

1 4 3

The resources of Arizona

Patrick Hamilton

mine

THE
RESOURCES OF ARIZONA.

ITS MINERAL, FARMING, GRAZING AND TIMBER LANDS;
ITS HISTORY, CLIMATE, PRODUCTIONS, CIVIL AND
MILITARY GOVERNMENT, PRE-HISTORIC
RUINS, EARLY MISSIONARIES,
INDIAN TRIBES, PIONEER
DAYS, Etc., Etc.

THIRD EDITION.

REVISED AND ENLARGED, WITH NEW MAP AND ILLUSTRATIONS.

BY PATRICK HAMILTON.



SAN FRANCISCO :
A. L. BANCROFT & COMPANY, PRINTERS.

1884.

CHAPTER II.

MOUNTAIN, RIVER, AND PLAIN.

“Land of brown heath and shaggy wood,
Land of the mountain and the flood.”

THERE is probably no country on the globe that shows so many striking and picturesque topographical contrasts as Arizona. Frightful chasms, dark and gloomy cauyons, massive mountains, rolling plains, rich and fertile valleys, arid wastes and beautiful mountain vales, form a panorama of nature at once in her wildest and most gentle mood. Here time has wrought mighty changes, and the face of the land yet bears the traces of the fearful convulsions which rent it from end to end. From Utah to Sonora, and from the great Colorado to New Mexico, the same physical features are met with. Mountain and valley, table-land and plain, barren peak and rocky gorge, and above all a sky without a cloud and a sun unequaled for brightness and brilliancy. Such a land is Arizona; a land blessed with many a gift, and showing a wild and attractive beauty all its own; a beauty that well becomes a clime that has given birth to a race wilder than its canyons and mountains, and with natures as fiery as its summer suns.

But although Arizona does not possess many of the soft and attractive features of regions fashioned after a tamer mood, she has other attributes which more than make up for the lack of that quiet and commonplace beauty so much admired. Her rugged mountains hold the wealth which purchases luxury and ease; her grassy plains can support the flocks and herds which, since the days of the patriarchs, have brought riches and honors to man; her sunny valleys, blessed by a climate unequaled on earth, are

capable of producing every variety of cereal, fruit, and vegetable. These are Arizona's gifts, and they more than offset any drawbacks in her physical appearance. It will scarcely be possible in this sketch to give a thorough outline of the marked and varied topography of the Territory. The compass of this volume would be inadequate to fairly and fully describe the appearance of a region so rich in material for the pen of the poet or the brush of the artist. The most salient features, only, will be touched upon. It is hoped, however, that this slight sketch will convey to the reader abroad some idea of a country so different from all others that it must be seen to be appreciated and understood.

The Territory of Arizona extends from the 109th degree of longitude, westward to the great Colorado; and from 31° 28' of north latitude to the thirty-seventh parallel. It is bounded on the north by Nevada and Utah, on the east by New Mexico, on the south by the Mexican State of Sonora, and on the west by California and Nevada. It comprises the extreme south-western corner of the United States, and has an area of 113,947 square miles. Its greatest length from north to south is about 400 miles, and from east to west, very nearly 350. The country may be generally described as a vast elevated plateau crossed and seamed in its northern part by deep cañons, mighty fissures, and narrow valleys. This great plateau has an elevation of from 5,000 to 7,000 feet in the north, which gradually descends to sea-level in the extreme south-west. Rising like a giant sentinel above this lofty table-land, is the extinct volcanic cone of San Francisco. This magnificent mountain has an altitude of 13,000 feet above the ocean. It is in latitude 35° 30' north, and longitude 111° 45' west. Its summit is crowned with snow for more than six months in the year, and its towering peak, looming up in solitary grandeur through the clear air, can be distinctly seen nearly 200 miles away. The most extensive of the grand *mesas* or table-lands of Arizona is known as the Colorado plateau. It may be said to extend from the thirty-fourth parallel of latitude to the northern boundary of the Territory, and has an average elevation of between 5,000 and 7,000 feet. Its surface is diversified by massive mountain ranges, like the San Francisco, the Bradshaw, and the Mogollon, with many detached spurs and peaks. Lying between these ranges are extensive grassy plains, beautiful

valleys and charming mountain glens, with a rich soil and a delightful climate. This immense region is drained by the Colorado of the West, the Verde, Colorado Chiquito, and many smaller streams.

From the base of the San Francisco peak, there is a rapid descent to the south, and during the melting of the winter snows, or after the heavy summer rains, the deep gorges and dry ravines are foaming floods, whose irresistible fury carries everything before them. South of the thirty-fourth parallel, there is a marked change in the aspect of the country. The descent from the upper plateau is abrupt, the climate is much warmer, and there is a difference of between 2,000 and 3,000 feet in altitude. From this point, to the boundary of Sonora, Arizona is a country of vast plains and wide valleys, crossed in all directions by detached mountain ranges, and dotted with many an isolated peak torn into fantastic shapes by the storms and floods of centuries, and baked and blistered by burning summer suns. This portion of the Territory has a gradual descent towards the California Gulf; a large quantity of the water which falls on the elevated plateau to the north, finds its outlet to the sea through its wide valleys, enriching them with the detritus which it gathers in its course.

The south-western portion of the Territory, adjacent to the Gulf, is made up of wide gravelly plains, covered with a growth of coarse grass and scanty shrubbery, and crossed by detached ranges and isolated spurs, devoid of vegetation. Water is scarce, and the soil of a poor quality. In the south-east, the mountains assume lofty and massive proportions, like the Santa Catalinas, the Santa Ritas, the Huachucas, the Graham range and the Chiricahuas. These ranges are clothed with verdure to their very summits, are well wooded and watered, and are among the most delightful spots in the entire Territory. Broad valleys, covered with rich and nutritious grasses and affording pasturage for immense herds of cattle, stretch away from these mountains to the foot-hills of the Sierra Madre, in Mexico.

Central Arizona is well watered, and contains the largest and richest body of farming land in the Territory. The valleys of the Gila and the Salt river are among the finest on the continent. There are here hundreds of thousands of acres with a soil that will grow anything raised within the temperate and semi-tropical zones. The climate is superb, and the productiveness of these rich bottom-lands

is not equaled by any portion of the great West. Although the mountain ranges of the Territory are detached and broken, they have a marked and regular parallelism in the trend and direction of their axes from north-west to south-east. Massive ranges, crowned to their summits by the lordly pine, isolated peaks, bare and barren, of strange and fantastic shapes, smiling valleys clothed in their garb of green, rocky gorges and dark and gloomy cañons, where the sunlight scarcely ever penetrates, rolling grassy plains, dry sandy wastes, and over all the cloudless skies, the wonderfully clear and balmy air, and the bluish purple haze which lends such a charm to the view and softens the harsh outline of rugged mountain and barren plain.

That portion of Arizona, north of the thirty-fifth parallel and east of the Colorado Chiquito and the Great Colorado, is mostly a barren region, devoid of timber or water. The geological structure is sandstone, and the country is made up of lofty *mesas*, their summits covered with dwarf pines and cedars, and their precipitous sides cut by deep gorges. Between these *mesas* sometimes occur narrow valleys well watered, which afford fine pasturage for stock. The extreme north-eastern corner of this wild region—embracing a strip of country forty miles long by eighty wide—is a portion of the Navajo Indian Reservation. It is a mountainous district, watered by the Rio de Chelle and its tributaries. The entire country, north of the Moqui villages, is occupied by the Navajos, who pasture immense herds of horses and sheep on its rich uplands during the summer months.

North from the junction of the Little Colorado with the great river is that remarkable region known as the Painted Desert. It is a wild and desolate plateau, entirely destitute of water or vegetation, its entire surface covered by lofty columns, isolated peaks and buttes, composed of sandstone, and worn into grotesque and fantastic shapes by the storms and floods of ages. This weird region is a veritable "Fata Morgana," and presents the most marvelous mirages. On its air of dazzling clearness are depicted "palaces, hanging gardens, colonnades, temples, fountains, lakes, fortifications with flags flying on their ramparts, landscapes, woods, groves, orchards, meadows, and companies of men and women, herds of cattle, deer, antelope, etc., and all painted with such an admirable mixture of light and shade that it is impossible to form any con-

ception of the picture without seeing it." The Indians call it the "Country of Departed Spirits," and carefully avoid it. South from the Marble Cañon, and about 40 miles north-west from the San Francisco Peak, is a fine body of timber, known as the Coconino Forest. That immense stretch of country in Yavapai County, south of the Grand cañon, and bordering the line of the A. & P. railroad, is one of the foremost grazing regions in the Territory. There are immense forests and clear cold springs in shady nooks where one can pass the long summer days as pleasantly as in any spot on earth.

The geological features of the Territory are as varied as the character of its surface. That portion north of the Little Colorado and extending to the Utah line is composed almost entirely of sandstone. It contains large deposits of coal, but as yet none of the precious metals have been found in that region. The country south of the San Francisco mountain, east to the line of New Mexico, and north of the thirty-fourth parallel, is covered by the lava flow, which in ages past was poured out in mighty volumes from the fiery furnace which seethed within the depths of this lofty peak. Evidences of the lava stream from this once active volcano are found all over the Colorado plateau, south and east from the San Francisco cone, and for a radius of nearly 100 miles in this direction traces of the fiery flow are visible. The main ranges through the central portion of the Colorado plateau are composed mostly of granites, porphyry and slates, with occasional belts of trap, metamorphic rock and limestone. Eruptive rock is found in many localities, and likewise quantities of conglomerate drift. The mountain ranges of the upper Colorado basin are generally porphyritic granites, with shistose and metamorphic slates.

The ranges in the south-eastern portion of the Territory, below the Gila, are mainly composed of primitive rocks, but large beds of lime, gypsum, feldspar, trap, and other secondary rocks are not uncommon. The lower portion of the great Colorado basin bears traces of violent volcanic disturbance. The mountains and the dry narrow valleys between them are covered with scoria, volcanic ash and large masses of igneous rock. There can scarcely be a doubt that this portion of the Territory was at some remote period the theater of volcanic action, and the isolated ranges and jagged peaks of which it is composed,

are scorched and riven by the fiery flood which once swept over this portion of Arizona. The geological characteristics of the region known as the Papagueria, in the southwestern corner of the Territory, present a curious geological medley. Granite, porphyry, mica schist, trachyte, quartzite, lime, quartz, feldspar and many other varieties are found in juxtaposition. The mountains extending from the Gila through the center of the Territory to the Sonora line, and including the Santa Catalinas, Santa Ritas, and Huachucas, are generally formed of granites, porphyry and slates.

Arizona is a land of marvels for the scientist as well as the sightseer. Nowhere on the globe can the work of nature be traced more clearly and intelligently. Torn and riven by stupendous gorges, crowned by lofty mountains, adorned with grassy plains, beautiful valleys, delightful parks, and lofty table-lands, the topography of the Territory presents a picture of weird beauty and massive grandeur, unequalled on the continent. The plateau of Arizona shows, throughout its entire extent, marked traces of water and volcanic action, and it is evident that the greater portion of its surface was, for ages, a series of vast lakes or inland seas. The isolated peaks, rising like islets above its valleys and plains, and the fantastically castellated *buttes*, which are so striking a feature of its varied landscape, show clearly the erosion caused by the retreating waters. Fire and flood have left the indelible marks of their visitation on the face of Arizona, but it has only added a new charm to her wild beauty, and given added variety to hill, mountain and vale. The geologist will find here a land full of interest and instruction. Nature was evidently in a varying mood when she formed a region whose geological and mineralogical features are in such striking contrast with long-received and firmly established theories. It is a land *sui generis* in its strata and formation, full of the most unexpected combinations and startling contradictions; but it is a land where the student of nature will find her great book with every page full of instruction, and with such a record of countless ages, that the historic period of man is but as yesterday.

Arizona has been called a Mountain Land, and the name fits it well. The ranges, spurs and peaks which cover so large a portion of its surface are among the most interesting physical features of this wonderful country. Although

apparently broken and thrown about without regard to continuity or regularity, the general trend of their axes has a marked inclination from north-east to south-west. The mountain system of the Territory is a continuation of both the Rocky Mountain chain and the Sierra Nevada. In $43^{\circ} 30'$ north latitude, the Wind River chain of the Rocky range divides about the remote sources of the Great Colorado. One branch trends southward, and, passing around the sources of the Platte, the Arkansas and the Rio Grande, is merged into the Guadalupe mountains, and at last loses itself in the great prairie plains of the south-west. The other branch, turning to the west and south, forms the Wasatch range, the eastern rim of the Utah Basin, and, widening out to the level of the great plateau, reaches the cañon of the Colorado near 112° of longitude.

A branch of the Sierra Nevada deflects from that range east of Owens river, and, with a general trend to the south-east, passes by the head of the Rio Virgen, becomes merged in the plateau, and unites with the Wasatch at the Grand cañon. These united ranges form the mountain system of Arizona, and south of the great river break up into parallel ridges, isolated groups, detached spurs and peaks, which are again united in one massive chain in the Mother of Mountains, in northern Mexico. The San Francisco peak may be considered the apex of the Arizona mountain plateau, and the northern limit of the numerous ranges extending from the thirty-fifth parallel to the Sonora line, and from the 109th to the 113th degree of longitude.

From the San Francisco mountain a ridge extends south-east which separates the waters of the Little Colorado from those of the Gila. This is known as the Mogollon range, while its south-eastern spurs are known as the *Sierra Blanca*, or White mountain. These ranges are well wooded, containing some of the finest timber to be found in the Territory. They are also well watered by springs and streams, are adorned with many beautiful parks and elevated valleys, covered with rich grasses, which afford excellent feed for stock. West of the Mogollon, and running parallel with that range, is the Sierra Mazatzal. Like the Mogollon, it is an extension of the San Francisco Mountain system. Its course is east of the Verde, and south to the Rio Salado. Its slopes and summit are covered with an abundance of pine, juniper, and oak, water is found in several streams and springs, and its valleys and foot-hills

are covered with a fine growth of rich grasses. Between the Mazatzal and the Mogollon are several detached spurs and short ranges. The largest of these is the Sierra Ancha. It is situated in what is known as Tonto Basin, and is a flat-topped mountain, some thirty miles in length, covered with one of the largest and finest bodies of pine timber to be found in Arizona. The scenic beauties of the Tonto Basin are unequaled in the Territory. On Pine creek is the great natural bridge of Arizona, one of the most remarkable curiosities in the West. A recent visitor thus describes it in the *Phoenix Gazette*:

“Saddling our horses one lazy afternoon, we soon left several miles of mountain trail behind us, and found ourselves on the summit of a cypress-crowned mountain, whose steep eastern slope descended abruptly 500 feet to a cosy little valley, hemmed in on the opposite side by an abrupt precipice of still greater height. Descending with difficulty, we find ourselves on a large flat, with an area of probably sixty acres, with cultivated fields, in which corn and potatoes were already well grown. We stood on the crown of the bridge, and did not know it, for this beautiful garden patch is fringed on all sides with shrubbery and graceful trees, and one has to go 100 yards south and descend into a precipitous cañon before he is aware of the huge tunnel which nature has cut through the solid rock beneath his feet. We ascertained, by the aid of a long fish-line, that the crown of the bridge at its southern spring was 168 feet, and the span was eighty feet. Its total width up and down the creek, is about 150 yards. About eight feet from its southern edge, exactly in the center of the arch, is a natural hole, cut into the interior, and, by looking down this, a bird's-eye view is obtained of the bed of Pine creek, far below, at a perpendicular depth of 168 feet. But a full idea of the grandeur of this arch is not obtained until one stands beneath it and looks aloft. The gigantic limestone walls spring in perfect curves to the perfect arch above, and the fluted columns, meeting in the semi-obscurity above, remind the beholder of the interior of some vast cathedral.

“The stream which winds among the huge boulders that strew the bottom, lies here and there in deep, dark pools of unknown depth, and its precipitous sides are pierced by caves and grottoes, whose numerous windings and alley-ways lead one far into the bowels of the mountains.

Many of these have been explored, and many more have never been trodden by the foot of the white man; though from arrow-heads, pottery and scraps of matting, mingled with bones and charred wood, we can see that our Indian brother has long been acquainted with these retreats. These grottoes are all hung with beautiful stalactites, which take all imaginable forms, and any article, whether of wood or other soft substance, if placed beneath the streams which continually trickle from the roofs of these caverns, will, in a short time, become petrified. We gathered several petrified pine-cones and branches of trees, which were as hard as rock, and as perfect in form and outline as if they had lately fallen from the trees."

Between the Salt river and the Gila are many mountain groups, some of which attain a considerable elevation. The most prominent are the Superstition range, which rears its lofty and rugged front east of the great plains, stretching between the Salt and the Gila; the Pinal range, which runs nearly parallel with the Gila, and whose northern slopes are heavily timbered; the Salt river and Apache mountains, south of the Salado; the Gila range, Sierra Natanes, and the Sierra de la Pitahaya. Nearly all of these offshoots from the main ranges are well watered and timbered.

That vast region west of the Rio Verde, and extending from the Great Colorado to the Gila, is crossed by numerous mountain ranges. Running parallel with the former stream, and west of it, are the Verde mountains. The northern end of this ridge is called the Black Hills, and is a massive elevation covered with a heavy growth of timber, having several fine springs and known to contain rich deposits of gold, silver and copper. The northern slope of the Black Hills is washed by the Verde, and running north of that stream is a range of hills which culminates in the Bill Williams mountain, a prominent peak west of the San Francisco cone. The next range to the west is the Bradshaw and the Sierra Prieta. This is one of the most magnificent mountain chains in the Territory. It may be said to begin at Granite Peak, some ten miles north of Prescott, and extends in a south-westerly direction to the wide plains which stretch along the Salt river near its junction with the Gila, being nearly fifty miles in length with an average width of about twenty miles. This grand mountain ridge is clothed with a heavy growth of pine, oak, cedar,

and many other varieties; is carpeted with a mantle of succulent grass; has many fine streams, and deliciously cool springs; is adorned with many a lovely vale and beautiful glen, and throughout its entire length is penetrated by rich veins of gold, silver, copper, lead and many other valuable minerals. North of the Sierra Prieta and connected with it by a chain of low hills, is the Juniper range, well timbered with the wood from which it takes its name. A great portion of it is covered by the lava flow from the San Francisco, and, as yet, no mineral discoveries of any value have been found in it.

Between the Juniper range and the Colorado, and north of Bill Williams fork, are a number of irregular spurs running parallel, and known as the Mount Hope, the Cottonwood, the Hualapai, the Cerbat and the Black mountains, bordering on the Colorado. Some of these elevations, such as Mount Hope and Mount Hualapai, are well wooded, while the others have but a sparse growth of timber. But nearly all of them are rich in the precious metals, and have been mined successfully since the first settlement of northern Arizona. Between these ridges are many valleys covered with a fine growth of grass, capable of supporting immense numbers of cattle, if water could be had. Southwest from Prescott, and extending from Date creek to the Hassayampa, is what is known as the Weaver range. It clearly defines the limits of the upper Colorado plateau, and south of it there is a sharp and sudden descent to the plains and valleys of the Gila and Salt rivers. It is famous through the length and breadth of Arizona as being the *locale* of Antelope Peak, where was discovered that wonderful deposit of gold, an account of which will be found in another place.

South of the Gila to the Sonora line the ranges of the plateau system are clearly defined. The Peloncillo is the first encountered west of the line of New Mexico. It is low and broken, and generally destitute of timber. Lying to the west, and separated from it by the magnificent San Simon valley—one of the finest grazing regions of the Territory—is the massive chain of the Chiricahua, one of the largest and most continuous mountain ranges in Arizona. In places it is twenty miles in width, and is over 100 miles in length, taking the Pinaleno and the Santa Teresa ranges which join it on the north, and which are really the same mountain ridge—the only break in their continuity being

the low divide known as Railroad Pass. The Chiricahuas are well watered, and contain some of the finest timber and picturesque scenery to be met with in Southern Arizona. They are also known to be rich in minerals, and many valuable discoveries have been made within their borders. West of the Chiricahuas, and separated from them by the rich grazing lands of the Sulphur Spring valley, is the Dragoon range. It is not so lofty or so well wooded as the Chiricahuas, but is a well-defined and rugged ridge with many striking peculiarities of outline and structure.

North of the Whetstones and connected with them by low, rolling hills, the Santa Catalina lifts its rocky front and majestic crest from the desert plain. It is one of the most imposing of Arizona's many mountains, and as seen from Tucson impresses the beholder with its vastness and rugged grandeur. Its summit is crowned with pine, oak, juniper, ash, and other varieties, while many springs bubble out in its shady glens and find their way to the thirsty plain through deep and rocky gorges which have been worn by the rains and floods of centuries. The Santa Catalina range extends north to the Gila, the upper portion being known as the Tortilla mountains. East of the Santa Catalinas, and between that range and the Pinalaño group, the Galiuro mountain lifts its somber crest. It extends from the cañon of the Gila in a south-westerly direction, until it abuts on the Sulphur Spring valley, having a length of between thirty and forty miles. In many places its slopes and summit are heavily timbered, and its foot-hills and narrow valleys are among the best grazing lands in the Territory. Its formation belongs to the tertiary period. Its northern extremity is crowned by the imposing peak known as Mt. Turnbull, a prominent landmark in this portion of the Territory.

South-west from the Santa Catalinas is the mountain group known as the Santa Ritas, whose lofty peak, Mt. Wrightson, rises into the clear air some 10,000 feet above sea level. The Santa Ritas are historical landmarks in the modern annals of Arizona. The first attempt at mining, by Americans, was made in this region, and the blood of many a pioneer has moistened their hills and vales. They are rich in all the minerals, and mining has been carried on here since the purchase of the country from Mexico. The Santa Ritas are well timbered towards the summit and have a delightful climate. To the south-east and joined

to the Santa Ritas by the Patagonia mountains, is the Huachuca range. This is a massive elevation, well wooded, and watered by numerous streams and springs. It contains many beautiful valleys and grassy glades, has a superb climate, and is one of the most delightful spots in the whole Territory. Its eastern slope fronts on the San Pedro valley, and the boundary line of Mexico passes through its southern end.

West of the Santa Rita range and between the Gila and the line of Sonora, the country is composed of wide grassy plains, with detached ranges, isolated spurs, and solitary peaks covering its surface. The most prominent of these ranges is the Atascoso, which walls in the valley of the Santa Cruz on the west and embraces a rich mining region; the Sierra Verde, which bounds the lovely vale of Arivaca on the west. The Baboquivera peak in this range is one of the most prominent landmarks in southern Arizona. It rises to a height of over 8,000 feet, and its sharp outlines can be clearly seen nearly 100 miles away. It stands like a giant sentinel guarding that wild and weird region to the west known as the Papageria, or home of the Papagos. The Cababi, the Ajo and many other isolated groups are found in this section. They are generally rugged and rocky, with little vegetation, but rich in nearly every variety of mineral. West of the Cababi the Quijotoa mountain raises its rocky crest 1,500 feet above the Santa Rosa plain. It is the highest point in a low and straggling range which runs for many miles through the Papageria, and is now famous as the *locale* of the rich mines to which it has given its name, a full account of which will be found in "Mines and Mining."

Between the Gila and the thirty-fourth parallel and west of the 112th meridian, the country is similar to the one we have just described. Extensive plains, covered with coarse grasses and stunted shrubbery, and barren mountains mostly destitute of water and bare of vegetation. The best known of these rugged groups are the Harcuvar, the Sierra de Estrella, at the junction of the Gila and Salt, the White Tank mountains, the Haqui-hela, the Big Horn, the Plomosa, the Castle Dome, the Chocolate range and the ridges which run parallel to the Colorado. Nearly all of these rocky elevations carry either gold, silver, or copper, and furnish an abundance of water at a short depth below the surface.

This sketch will convey to the reader some idea of the grand mountain system of Arizona. They are the most striking feature of the country's topography, and contain within their rocky recesses more mineral wealth than any region of a like extent on the globe. Their rugged outlines have a wild and fascinating beauty of their own; and the delicate tints of light and shade with which an Arizona sun enwraps their jagged peaks and gloomy gorges, form a picture seen nowhere else outside the land of cloudless skies and perpetual summer.

The altitude of the principal mountain ranges above sea level is as follows:

San Francisco Peak.....	12,561	feet.
Sierra Blanca.....	11,496	"
Mount Graham.....	10,516	"
Mount Wrightson (Santa Ritas).....	10,315	"
Santa Catalina.....	9,950	"
Mount Kendrick.....	9,800	"
Mount Turnbull.....	9,500	"
Mount Sitgreaves.....	9,097	"
Bill Williams.....	9,080	"
Chiricahua.....	9,000	"
Mount Union (Sierra Prieta).....	9,000	"
Four Peaks (Mazatzal).....	8,600	"
Wallapia Mountain.....	8,000	"
Superstition Mountain.....	8,000	"
Baboquivari.....	7,000	"

First among the rivers of Arizona is the Colorado of the West, which washes the western border of the Territory, and takes rank among the great water-ways of the continent, both on account of the vast area it drains, and the mighty volume of water it carries to the ocean. It belongs to that grand system of rivers which have their sources in the Rocky mountain Cordilleras, and drain the continent from ocean to ocean, and, next to the Columbia, is the principal tributary of the Pacific ocean on the American continent. The Colorado takes its rise in the Wind River chain of the Rocky mountains, some 12,000 feet above the level of the sea. It flows south-easterly in its upper course, and is known as the Green. In south-eastern Utah it is joined by the Grand, which flows down from the western slope of the Rocky mountains. The streams, united, form the Colorado proper, and from the point of junction to the Gulf of California it is known by that name. Below the junction the course of the stream is south-



BANCROFT-LITH-S.F.

GRAND CANYON OF THE COLORADO.

Digitized by Google

westerly, until it is joined by the San Juan, from the east, above the entrance to the Great cañon. From there it runs south-westerly through the tremendous chasm of the plateau, to the mouth of the Virgen, and from there it winds its way almost due south to the Sea of Cortez. The great river was discovered by Captain Fernando Alarcon, on the 9th of May, 1540. He ascended the river in boats as far as the Great cañon. The length of the Colorado, from the head waters of Green river to the Gulf, is over 1,500 miles, and the area of territory drained by this mighty river is larger than New England, Pennsylvania and Virginia combined. Above its junction with the Grand its waters are clear and limpid, but after passing through the Grand cañon they are as turbid as those of the Missouri. The river is navigable by boats of light draft for over 600 miles, but it is one of the most changeable and capricious streams on the continent. It is continually shifting its channel, and it requires long experience and careful study to pilot a boat through its sinuous current. It is claimed that the channel changes every twenty-four hours, and where the river ran last year is often a fertile bottom overgrown with weeds and willows. Owing to the shifting sands and shoals, the Colorado can never be utilized to any great extent for travel or traffic. No doubt many of the camps along the river will receive their material by this route, but the building of two transcontinental railroads forever precludes the possibility of its supplying any large area of country. The Colorado drains the entire Territory of Arizona, and every drop of water which falls on its mountains, plains and *mesas*, finds its way to the great river. In its course through the Territory it receives but two tributaries of any consequence—the Little Colorado and the Gila.

The grand cañon of the Colorado is the most stupendous chasm on the globe, and has not a parallel anywhere on earth. It is a tremendous gorge over 400 miles in length, and from 1,000 to 6,000 feet in depth, cut through the eruptive rock of the elevated plateau by the river in its passage for ages from its mountain sources to the sea. A recent visitor to this wonder of the western world thus gives his impressions in the *Central New Mexico*: "Four hundred and sixty-five miles west from Albuquerque, at Peach Springs, Arizona, is the point on the A. & P. railroad nearest the cañon, it being only eighteen miles northward

down Dry Wash and Diamond creek to the river. At this point you take a wagon and start down Dry Wash. Almost from the commencement the scenery becomes interesting. Every mile you advance raises the walls above you; every corner you turn discloses some new castle, a higher pillar or huger column. About half way down you enter the Amphitheater—well named indeed. The cañon at this point widens out; its walls are a succession of stairways of strata, forums and pillars occupy the arena, and the upper walls are turreted with sandstone monuments that stand like sentinels against the clear sky.

“Farther down, Diamond Creek enters the cañon abruptly through a side door, as it were, from a major gorge of its own. The cañon is very deep at this point, and the rest of the distance to the river grows rapidly deeper. Some magnificent scenery is now presented to view—Noah’s Ark, Moses on Sinai, the Parthenon, etc. The cañon widens out, leaving a sort of triangular mountain in the bottom, and this is nearly 3,000 feet above the water of the creek. A lady who recently visited this spot is one of the first that ever accomplished the feat of climbing to the summit of this mountain in the cañon, and declares that it has pillars on its surface 1,000 feet high, which do not begin to reach the top of the cañon proper. She says, also, that the walls of the cañon look just as awfully high after climbing this 3,000 feet as they did from the creek.

“On down the cañon a little further and you are at the great gorge itself. The scenery in this vicinity is beyond the power of language to describe. The pen of T. Starr King would falter at the task. Moran or Elkins would die of grief at the inadequacy of their brushes to paint it. The sun shining in at different peaks behind the castellated walls produces a rainbow here, throws a grotesque shadow there, or brings a profile into relief at another point. The rocks in this light are of many colors—white, dark gray, pink, and purple. From some of the narrow side cañons the stars are visible at midday. In fact the walls are so high that the sky seems a spangled azure cover laid gently across from brink to brink. The grand old Colorado itself, fifty feet in depth, is a roaring torrent, rushing on with high wave and fury, wearing its bed even deeper yet.

“Every turn you make in its tortuous course brings newer visions still. Up its side cañons you catch glimpses of heaven through vistas of brink that would enchant a

fairly; all along its banks cloud-reaching, polished; but-tressed, moss and vine-covered castles lift their lofty heads up amongst pictures of light and shadow so high that they are hazy in the distance. Variegated sandstone Babels run up higher still, until the blue air of heaven clasps them round in gauzy-like embrace.

"The awfulness of the scene is appalling. Rocks overhang the pathway as you advance, and histrionic statues point scornful fingers at you from all directions. Frowning profiles seem to threaten your every step, and misty caves suggest filmy apparitions as you gaze into their depths. Every stream that enters this great gorge has cut another chasm; every rivulet, rill, and brook has cut its cañon too. In fact, the whole of the Grand cañon, along its whole length, is a vast labyrinth of gorges, a tangled maze of cañons, pillars, cathedrals, castles, pisas, and battlemented babels, which, as the sun advances on its course, present an unpaintable, untellable and wholly indescribable picture.

"No description that can possibly be written of this 'paradise of the geologist,' until it can be more thoroughly explored, can at all convey an adequate idea of its grandeur. Its whole course is through the Union's greatest table-land, averaging as high as 8,000 feet above sea-level. It might truly be said that this great river flows on the ground-floor of America, and the Rocky mountains are built up around it."

Mr. Jay W. Spafford, of Flagstaff, who lately viewed the wonders of the cañon from the heights of the Coconino forest, thus records his impressions: "One cannot but feel how insignificant the term of 'cañon,' or gorge, when applied to such a place, as he stands upon the brink of these sublime depths; the height of its mountains, the depth of its chasms must be computed in miles to give the human mind some conception of their area and extent. Writers of world-wide fame have paled and retired before the grandeur of Niagara. Who then can hope to convey by a pen-picture the sublime chaos which nature in some mad freak has wrought in this isolated region? The meanest gorge that furrows the face of this king of chasms would swallow up a hundred like that below the falls of Niagara and be less than its fellow. The unbroken walls of the grand cañon at this point stand fifteen to eighteen miles apart, and out from those awful depths between, mountains with perpendicular walls rise to the height of the spot on

which we stand 8,000 feet above the sea. All chasms and gorges and cañons that gash and furrow its sides rise within the boundary of its walls and end at the river 6,000 feet below. Many of these are hundreds, ay, thousands of feet deep, yet they are so many cañons within a cañon, gorges within a gorge. It is a vast area of country so rent and torn that with its results before us the human mind is lost in its endeavor to comprehend its force. Strange architectural forms everywhere greet the eye—clusters of spires, obelisks, plain cliffs, and bold battlements, here a cathedral, there a tower, and miles away, snug in some cosy recess, the 'little church around the corner,' surrounded by plain but natural-looking habitations, with clean cool streets and arched passages. With a powerful field glass we strolled out a day on the heights of the Coconinos to admire the temples of the gods, and listen to the oft-repeated exclamation from some member of our party, 'Surely this is beyond the comprehension of man,' and one more enthusiastic exclaimed, 'It is as incomprehensible as eternity itself!'

This awe-inspiring and mighty work of nature has been explored its entire length by Major Powell, who has given a most interesting and vivid description of its many wonders. So grand, gloomy, and peculiar a view is found nowhere else on earth. To stand beside the dark and seething waters of a rushing river, over a mile below the crust of the earth, and gaze up at the buttressed and battlemented walls, whose summits seem to reach the sky, is a spectacle so different from the ordinary scenes of nature that it is sure to attract thousands of visitors from all parts of the country.

The Little Colorado, named by its Spanish discoverers *Rio de Lino*, and known to the Mexicans as the Colorado Chiquito, takes its rise in the Sierra Blanca range, near the line of 34° north, and only a short distance from the sources of the San Francisco, the Black and the Salt rivers. The country around its head waters is covered with extensive pine forests, and contains many beautiful mountain parks, springs and small lakes, the latter fed by the heavy snows which fall upon these mountains. The course of the stream is north-west, and its first important tributary is the Zuni river, which comes down from the pueblos of that name, in New Mexico. A short distance to the north-west it is joined by the Rio Puerco, which likewise has its source in New Mexico: About ten miles

above its junction with the Little Colorado, the Puerco receives Lithodendron creek. On the banks of this creek is one of the most remarkable natural curiosities in the United States. It is a large petrified forest extending over many miles. They are silicified conifera of a gigantic size. One has been discovered that measures more than twenty feet at the base, and at a break, 100 feet from the base, it was ten feet in diameter. Limbs and branches, petrified to solid rock, are found scattered about in every direction. It is also said that many fossil ferns exist in conjunction with the trees. This singular freak of nature belongs to the carboniferous period, and is evidently a portion of that vast forest which once existed in this treeless waste, and now forms the great coal measures that underlie its surface. The texture and form of the dead trees is clearly discernible, resembling much the immense redwoods of California. Many fossils of animals of an unknown and extinct species are found scattered about among these immense rocky trunks, solidified to pure dolomite or magnesian limestone. This most remarkable curiosity of a remarkable country is some few miles north-east from Holbrook, on the A. and P. railroad. The dead monarchs of the forest show clearly every fiber of the wood, transformed into a different variety of rock. The heart of some is a mass of sparkling crystals, while others, again, show sections of the purest quartz. All the different stratifications of the wood are clearly shown by the hues of the rock, and offer a most interesting study for the geologist, as well as a never-ending source of surprise and wonder to the sight-seer.

The "Petrified Forest" is one of the wonders of Arizona, and is already attracting many visitors from the Thirty-fifth Parallel railroad. West of the Lithodendron, the Little Colorado is joined by Leroux fork from the east, and Chevelon's fork from the west, both small mountain streams. From thence the river flows in a north-westerly direction, keeping about thirty miles to the north of the San Francisco peak. Below the Moencopy, which joins it from the north, it enters a deep and rocky cañon, whose eroded walls show the action of the water for ages, in wearing its bed to the great river. Through this cañon, which is in places half a mile in depth, with smooth, perpendicular walls, the stream flows on to the Colorado of the West, which it enters at the Grand cañon. The Colorado Chi-

quito has a length of nearly 200 miles, and contains some large and fertile valleys along its upper course.

Next to the Colorado the Gila is the largest river of Arizona. Its sources are in one of the eastern spurs of the Mogollon mountains, near the summit of the divide that separates the waters flowing into the Mexican gulf from those that seek an outlet in the Pacific ocean. It crosses the Territory from the line of New Mexico to the Colorado near Fort Yuma, following very nearly in its course the thirty-third parallel of latitude. Almost the entire Territory south of the thirty-fifth parallel is drained by the Gila, and four fifths of the streams within its borders are tributary to it. For more than half its length it is a mountain stream, dashing through deep gorges, rocky cañons, and wild and rugged scenery. After passing the boundary line it forms a narrow valley with a rich soil, until it enters the Sierra de la Petahaya and the Sierra Natanes. From the latter range it receives the Rio San Francisco, a clear and impetuous mountain torrent. A few miles west of the San Francisco the Gila receives the Bonita and Eagle creeks, beautiful mountain streams having their sources in the Sierra Blanca, and bordered by grassy valleys containing many acres of rich arable lands. Below the mouth of the Bonita the Gila forms a valley nearly forty miles in length, and from two to four in width. This magnificent vale is known as *Pueblo Viejo* (Old Town), and throughout its entire length are the ruins of former habitations, the marks of large irrigating canals, and fragments of broken pottery, showing that a dense population once had their homes here. The valley is being rapidly settled up. At this point the great valley of the San Simon sweeps down from the foot-hills of the Sierra Madre, and the waters of its underground river—the Rio del Sur—enter the Gila near the town of Solomonville.

Below the Pueblo Viejo, the Gila cuts its way through the Santa Teresa, the Galiuro, the Mescal, the Tortilla and other detached ranges. In its course through these rocky barriers, it forms deep gorges and narrow cañons for a distance of nearly sixty miles, exhibiting in places mountain scenery grand in its solitude and savage beauty. Before entering the cañon the Gila is joined from the north by the San Carlos, a large stream with a rich and beautiful valley. The remains of irrigating works and the ruins of former dwellings which line its banks show that a large

and industrious population once existed here. The name has become familiar throughout the United States as the home of thousands of idle, worthless and vicious Apaches. Midway in its course through the cañon, the Gila is joined by the San Pedro flowing from the south, one of its longest and most important tributaries, a full description of which will be found later on. About ten miles above the town of Florence the Gila emerges from its mountain fastnesses, enters on the wide plains which extend to the Colorado, and flows through a large, rich and fertile valley to its junction with the latter stream.

This valley of the Gila embraces a large portion of the arable lands of Arizona; has a soil of exceeding richness, and produces magnificent crops of grain, vegetables, grasses and fruits. At Florence and other points to the west, this valley is under a state of cultivation, a full and detailed description of which will be found under the head of "Agriculture." Near Maricopa Wells the Santa Cruz mingles its waters with those of the Gila, by an underground passage. It is a sluggish stream, and for two-thirds of its course sinks in the thirsty sands. Some ten miles west of the town of Phoenix the Salt river joins the Gila, from the north. This is the most important tributary which it receives in its course. Indeed, it can hardly be called a tributary, as its volume of water is much larger than that of the last-named stream. From the Salt to the Colorado of the West, the Gila receives no living stream, though several dry river-beds, like the Hassayampa and the Agua Fria, are often swollen by the summer rains, and carry down vast volumes of water from the Bradshaw and Sierra Prieta ranges.

The Salt river, which joins the Gila below Phoenix, is formed by the Black and White rivers, which unite their waters in the Mogollon mountains, about twenty miles west of Fort Apache. These streams have their sources in the Sierra Blanca, and before they unite receive many sparkling tributaries, fed by the springs and snows of this elevated region. The most important are the north fork of White river, Bonita fork, and Carizo creek. These water-courses, as well as the White and the Black, contain some magnificent mountain trout, and afford fine sport for the angler. Below the junction of the last-named streams the Salt river enters the mountain system through which the Gila winds its way, some forty miles to the south. The

cañon formed in its course is longer than that of the Gila, and much more striking in its scenic effects. The deep gorges, with their towering walls on either side, and masses of rock piled in wild confusion and twisted into most fantastic shapes; the numerous cascades and falls over which the water foams and whirls, present a scene of wild beauty worthy the pencil of an artist.

During its course through the cañon, the Salt receives several tributaries from the north, the largest being Tonto, Cherry and Cibicu creeks. These streams sometimes carry large bodies of water, and are bordered by rich but narrow valleys. About thirty miles above its junction with the Gila, it is joined by the Rio Verde, flowing from the north. The Salt river drains a large area of country; and, next to the Colorado, carries the largest volume of water of any stream in the Territory. After leaving the cañon it flows through the richest and most extensive body of agricultural land in Arizona. Its length, reckoning from the head of Black river, is nearly 200 miles. The San Pedro, which enters the Gila at the lower end of the cañon, takes its rise in the spurs of the Sierra Madre, in Sonora, and flows north through a fertile valley, with grass-covered *mesas*, gradually swelling into the mountain ridges on either side. It is a sluggish, narrow stream, but carrying sufficient water to irrigate the rich bottom-lands through which it flows. Its principal tributary is the Arivapai, which enters it from the east near the site of old Camp Grant. This stream heads in the Pinaleño range, and flowing to the north-east forms a deep and precipitous cañon in its passage through the northern end of the Galiuro mountains. This cañon contains some of the wildest mountain scenery in the Territory, and has been the theater of many a bloody encounter with the Apaches, who long looked upon it as one of their strongholds.

The Santa Cruz, briefly alluded to heretofore, is perhaps the most remarkable of the streams which go to form Arizona's system of water-ways. Its sources are in the southern end of the Patagonia mountains near the Mexican line. From thence it flows to the south through Sonora for several miles, and then, making a sharp bend to the north, passes by the towns of Calabasas, Tubac, and the city of Tucson. Its bed is formed of loose sand, and for the greater portion of its devious way it seeks an underground channel. From its source to Tucson, it is bordered by a

valley of exceeding fertility which yields large crops of cereals and fruits wherever the land can be irrigated. At Calabasas, Tubac and Tucson the water forces itself to the surface, and the valley is under a high state of cultivation. From the last named town the Santa Cruz pursues a north-westerly course to its junction with the Gila, losing itself completely in the barren plain, and only appearing once, at Maricopa Wells, before it unites with that stream. Its entire length is about 150 miles.

The Rio Verde is formed from a series of springs in what is known as Chino valley in the great Colorado plateau, and between the Juniper range and Bill Williams mountain. Thence flowing south-east it receives several small streams from the south, among them Granite Creek, on which Prescott is situated. Still pursuing its southerly course the Verde passes around the northern slopes of the Black Hills, receiving from the mountainous region of the east, Turkey, Oak, Beaver, and several other creeks flowing from the base of the San Francisco peak. Below Fort Verde, Clear Creek, Fossil Creek, the East fork and many smaller water-courses enter the stream from the Mazatzal range on the east. The Verde carries a volume of water almost as large as the Gila. During its course it forms several small but exceedingly rich and beautiful valleys, many of which are under a high state of cultivation. The waters of the Verde are clear and limpid; its banks are shaded by a fine growth of cottonwood, ash, box-elder, maple and many other varieties; it is well stocked with fish, and is one of the most beautiful streams in the Territory. Its entire length is nearly 150 miles.

The Agua Fria takes its rise some ten miles east of Prescott, and sweeping around the northern slopes of the Sierra Prieta range, pursues a southerly course, parallel to the Rio Verde, and some thirty miles west of the latter stream. It is fed by the rains and snows which fall on the southern spurs of the Sierra Prieta basin. It enters the Gila at the Big Bend by an underground channel, 120 miles from its mountain home. The Agua Fria forms many beautiful farming and grazing valleys, which contain some pleasant homes.

Some twenty miles west of the Agua Fria the Hassayampa enters the Gila. This stream heads in the Sierra Prieta range, ten miles south-east of Prescott. It flows south through a mountainous region, draining the western slopes

of the Bradshaw and the Antelope mountains. It contains a few narrow valleys, which yield prolifically of grain and fruits. Bill Williams Fork is formed by the junction of the Santa Maria and the Big Sandy. The Santa Maria rises in the elevated plateau known as Peebles valley, lying north from the Antelope mountains. Thence it flows northward, and is known as Kirkland creek. Being joined by Sycamore creek from the Mount Hope range, it turns to the west and unites with the Big Sandy. This latter stream heads in the Cottonwood range near the thirty-fifth parallel, and pursues a southerly course. Bill Williams Fork, below the junction of the two streams just described, follows a nearly straight course westward to the Colorado. The country through which it passes is a dry and barren region, but rich in the precious metals. The upper sources of the stream contain some small but rich valleys, which produce good crops of hay, corn and vegetables. In the hills and mountains adjacent there is also some excellent grazing land. These are the principal streams of Arizona. There are many smaller water-courses which space will not permit to mention. Although considered a dry country, it will be seen that the Territory is well supplied with water. In this sketch no mention has been made of the numerous springs, of which there are a number in every wooded mountain range. These cool and sparkling fountains bubble out in shady nooks and secluded glens, and the music of their rippling laughter falls sweetly on the ear of him who comes tired and worn from the fiery desert or the heated town. Many of these springs—notably in the San Francisco mountain country—will yet become popular resorts. There is abundance of game, good fishing, and a climate cool, bracing and healthful during the hot summer months.



Territory, and for the past four years has been used almost exclusively in southern and central Arizona. But the opening of the northern transcontinental line bids fair to bring the home product once more into general use. Already large shipments are being made from Flagstaff by way of Albuquerque to the towns and camps of the south, and with the opening of the proposed Mineral Belt road, which will pass through the heart of the great forest, every foot of timber used in the Territory will be of native growth.

With the richest of mines, the finest of grazing and farming lands, extensive coal deposits and thousands of square miles of timber Arizona has all the resources to make a rich, populous and prosperous State.

Nor has the Territory been neglected in the supply of water. The Colorado, the Gila, the Salt, the San Pedro, the Verde, and scores of other streams are capable of irrigating vast stretches of land. We have seen that the Territory was at one time the home of a dense population. The remains of *acequias*, or irrigating canals, are found in almost every valley, showing that hundreds of thousands of acres now relegated to the desert were once under cultivation. There is no reason to suppose that the rain or snow-fall was greater then than now, but there can hardly be a doubt that ten times the acreage was cultivated. And the same result can be achieved again. The water supply of Arizona is sufficient to irrigate nearly all the arable lands within her borders, and with a system as perfect as that which once prevailed as large an area can be reclaimed. On the judicious, careful and systematic handling of the water supply and its proper application to the soil depends the future of Arizona as an agricultural country. Here the richest soil without water is valueless for farming purposes. The rain-fall is short and uncertain, and the tiller of the soil must always depend upon artificial means for the production of a crop. But, fortunately, the numerous streams and springs throughout the Territory supply him with the element which causes the arid valley to bloom and blossom and crown his labors with a generous yield. Although requiring some additional labor, this mode of cultivation commends itself for its certainty and for its large returns. When the farmer who depends on the natural aids to insure a crop is harassed by spring deluges or summer droughts, the irrigator has his water under control and can apply

the life-giving element whenever his fields or orchards require it.

But the fact is apparent that the ancient tillers of the soil had a much better knowledge of the irrigating problem than their modern successors. They evidently utilized every drop, and allowed none to go to waste. The present occupants have not yet attained the same degree of perfection in this respect, but it is only a question of a very short time when some regular system must prevail. As the farming industry depends for its success entirely on irrigation, and as the system is little known or practiced anywhere in the United States outside the Pacific States and Territories, some brief data regarding it are here inserted which may be of benefit to those who think of coming to the Territory and engaging in farming.

Irrigation is probably the oldest system of agriculture known to man. In the cradle of our race, the dry elevated plains of Persia, Assyria and Babylon, it is practiced at the present day, and it is not unlikely that Adam, after being driven out of the Garden and compelled to earn his bread by the sweat of his brow, learned to construct canals and raise crops by irrigation on the plains of Mesopotamia; and tradition has it that Noah, after leaving the ark, cultivated the vine by irrigation on the sunny slopes of Ararat. Some of the richest and most productive regions on the globe have been cultivated in this manner ever since man learned the art of tillage. The greater portion of India, the plains of Lombardy, the valley of the Nile and the fruitful fields of Castile have always depended on irrigation for the raising of crops. And although subject to such a system for thousands of years, they are to-day the most productive spots on earth and support a dense population.

In India, where irrigation has been most successful, there are from 200 to 600 persons to every square mile. In Italy we find an average of 270 persons for Piedmont and 390 persons for Lombardy. The irrigated portions of Spain have populations ranging in number from 200 to 430 souls per square mile. Egypt, which for ages was called the "granary of the world," has a population equivalent to 484 persons upon every square mile of her cultivated territory. In these countries the governments have framed laws regulating the entire irrigating system and defining clearly what shall be the "duty of water," that is, what quantity each occupant is entitled to in the raising of a crop. The