A REMARKABLE STAGE ROAD.

BY C. F. HOLDER.

Among the developments of the Southern Californian region during the past few years, the island of Santa Catalina has occupied a prominent position, from its location and natural beauties, being the popular resort of the people of this section. Ten years ago there were but one or two houses on the island; to-day there is a good sized village, Avalon, on the bay of that name, which has a large modern hotel with smaller ones and cottages by the score.

This growth is due to several reasons. The island possesses great natural beauties, and its proximity to Los Angeles, being but three and a half hours by boat and rail from this progressive city of 115,000 inhabitants, has been a factor in its development. Santa Catalina lies about twenty-five miles off the coast of Los Angeles County, and constitutes one of the southernmost of the chain of islands reaching down from Point Conception and ending with San Clemente. The island is twenty-two miles in length, and is an off-shore spur of the Coast Range, a range of mountains lifted out of the water, presenting the appearance of an emerald in a setting of azure in winter, when the rains have changed everything to a rich green. The island mountains run parallel to the greatest length, and in the center have an elevation of 2,500 or 3,000 feet in several peaks, as Mt. Banning, Orizaba, and Black Jack, which can be plainly seen from the Sierra Madres, many miles distant, constituting the peaks included in the United States Signal Service in their work of signaling up the coast.

AVALON BAY AND VILLAGE, SANTA CATALINA ISLAND, CALIFORNIA.

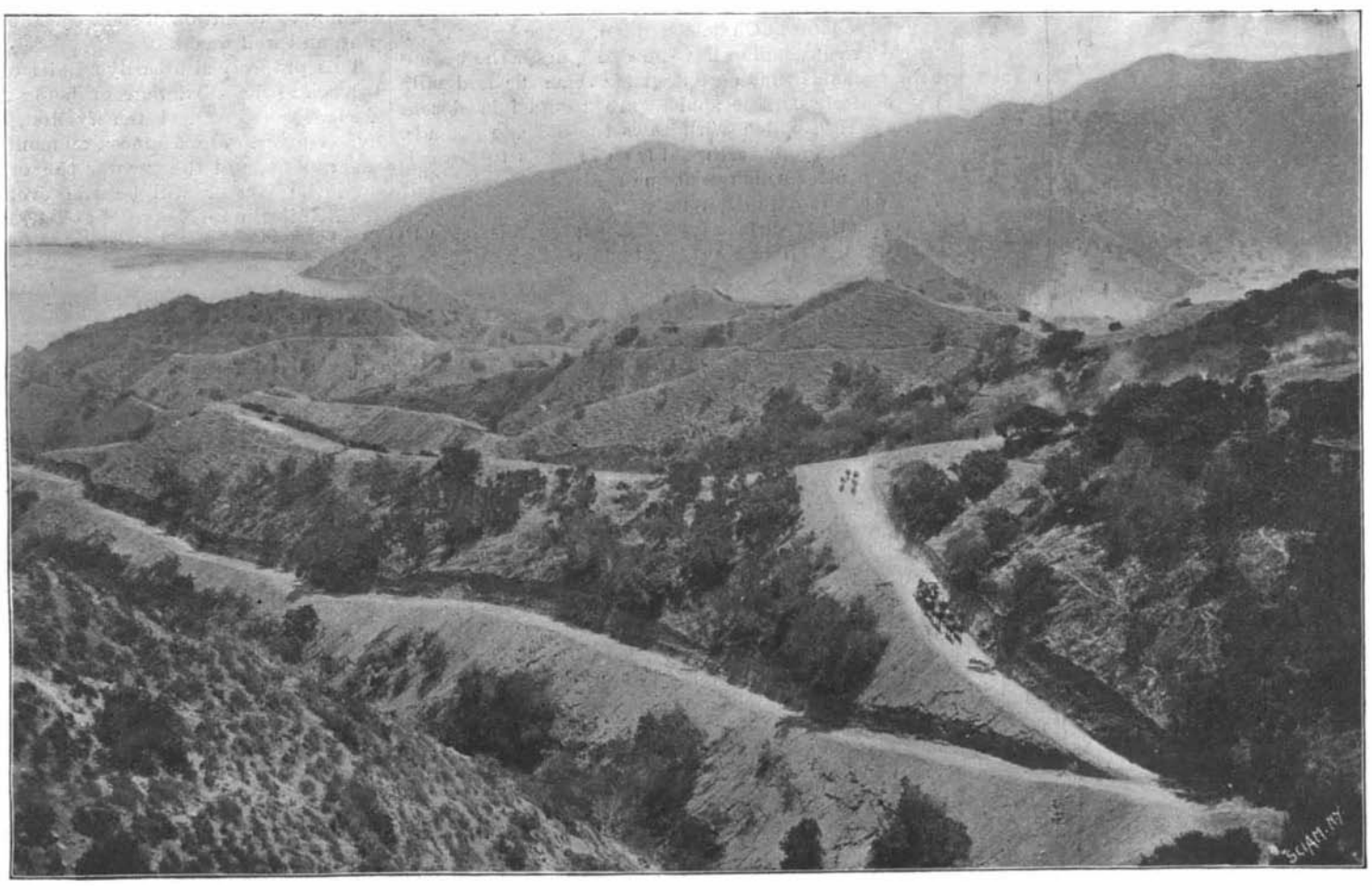
The conformation of the island is singular and different from that of the East, owing to the powerful rains, resulting in cutting up the island into a maze of cañons, which are in turn branched and bifurcated to such an extent that the surface is everywhere scored, level tracts being confined mainly to the large cañons. These cañons dominate everything; their mouths constitute the only beaches and approaches, as originally the island had abrupt cliffs which breasted the sea, but in ages the rains in rushing down from the interior have cut deep cañons and branches which have become filled with verdure. The sea has ground up the rock and formed beaches, and in this way the east and south slopes have been supplied with shallow bays and coves, each being the mouth of a cañon and bearing a stream either at the surface or beneath the sand, after the fashion of many California rivers.

The island lies in the great Japanese current, and Avalon has a climate which varies little winter and summer. As an example of its singular features, at the present writing, May 27, the thermometer at 2 P. M. and 10 P. M. shows the same, or 60°. The summer days are almost always delightful, the winter the time of flowers. Having such conditions, Santa Catalina has deservedly acquired a reputation as a health and pleasure resort; and, being also remarkable for its game fishes, people have come here from all over the country. For many years the upper and almost inaccessible interior was reached by narrow trails which tested the nerves of the tourist. The interior island had good hunting, a different climate, and so many natural attractions that the owners of Santa Catalina decided to build a stage road from one end of the island to the other. This has been nearly accomplished, giving a fine roadway, which, owing to the remarkable difficulties in the way, is one of the most interesting pieces of construction in the Western country. The proposition was to build a ten per cent grade road fifteen feet in width up and over a series of five deep cañons and along their precipitous sides to the summit of the island, then across in a northwest direction to Little Harbor on the south and west, eleven miles, and from there in a northerly direction eight miles to what is known as the isthmus. The average observer, contemplating the steep cañons which lie about Avalon, would have pronounced this road impossible, yet the result has shown the reverse, and one of the most picturesque and attractive stage roads in the country has been opened up.

Avalon lies on a perfect crescent shaped bay the natural mouth of Grand Cañon, which extends across the island at the south end, almost cutting it in two, a lofty ridge being the barrier and breaking the prevailing winds. The coach road begins on the north side of the entrance to this cañon, passing over what was once the site of a populous native town. It leads up from Avalon, then takes a sharp turn, and skirts the edge of Grand Cañon, running out to the point, then turning abruptly and beginning the ascent of Descanso Cañon. The road is a ten per cent grade, and from here was cut on the face of what was much of the way a steep, precipitous cliff, the slope being so steep that a rock would roll rapidly to the bottom, hundreds of feet. Descanso Cañon is winding and filled with verdure, and the view charming and attractive; the eye resting now on the upper range in rich grays against the sky, now on the river of green winding below, or, as the coach and six turns, on the blue ocean that extends away thirty miles to the mainland, where, thirty or forty miles further, loom the snow-capped Sierra Madres.

Following the face of this cañon, the road gives several fine horseshoe curves, which afford the whip ample opportunity to display his skill in six-in-hand driving. For a mile or two the road gradually rises up Descanso, the coach seemingly in the air or suspended over the trees of the cañon bed; now it is on the bare and rocky face of the cliff; now reaching the head of the cañon, it dives into a low forest of wild lilac, greasewood and others, turning again to descend with a rush, facing the sea. So precipitous are the sides of the cañon and so sharp the turns, that several loops have been brought into play, the coach and six turning on itself, without which it would be impossible to continue, owing to the sharp point of the mountain spur. At these loops the coach seems moving out into space over an airy cape that terminates abruptly; but once up to it, the road is seen to turn gracefully, forming a half figure eight, the coach crossing its own tracks and entering the third cañon.

The road now runs parallel to the sea awhile, then following the third spur, turns and apparently runs down to the ocean. But this spur is soon surmounted and the turn into another cañon made; and thus turning and climbing, and by the aid of three ingeniously constructed loops, the coach reaches the summit of the island at this portion, standing apparently directly over the water, 1,500 feet above it. From here a magnificent panorama is displayed, and the entire contour of this portion of the island seen. From the coach one looks down upon the coast, with its green slopes, its white, sandy bays and beaches, and, most striking of all, Grand Cañon with its maze of cañons, well illus-



NEW STAGE ROAD OVER THE MOUNTAINS, SANTA CATALINA ISLAND, CALIFORNIA.

trating the undoing of mountains and the making of cañons in California.

This has been the most difficult part of the road, and it may be of interest to note, in passing, some of the items of construction. The route was selected and the grade established after much difficulty, many problems presenting themselves, but the eleven miles already completed from Avalon to Eagle Camp was built in five months, with a gang of from thirty to fifty men and twenty-eight horses, at an expense of about $20,000. As stated, the grade is ten per cent, and about 140,000 yards of material were removed, in which eight tons of powder were employed in blasting the rock from the mountain side. In reaching the summit five cañons were crossed, or rather passed, without the aid of a bridge, all the curves and natural indentations being followed—a feature which adds much to the attractiveness of the drive.

From the summit the road extends for a long distance parallel with the front ridge of the island, affording the observer a constantly changing view of cañons which enter the sea north of Avalon and south of Long Point—a high cape. Not far from the natural base of one of the highest peaks is the widest portion of the island—about 8 miles. Here the longest cañon begins, winding down, first as a narrow gulch, gradually widening out into a flat level plain, encompassed by the peaks, Mount Banning, Orizaba, and Black Jack, and the ridges about them.

An interesting feature of this drive is that it passes several ancient town sites where the aborigines lived, the heaps of abalones at the mouths of the cañons telling the story. North of Black Jack is an ancient olla manufactory, where the natives made their stone mortars, which they sent to the mainland for exchange. On the fronting ridge the writer found evidences of an arrow manufactory—bits of broken arrows, flint, and heads in various stages of completion.

Once in Middle Ranch Cañon, the six-in-hand gallop along the fine level roadway, finally reaching Eagle Nest Camp beneath a group of sycamores, which constitutes the terminus of this section of the road at present. From this point the road has been surveyed to Little Harbor, and owing to the amount of rock to be blasted, it will be the most difficult portion to build. Little Harbor has its inn, and from here to the Isthmus, eight miles, the road is completed, rising to the divide, above the Isthmus, where there was a large Indian village, then pitching down suddenly, with many fine curves around various cañons, ending on the sandy beach, giving the traveler nineteen miles of staging and five of horseback riding, assuming that he has taken the entire trip.

There are several famous stage roads in California, but it is safe to say that none exceed this in novelty, by which the coacher is treated to a constantly changing panorama of mountains and ocean in a climate which will make this island one of the great sanitariums of the world.

Machinists' Nomenclature.

There are, perhaps, few except those who have had much translating of technical literature from English into foreign languages, who have any idea of how many absolutely meaningless names we have drawn from the animal kingdom, and which very seldom can be rendered in their technical sense by their actual equivalent.

Thus the machinist employs a *dog* on his lathe; he takes a *hog* cut, if the tool will stand it; the castings are made from *pigs* of iron, which in turn were fed from a *sow*. Work is set upon a *horse* or *buck*, and punched or bent by a convenient *bear;* screws are turned by a *monkey* wrench.* Hoisting is done by a *crab*, and a convenient *cat* is a part of the outfit of a shop *crane*, and a *kit* of tools is ever at hand. A *crow* helps to straighten work, a *jack* to lift it, a *mule* pulley aids in driving machinery that a *donkey* engine turns. A *fish* connects parts end to end, or strengthens a broken beam; *shells* are used all over; a *worm* does powerful but quiet work. A *cock* shuts off the water; one kind of a *ram* raises it and another does heavy work. A printing press has a *fly;* the first locomotives had a *grasshopper* valve motion and drive, and *butterfly* valves are common. *Herring-bone* gears are used by the best builders; *turtles* fit printing press cylinders, and *fly*-wheels are running all over the world. In drilling, even an *old man* is called into service, and *doctors* prevent faulty lathe work.

But from the human body itself we borrow the name of nearly every principal part, as head, neck, and chest; arm, leg, and toe; heel, sole, and foot; elbow, shoulder, wrist, and knee; knuckle and finger; rib and diaphragm; eye, ear, nose, and cheek; mouth, tongue, and tooth; throat and gullet; back, side, and belly.

From the minor animals also we get snout and horn, tail and claw, wing and feather, quill and spur, fin and scale.

Exasperating to foreigners learning our technical terms.—R. Grimshaw.

* This, however, got its name from the inventor, Thomas Monkey, of Bordentown, N. J.

Science Notes.

Van Ermenglin states that the toxic ptomaines sometimes found in preserved meats, hams, game pies, etc., are due to the presence of a specific organism, Bacillus bolulinus. The soluble toxine it secretes, called boluline by the author, is stated to be so intensely toxic that one thousandth part of a milligramme killed a rabbit in twenty-four hours. Fortunately, this ptomaine is destroyed at a temperature of 60° to 70° C., and the bacillus which produces it at 95° C., so that thorough cooking will remove all dangers in the case of salted or smoked meats.—Journ. de Pharm. [6], ix., 88.

Prof. A. Gray has been devoting a considerable part of his time to determining the circumstances which affect the conductivity and specific conductive capacity of glass. From manufacturers in London and Jena various specimens of glass were obtained. These were all richer in lead and freer from soda than glasses formerly available. Specimens of glass used for thermometers, and a barium crown glass, were tested also. It was sought to ascertain whether by increasing the lead-oxide and diminishing the amount of soda, the conductivity would go on diminishing. The resistance was taken after five minutes' electrification. The "Jena glass" showed considerable effects of dielectric polarization. Powell's glass did the same. The barium glass showed hardly any, but it had a very high resistance, and behaved like lead and lime glasses. The Jena glass had low resistance, from its high percentage of soda and complex composition.

The medical officer of one of the leading deaf and dumb institutions of England states that he has obtained material aid from the seemingly improbable source of a loud-speaking telephone in the treatment of his patients, in the education of such deaf mutes as possess a fragment of hearing power, the telephone being found to possess many important advantages over the speaking tube usually employed. In the first place, in arranging for this purpose, the wires from several receivers can be coupled up to one transmitter, and thus a teacher can instruct a group of children at the same time; then again, it is not necessary for a teacher to apply his mouth close to the transmitter, so that pupils have a full view of the facial expressions and lip movement, which is not possible when having to direct his voice into the mouthpiece of a speaking tube or trumpet. While seeing the movement of the lips, the patient has the sound conveyed close to his ear drum—a most advantageous combination.

The idea of utilizing the threads of the spider on a larger scale than is, or was, done by telescope makers is very old, but attempts have never been persevered in. About ten years ago a Madagascar missionary, Camboué, experimented with two kinds of spiders of that country. He seemed to be successful, but nothing further has been heard of his researches. In the professional schools at Chalais-Meudon, we see from the Industrie Textile, spiders have now to spin for the benefit of the balloons which are used for scientific and military researches. The spiders are grouped in dozens before a reel, which withdraws the delicate threads. One spider can give a thread from 20 yards to 40 yards in length, after which performance it is released. The threads are of a pinkish hue, and are washed to remove the sticky surface layer. Eight threads have to be combined. The resulting texture is much lighter than ordinary silk of the same bulk, and strong cords for military balloons can no doubt be obtained in this way.

After numerous practical experiments, it has been found by Ferdinand Linneborn, of Hagen, Germany, that a fabric may be produced for garments which shall have properties adapted to keeping the skin cool and thus obviating excessive perspiration. Wool and cotton-wool have the property of absorbing moisture, but wool deprived of oil has it in a considerably greater degree; but in order to prevent clogging of the pores by the fluff, the new fabric is woven or knit with that surface which comes in direct contact with the skin with linen and wool fiber. The linen threads, which come in contact with the skin and are possessed of little power of absorption, are well dried at 100 degrees Celsius, then steeped in a solution of ten parts of paraffine and one hundred parts of benzine, remaining thus from four to five hours at a medium temperature, and when taken out are completely dried at 100 degrees Celsius, after dripping; the yarn so obtained does not absorb any perspiration. The wool remains in a bath of 40 degrees Celsius and consisting of one hundred liters of water, six of spirits of sal ammoniac, one and three-quarters pounds of soap, and two pounds of soda for four hours. It is then well stretched, rinsed in clear running water, and dried at 100 degrees Celsius; while still warm, the wool is now placed in a bath of 40 degrees Celsius and composed of five parts of spirits of sal ammoniac and three of benzine, each skein being now stretched under strong pressure for three minutes, again rinsed in running water, and dried. These threads are woven or knit into a fabric having one side entirely of linen threads or yarn and the other entirely of woolen.

Correspondence.

Speed of the Bicycle.

To the Editor of the SCIENTIFIC AMERICAN:

On page 151 of the SCIENTIFIC AMERICAN for September 3, there is an interesting rule for determining the rate of speed of a bicycle. We think a still simpler one is the following, as it enables the rider after he has found the number of seconds for his own wheel, to ever afterward determine his rate of speed without any further calculations.

Rule.—Multiply the gear by 10 and divide by 56. Call the result seconds. The number of complete revolutions made by either pedal in that number of seconds shows the rate of miles per hour. Example.—If your gear is 84, then $84 \times 10 \div 56 = 15$; and if either pedal makes 20 revolutions in 15 seconds, you are riding at the rate of 20 miles to the hour. If the gear is 67·2, then $67{\cdot}2 \times 10 \div 56 = 12$, and 20 revolutions made in 12 seconds equals 20 miles to the hour.

JOSEPH DIXON CRUCIBLE COMPANY.

The Uranium Intensifier.

Uranium has long been known as a first-rate intensifier with many advantages over the poisonous mercury. It is so simple and gives such good results.

But the usual one solution intensifiers, generally used, have the serious drawback of rapidly deteriorating, and becoming useless, which has no doubt considerably restricted their employment.

The plan I have adopted, however, completely overcomes this difficulty, and the intensifier prepared on the following lines will keep well.

The method is to make up two separate stock solutions, which are mixed as directed, when required for use. The mixed intensifier is then of precisely similar strength, etc., as the "single solution" ones.

Stock Solution No. 1.

Potassium ferricyanide (red prussiate)	100 grains.
Boiled water	5 ounces.
Glacial acetic acid	5 "

Stock Solution No. 2.

Uranium nitrate	100 grains.
Boiled water	10 ounces.

To prepare the intensifier, take 1 ounce No. 1 and add 8 ounces water, then add 1 ounce No. 2, which quantity will intensify several half-plates, and is best thrown away after use.

The negative may be immersed either dry or wet, but it must be free from hypo, also it is essential to keep the dish rocking.

When sufficiently intensified, wash until greasy appearance of plate disappears, which is about twenty minutes; too long washing is injurious.

If from any cause the intensification is unsatisfactory, it can be entirely removed in a few minutes by soaking in a solution of soda carbide 2 ounces, water 1 pint, and well washing.

This property also easily admits of local reduction. It has also the advantage of being capable of being used as a reducer. Intensify first, then immerse in hypo 1 ounce, water 6 ounces, ammonia 1 drachm. This acts rapidly, and the greater the original intensification, the greater will be the eventual reduction.—J. R. R. in Photo. News.

Comparative Census of European Countries.

According to figures given by the latest number of La Revue Française de l'Etranger, the total population of Europe, by calculations made on the latest census, is 380,000,000, which is a gain of 37,000,000 over that computed January, 1888. Here is a table showing the figures given in the Revue Française de l'Etranger:

Europe and Russia and Finland	106,200,000
Germany	52,300,000
Austria-Hungary	43,500,000
The United Kingdom	39,300,000
France	38,500,000
Italy	31,300,000
Spain	18,000,000
Belgium	6,500,000
Turkey in Europe	5,800,000
Roumania	5,600,000
Portugal	5,000,000
Sweden	5,000,000
Holland	4,000,000
Bulgaria	3,000,000
Switzerland	3,000,000
Greece	2,400,000
Denmark	2,300,000
Servia	2,300,000
Norway	2,000,000

The density of the population according to each square kilometer (about 0·386 square mile) is thus reckoned: In Belgium, 220; Italy, 169; Holland, 149; England, 126; Germany, 97; Switzerland, 73; France, 72; Austria, 69; Spain, 36; Russia, 20. While the annual increase of the population of Russia has been 1·45 for every 100 in the last ten years, that of Germany has been 1·15, of Austria-Hungary 0·96, of England 0·35, of Italy 0·45, of France 0·08. At this rate of augmentation, in 100 years, Russia would have 228,000,000 inhabitants, Germany 106,000,000, Austra 79,000,000, England 65,000,000, Italy 44,000,000, and France only 40,000,000.