending June 30, 1869, was 58.59° F., the extremes being, on July 1, at 2 p. m., 105°, and on December 14, 1868, at 7 a. m., 25° F. Rain-fall 15.6 inches. Snow falls occasionally, but lies only for a short time. The prevailing winds are south and westerly.

During the first year the three companies, which for the most part of the time formed the garrison, lived in A tents, and made use of such of the old buildings of Fort Buchanan as could be made serviceable. One by one, as the buildings of the new post were finished, they were occupied. At the present time two sets of company quarters are completed, a guard-house, hospital, commissary store-house, corrals, and sinks. No officers' quarters have yet been built, but three mess-rooms, with kitchens adjoining, are used as quarters for the time being. Of the old buildings which have been repaired for temporary use, one is the quartermasters' store-house, another that of the post trader, while three are used by quartermasters' employés, and one by the only soldier's family at the post. These are all in poor condition, and leak badly during rains. No mess-rooms for the men have been built yet.

The new buildings are all of adobe, and furnished with mud roofs, except the guard house, which is shingled; this exceptional roof was found during the past season to be the only one which was weather-proof. As shingles can be cut by soldier labor in the Santa Rita Mountains, it has been suggested that all the roofs be so constructed.

The two sets of company quarters are built each in the form of the letter E, and consist of a main building, 117 by 18 by 11 feet, two wings, each 18 by 18 by 11 feet, one of which is the first sergeants' room, and a kitchen, 20 by 16 feet, and bakery, 20 by 14 feet. These quarters afford to the men occupying them an air space per man of 600 cubic feet; but that this may be so, a detachment of one of the companies is obliged to live in tents near by. They are warmed by four fireplaces, lighted and ventilated by nine windows, two doors, and a number of loopholes, six inches

square, near the roof. The bunks are well raised and solidly built, each accommodating two men; the only fixtures are wooden arm-racks and benches.

The guard-house consists of a guard-room, and prison-room communicating with it; the former is 17¾ by 20 by 9 feet, giving to an average occupancy of twelve men 266 cubic feet of air space; the latter, 17¾ by 15½ by 9 feet, furnishes each of its eight occupants with 310 cubic feet. Each of the rooms has a fireplace, and as ventilators, in lieu of windows, the prison-room has apertures in the wall near the roof.

The commissary building is 100 by 21 by 9 feet, and has the corrals near by it, surrounded by an adobe wall, 132 by 100 feet. Refuse from the corral and camp is wagoned to a ravine 350 yards distant, where, when dry, it is burned.

The hospital has been built on the lowest portion of the site of the camp, and is the building nearest the marsh above mentioned, receiving from it, with the prevailing winds, the full influence of its exhalations. The roof is in such poor condition that during a late storm the floor became flooded, and the patients had to be removed from the ward. It has since been repaired, and covered with a layer of lime and fine sand. The building is divided into a ward, 55 by 17½ by 11 feet, and a dispensary, 14½ by 17½ by 11 feet. The ward contains twelve beds, to each of which it affords a superficies of 80 feet, and an air space of 880 cubic feet. Average occupation, four. Tents are made use of as kitchen, mess-room, and bath-room. As yet there is no store-room other than the dispensary.

The cavalry of this command has been almost constantly employed in scouting and escort duty, while the infantry have performed most of the camp duties, including the building of the greater portion of the post. Their recreations comprised base ball, and exercise on the horizontal and parallel bars.

The full regular ration has been issued to the men, and, with the exception of the beef, its component parts have been of good quality. Corn, cabbage, onions, potatoes, tomatoes, and peas are obtained from the company gardens, in part also by purchase with company funds, and by personal purchases of the soldiers. Vegetables from the Sonoita and Santa Cruz Valleys are worth 20 to 25 cents per pound. Eggs from Sonora are $1 a dozen. Butter is seldom seen, and is received only from San Bernardino, in Southern California, by way of Tucson, scarcely any being produced in the adjacent country.

Scurvy was to some extent present in the command during the winter months; but in May, when the produce of the company gardens became available, the disease disappeared. Intermittent fever is the prevailing disease.

A few settlers, farming parts of the Sonoita Valley, are the only inhabitants in the vicinity of the post; but Apache raiding parties frequently pass in the neighborhood.

Statement showing mean strength, number of sick, and principal diseases at Camp Crittenden, Arizona Territory, for the years 1868 *and* 1869.

Years.	Mean strength.	Whole number taken sick.	Typhoid fever.	Malarial fevers.	Diarrhœa and dysentery.	Tonsillitis.	Venereal diseases.	Scurvy.	Rheumatism.	Phthisis.	Catarrhal affections.*	No. of deaths.
1868, (9 months)	207.88	716	1	564	49	5	16	12	4	1	12	3
1869	137.83	663	.....	487	62	6	7	9	12	.....	20	1

*Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP DATE CREEK, ARIZONA TERRITORY.

INFORMATION FURNISHED BY ASSISTANT SURGEONS R. M. O'REILLY AND CHARLES SMART, UNITED STATES ARMY.

Camp Date Creek, until recently known as Camp McPherson, is on the left or south bank of the creek, about 700 yards distant from it and 100 feet above its level. Communication with San Francisco, California, is effected by way of Camp Whipple and Prescott, which is 60 miles distant by the road, although but little more than half that distance in a direct line northeast, and with Washington by way of Maricopa Wells and Tucson. The road from La Paz, on the Colorado River, east to the mining town of Wickenburg, passes the post, intersecting the northern road to Prescott. The upland valley in which the camp is placed is surrounded by high lands. Three miles distant on the east is the divide between the waters of the Hassyampa, tributary to the Gila, and the Williams Fork of the Colorado, of which Date Creek is one of the headwaters. The soil of the valley is gravelly and well covered with gramma and gayeta grasses, except where the underlying metamorphic rocks crop out into broad belts of cactus and yucca-covered *mal pais*. Half a mile down stream, to the west of the post, the creek flows through a cañon 150 feet wide and from 50 to 200 feet deep, below which there are some strips of fertile bottom land, on which farms have been located by a few settlers. Mesquite, cottonwood, and willow grow along the creek.

The climate of this part of the country is hot and dry, with a rainy season occurring in autumn. The mean temperature for the year ending June 30, 1869, was 63.04° F., with the wet-bulb indicating 54.75°. The extremes of temperature were 21° and 108° F. Prevailing wind, southerly.

The Date Creek Camp was originally established in 1864, by California volunteers. In 1866 the troops were moved 25 miles north on the road to Prescott for the protection of settlers in Skull Valley. In 1867 the command returned to Date Creek, and went into quarters close to the bank. This position was found to be very unhealthy, the greater portion of the men being prostrated during the fever season commencing with the July rains. Hence in 1868 they were moved to the higher ground further from the creek—the present location. In this the drainage is good, both from the gravelly character of the soil and the incline toward the bed of the stream.

The buildings are arranged so as to inclose a quadrangular parade ground—the men's quarters, kitchens, and post bake-house on the north, those of the officers on the south, the guard-house on the east, and hospital on the west. The soldiers' quarters are two adobe buildings, each 76 by 20 by 13 feet, with shingled roof and earthen floor. Ventilation is effected in each by eight windows, two doors, a series of apertures, 9 by 4½ inches, just above the ground level, and an air space between the roof and walls. These are aided by an open fireplace at each end and a wood-stove in the center. Air space per man of average occupation, 350 cubic feet. The bunks are framed, and, with the arm-racks, form the only fixtures of these dormitories.

The hospital is a shingled adobe building, warmed and ventilated in the same manner as the quarters of the men.

The arrangement of the building is shown in Figure 58. A, ward, 30 by 18 feet; C, surgery, 14 by 12 feet; D, dispensary, 14 by 14 feet; E, store-room, 14 by 8 feet; K, kitchen, 14 by 14 feet; M, mess-room, 14 by 12 feet. Height of rooms, 14 feet.

The ward is furnished with twelve beds, to each of which it affords 630 cubic feet of air space. Its average occupation is six patients. Its supplies are obtained from San Francisco, California, and are required for yearly. No ambulance at the post.

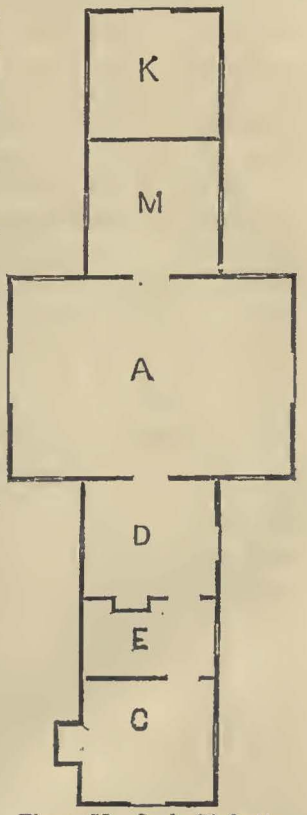


Figure 58.—Scale 20 feet to 1 inch.

The first sergeant's room and company store-room, each 16 by 14 feet, and the kitchens (two in number) and bake-house, each 23 by 14 feet, are of the same kind of materials as the barracks. No mess-rooms have yet been built. The officers' quarters are four mud-roofed adobe buildings, each containing a single room, 26 by 13 feet. The guard-house, at present, is represented by wall tents for the ten members of the guard and average of three prisoners. The quartermaster and subsistence store-house is outside the line of buildings around the parade. It is 100 by 22 feet, built of stone and roofed with shingles. The sinks, properly in rear, are open trenches with willow shades.

The water supply is carted from the creek in barrels and run through charcoal filters. It is largely impregnated with organic matter. In the unhealthy autumn season permanganate of potash was likewise made use of. A well is being sunk.

The diseases prevalent are all of malarial origin. It is expected that the removal of the camp from the immediate neighborhood of the creek, and success attending the attempt to sink the well, will materially decrease the sick rate of this post.

The Indian tribes in the vicinity are hostile; Yavapais and Apache Mojaves.

Statement showing mean strength, number of sick, and principal diseases at Camp Date Creek, Arizona Territory, for the year 1869.

Year.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Tonsilitis.	Venereal diseases.	Scurvy.	Rheumatism.	Catarrhal affections. *	No. of deaths.
1869	103.16	364	132	79	9	1	1	17	16	.....

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

CAMP CADY, CALIFORNIA.

INFORMATION FURNISHED BY ASSISTANT SURGEON CHARLES SMART AND ACTING ASSISTANT SURGEON F. A. ROMATKA, UNITED STATES ARMY.

Camp Cady is situated in San Bernardino County, on the road leading from Wilmington, on the coast, into Northern Arizona. The road to Salt Lake City branches off a few miles west of the post. The town of San Bernardino lies west about 130 miles; Hardyville, on the Colorado River, about the same distance east. Communication with San Francisco, California, is effected by means of steamer to Wilmington, whence the road leads eastward by San Bernardino. Letters reach San Francisco in eight days; Washington in eighteen.

The post, as it now exists, was established in the autumn of 1868, about half a mile distant from the point formerly occupied. This situation was originally garrisoned, about fourteen years ago, to protect the sparsely settled districts of Southern California, and the line of travel between them and Utah from the inroads of Pi-Utes and Mojave Indians. The post is placed about 300 yards from the north bank of the Mojave River, on a small plateau 30 feet higher than the bed of the stream, but a little lower than the level of the surrounding country. This point is in part sheltered by a few low hills, against the western base of which is impacted much of the sand which would otherwise sweep over the camp with the prevailing winds. The neighboring country is part of the Colorado desert or plateau, a level sand waste, which, from this point of view, is encircled by bare and grotesquely eroded mountain ranges, which rise from 1,000 to 4,000 feet above the desert level. These are from 20 to 60 miles distant from the post, and are said to be rich in silver and lead. The plateau bears little other than the wild sage, and in many parts is destitute even of this, bearing, instead of vegetation, a white, glistening efflorescence of soda salts. A few scattered bunches of grass grow along the river, and stunted specimens of cottonwood, mesquite, and willow, tangled with wild vines. Attempts have been made to cultivate a post garden, but the alkalinity of the soil has rendered them all fruitless. Antelope and mountain sheep are sometimes seen on

the mountain ridges, but it is chiefly along the river that game is discovered, consisting of rabbits, quail, ducks, and geese. A small water turtle is found, and some mountain trout. The coyote, lizards, snakes, scorpions, tarantulas, centipedes, and all the other inhabitants of the American desert are plentiful here.

The soil is sandy, with an admixture of clay, which, when sun-dried after rain, gives its surface a firm coating, as if covered with a layer of adobe plastering.

This part of the country has its dry and wet season, but the latter is usually abortive, the quantity of rain being small. The temperature of the year has been 63.18° F., the wet-bulb showing for the same time a mean of 62.69°. The extremes were 116° and 22° F. The prevailing winds are from the west, frequently blowing strong and continuously, constituting sand-storms, in which the air is so clouded with fine particles that objects within a few yards are only visible. The mirage is of frequent appearance.

The post has a parade ground 300 yards square, and has the buildings arranged along three of its sides. The buildings are of adobe, floored, and shingle-roofed, plastered outside and plastered and whitewashed inside. The officers' quarters is the only building ceiled. The hospital and laundresses' quarters have not been built. For temporary use as such the buildings of the old camp are retained. Cases requiring hospital treatment are few.

The barrack building is 86 by 26 by 12 feet, but has the northwest and southeast corners partitioned off as temporary dispensary and saddler's shop respectively. It is heated by stoves when necessary, lighted and ventilated by twelve windows and three doors, and has furnished, to the average occupation of the past year, 650 cubic feet of air space per man. The bunks are temporary structures made by the men. In rear of this building is one, 48 by 18 feet, partitioned into a kitchen and mess-room.

The officers' quarters is one building, 36 by 18 feet, divided by a hall into two rooms. There is a wing in rear, 14 by 12 feet, and a small out-house as kitchen.

The building constructed as a guard-house is 26 by 18 feet, and divided into two rooms, which, for the time being, are occupied as quarters by the post surgeon and his family, a hospital tent being used meanwhile as guard house.

The store-house, 76 by 24 by 14 feet, is divided into a room for quartermaster's stores, one for subsistence, and an office. The corrals and sinks are near the river, sufficiently distant from the quarters.

The water supply is at present obtained from springs in the bank of the river, at the site of the old post, half a mile distant. Some half a dozen wells have been dug, and water invariably found at from 3 to 5 feet, but it has proved unfit for use from its alkalinity.

The ration issued has been of good quality, but the commissary department has been almost the only source of vegetable supplies. A good stock of canned vegetables has been on hand for purchase. Potatoes and onions are occasionally brought from San Bernardino. There have been no diseases at the post, except trivial cases. Care has been taken to secure all the vegetables possible as preventive of scurvy.

The hospital is kept well supplied with medicines and stores by yearly requisitions on the medical purveyor at San Francisco, California.

There are no inhabitants in the vicinity. Occasionally a band of hostile Indians, supposed to be Pi-Utes, cross the road on their way to or from the Colorado River.

Statement showing mean strength, number of sick, and principal diseases at Camp Cady, California, for the years 1868 *and* 1869.

Years.	Mean strength.	Whole number taken sick.	Malarial fevers.	Diarrhœa and dysentery.	Tonsillitis.	Venereal diseases.	Scurvy.	Rheumatism.	Catarrhal affections.*	No. of deaths.
1868	51.16	104	21	24	1	4	3	12	9	.....
1869	26.33	46	12	12	2	1	.....	5	1	1

* Include laryngitis, bronchitis, pneumonia, and pleurisy.

FORT YUMA, CALIFORNIA.

REPORT OF ASSISTANT SURGEON J. V. LAUDERDALE, UNITED STATES ARMY.

After receiving the Gila at a point 160 miles from its mouth, the Colorado River turns suddenly westward and forces its way through a rocky defile, 70 feet high, 350 yards long, and 200 yards wide, thus cutting off a narrow rocky bluff and leaving it as an isolated eminence on the California side of the river. On this rocky eminence, which has been shifted not many ages since from the Arizona to the California side of the ever-varying stream, (and during high water it is hard to tell which side it is on, as the water flows freely all around it,) stands Fort Yuma, (latitude 32° 32′ north, longitude 114° 36′ 9″ west,) rising gray and somber above the broad sea of green as it is approached on the emigrant road from Pilot Knob. At this point the bottom lands adjacent to the river average seven miles in width, and are covered with a dense growth of cottonwood and mesquite. Chains of low serrated hills and mountains limit the view on nearly every side, all bare and gray save when painted by the sun with delicate tints of blue and purple.

History says that in the year 1540 the Viceroy of Spain sent Fernando Alarchon to explore the Gulf of California, and he discovered the mouth of the Colorado, which he describes as "a very mighty river which runs with so great a fury of stream that we could hardly sail against it." The difficulty of ascending this river is due to the tidal wave flowing from the ocean through the Gulf of California, and to a greater or less distance (depending on the height of the annual overflow) up the river, renders it unsafe for any but light-draught boats to make the attempt. All freight from San Francisco must be reshipped at the mouth of the river, and the boats are able to run up as far as Fort Yuma, where the average depth is 4 feet. During the months of June and July the flood from the hills meets the tidal waves from the Gulf and causes an overflow or setting back of the waters over the California desert, filling up the basins and that long bayou known as New River, from which, during the summer, it gradually recedes or is evaporated by the burning sun. The course of the river from the gorge at Fort Yuma is remarkably straight as far as Pilot Knob, a distance of 10 miles; the banks are regular, and the current so rapid that bodies set afloat at the fort will be carried nearly to the Knob.

Before reaching the fort the road leads the traveler through a long avenue, shaded by young cottonwoods and mesquite, with an impenetrable growth of arrow-bush and cane; at length he arrives at the bend of the river, and the water no longer bears the Colorado or ruddy tint which gives it its name, but appears of a muddy color, the red being due to reflected light. What appeared in the distance to be a heavy fortification resolves itself into a collection of substantial adobe houses, inclosed by deep verandas with venetian blinds, which shut out every direct ray of sunlight and exhibits an air of privacy unsurpassed by the surroundings of a Mormon harem. Shade trees are an impossibility, and "grassed surfaces" unknown. Paragraphs 42 and 43, Revised Regulations, do not apply to Fort Yuma.

Leaving the flat land along the river, we ascend the rocky hill toward the fort, and, by an easy winding roadway, cut out of the side of the bluff, reach the hollow square called the parade. Not one single blade of grass, or vine, or tree, worthy of the name, is seen; all is rock and the débris of rock, and in many places the abraded faces of the crumbling feldspathic granite forms the substantial but gritty pathway.

All the buildings at the post are of sun-dried brick, and neatly plastered within and without. They are constructed one story high, with lofty ceilings, large rooms, with double sash doors extending from floors nearly to ceiling, and affording the freest ventilation. The roofs are made double like the walls, inclosing an air chamber, and over all a metal sheeting. Each house is surrounded on all sides by a veranda, and adjacent houses have their verandas meet so that an inmate may pass from house to house without exposing himself to the sun.

That which entitles Yuma to the designation of fort are certain unpretentious intrenchments scattered along the slopes of the bluff, which command the river and the bottom-lands adjacent; they are not visible from the river, and the spectator is not aware of their existence until he

steps to the edge of the bluff and looks down upon their gabion revetments. They were constructed for barbette guns, but are now dismantled.

This not being a point for offensive operations, the garrison is small and chiefly engaged in guard duty at the large quartermaster's depot across the river, and in escorting supply trains to the interior of Arizona.

The parade we find a stony lawn; the rocky hill roughly dressed and made smooth by filling in with fine grit, and inclosing a square 200 by 600 feet in extent, with a gentle slope toward the river. The arrangement of the post is shown in Figure 59.

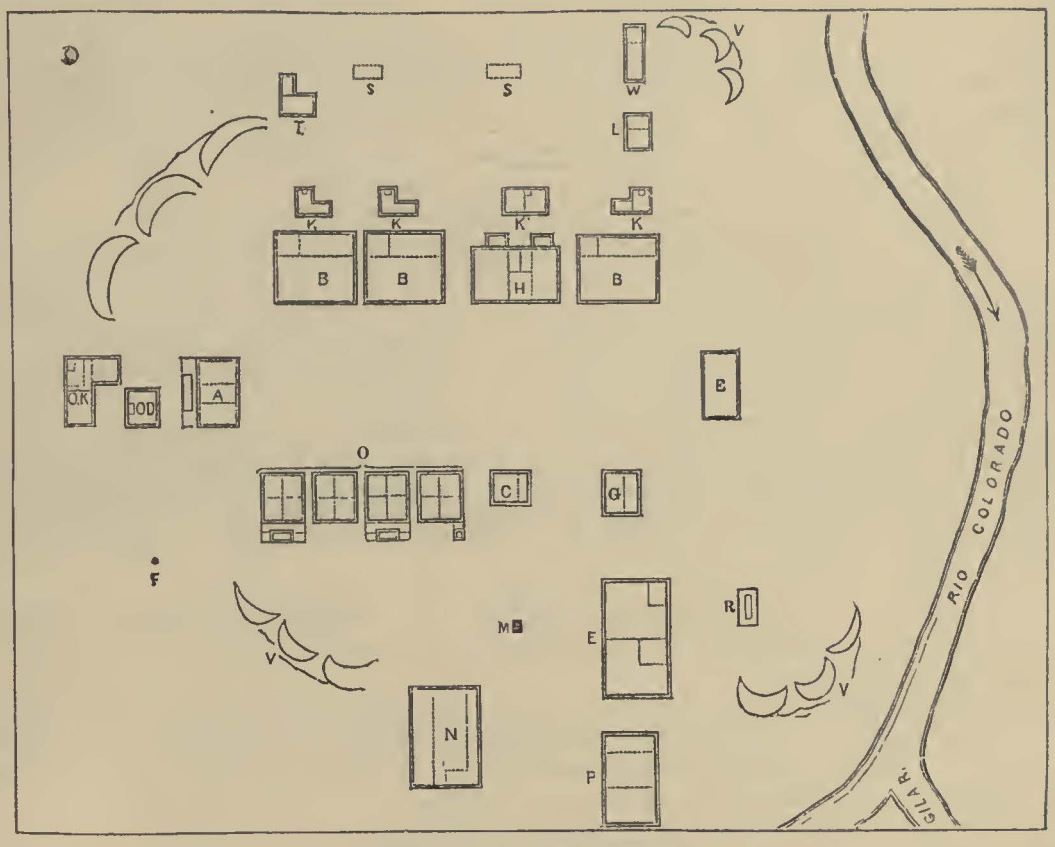


Figure 59—Scale, 160 feet to 1 inch.

A, commanding officer's quarters; B, company quarters; C, quartermaster and adjutant's offices; E, store-houses; F, flag-staff; G, guard-house; H, hospital; K, kitchen; L, ordnance office; MN, corral; O, officers' quarters; OD, dining-room; OK, kitchen; P, shops; R, reservoir; S, sinks; T, sutler's store; V, bastions; W, bakery.

This post is well selected as a defense against Indians; it is very healthy, but it is impossible to find a more uninviting spot for a residence than this small promontory of decomposing trachyte. The earth and rock are of that light ash-gray color so trying to the eyes that it is a relief to stand near the flag-staff at the brow of the hill and look out upon the green vegetation that everywhere covers the bottom lands.

Being near an extensive desert the air is very dry, and evaporation is rapid. Rain seldom falls; the annual quantity does not exceed five inches. During the months of April, May, and June no rain falls; then, with the thermometer at 105°, the perspiration is scarcely seen upon the skin, and it becomes dry and harsh, and the hair crispy. Furniture put together at the North and brought here falls to pieces; traveling chests gap at their seams, and a sole-leather trunk contracts so that with difficulty the tray can be lifted. Furniture to hold together must be made of the very driest timber. The extreme dryness of the atmosphere is observed in the ink that dries so rapidly upon the pen that it requires washing off every few minutes. A No. 2 "Faber" leaves no more

traee on paper than a pieee of anthraeite, and it is neeessary to keep one immersed in water while using one that has been standing in water some time. Newspapers require to be unfolded with eare; if rudely handled they break. I was called to inspect some eommissary stores a short time ago, and the loss they had sustained was remarkable. Twelve-pound boxes of soap weighed ten pounds. Hams had lost 12 per cent, and rice 2 per eent of their original weight. Eggs that have been on hand for a few weeks lose their watery eontents by evaporation; the remainder is thick and tough; this has probably led to the story that our hens lay hard-boiled eggs.

The mercury gained the highest point last summer, on the 2d day of July, when, for two hours, it stood at 113° in the shade. All metallie bodies were hot to the toueh; my watch felt like a hot boiled egg in my poeket; the eords of my grass hammoek were like heated wires. At such times, if the wind is from the south, the air is like that from the mouth of a furnaee, hot and ovenish.

The effort to cool one's self with an ordinary fan would be vain, because the surrounding atmosphere is of a higher temperature than the body. The earth under foot is dry and powdery, and hot as flour just ground, while the rocks are so hot that the hands eannot be borne upon them. The parade is always hot at midday, and the story told of the dog that ran on three legs across it, barking with pain at every step, may be eorreet, though I have never seen it tried.

This post, although not the most southerly, is the hottest military post in the United States; the mean annual temperature is 76.86°. The highest temperature reeorded in our books sinee 1850, when the post was established, is 119°, observed at 2.25 p. m., June 16, 1859. The monthly mean for July, 1868, was 93°, and for nineteen days the mereury at 2 p. m. stood above 100°. A temperature of 100° may exist at Fort Yuma for weeks in sueeession, and there will be no additional eases of siekness in eonsequenee.

The dress must be of the lightest, suitable to the temperature. The lightest woolen fabries that are made should be worn next to the skin, or, if woolen is not borne well, eotton. The dress of the natives is very simple. The heavily fringed kilt, made of the bark of the eottonwood, or woolen yarn, in two divisions whieh hardly eome together at the hips, and worn about the loins, is the fashion whieh obtains among the Yuma women, while the men of this tribe eneumber themselves with about two yards of muslin, and a belt or strap.

Ice is never seen, not even on the eoldest day in winter. I do not think it would be desirable to have the article in summer if it eould be furnished. The water we drink is relatively eool at 60° to 75°, and is very refreshing.

We have none of the malarial diseases ineident to the eities of the Gulf of Mexieo, or along the eastern seaboard. The heat depresses the already debilitated, and we miss the tonie effeet of eold weather; but those who eome here in good health, and observe the ordinary rules for preserving it, will have nothing to fear from the high temperature.

Statement showing mean strength, number of sick, and principal diseases at Fort Yuma, California, for the years 1868 *and* 1869.

Years.	Mean strength.	Whole number taken sick.	Typhoid fever.	Malarial fevers.	Diarrhœa and dysentery.	Venereal diseases.	Scurvy.	Rheumatism.	Phthisis.	Catarrhal affections.*	No. of deaths.
1868	97.5	135	.....	17	29	20	8	13	.....	11	3
1869	128.5	111	1	16	20	17	.....	9	1	2	1

* Include laryngitis, bronchitis, pneumonia, and pleurisy.