The PONTINE MARSHES

View of the Appian Way.

THE Pontine marshes, close to Rome yet little known, form one of the strangest corners of Italy.

It is paradoxical that this region is not better known, for one of the world's most famous roads, the Appian Way, leads straight to it.

The Via Appia, built by Applus Claudius about 300 years B. C., starts from Porta San Sebastiano, the southern gate of Rome, and leads toward Naples. For the first 65 miles it runs as straight as a taut string, until it reaches the town of Terracina, where it passes under the cliff of Monte Saint Angelo that overhangs the sea.

The Romans had to chisel off part of the rock to make space for the roadbed. After passing this point it makes a first bend and then goes to Naples.

When you leave the Eternal City on this classic road you pass at first along a wonderful array of old Roman sepulchral monuments; then you climb up the Alban hills, extinct volcanoes of prehistoric times, and from there you gradually descend upon a great plain, some 30 miles from Rome, known to history as the Pontine marshes.

On the left, as you travel toward Terracina, are the olive-covered Lepine mountains, of gray limestone, that at sunset are veiled by that beautiful purple haze one sees so often reproduced on the background of the early Renaissance paintings. To the right is the Tyrrhenian sea, along the border of which runs a large sand dune covered by a wonderful oak forest some 30 miles in length. Between the dune and the sea is a series of lagoons.

At the extreme end a solitary mountain rises, to all appearances from the sea. It is Mount Circeo, the cornerstone of the Pontine marshes. This mount was an island in bygone ages, as geologists have proved, and Homer, eight centuries before Christ, speaks of it in the "Odyssey" as an island, though probably it was not so any longer.

Water of the Marshes Confined.

The large quadrangle formed by the foothills of the Alban volcanoes, by the Lepine mountains, by the wooded sand dunes of the coast, and by Mount Circeo, measuring some 150,000 acres of extraordinary fertile land, is known to history as the Pontine marshes. The water, hemmed in on all sides, cannot flow out.

In winter the mountain streams pour their foaming, muddy torrents upon this lowland, flooding thousands of acres; the rich mud slowly settles, coating the fields with a silt which is the finest of fertilizers; then the waters gradually flow out through narrow channels until, in summer, only the lowest portion of the land, that which lies practically at sea-level, remains in a swampy condition.

A dense, luxuriant growth of water plants springs up with the approach of the warmer season; the stagnant, lukewarm waters teem with life of every description, and toward the month of July the treacherous Anopheles mosquito drops its filmy larval veil, rises out of the marshes, and, flying around in search of a living for itself, sows death upon humanity.

Many centuries ago most of the inhabitants fled to the mountains, built their towns on some steep hills, and from these vantage points made dashes into the plain to work the fields and tend the cattle. Such a place was ancient Cori, founded by the Trojan Dardanos, with its city walls constructed of huge polygonal blocks and with its beautifully preserved temple of Hercules.

Ancient Towns of the Hills.

A little farther on rose Norma, on the very edge of a vertical cliff 600 feet high, as ancient as the city of Rome, if not more so. In olden times it was called Norba, and the cyclopean walls, formed out of huge, carefully trimmed boulders, are still a marvel to those who visit this not easily accessible place.

At the foot of Norma is the abandoned medieval town of Ninfa, the Pompeii of the Middle ages, as Gregorovius called it, covered with ivy and brambles. This is one of the most poetic spots of the world.

A little farther along the range is Sermoneta, with the Thirteenth century castle of the Caetani towering on a high mountain spur and dominating the vast plain of the Pontine marshes. Then follow Sezze, Piperno, and other towns.

These are the inhabited places today; but in olden times the whole land was densely populated and highly productive. Twenty-three towns are supposed to have existed where now one sees not the trace of a single building. The most famous of these cities which have disappeared was Pometia, conquered and sacked by the Roman king, Tarquinius the Superb, in the Sixth century before Christ.

The lagoons of the marshes have formed between the great prehistoric dune covered with oak forest and the more recent one thrown up by the sea. There is no natural communication between the lagoons and the sea. When these lakes swell, during the rainy season, the fishermen cut a small ditch across the dune, and the waters, rushing out to the sea, in a few hours widen to a broad river. The fish taste this lukewarm, brackish water and swim by the thousands and millions into the lagoon, where they are caught.

This locality is also a wonderful shooting resort. There the ducks come from the sea, seeking shelter and food in that maze of ponds and canals distributed throughout the dense growth of reeds.

How the Marshes Were Created.

At the time of the Roman republic, in the Fourth and Fifth centuries B. C., the Pontine region seems to have been free of waters, healthful and densely populated. Then, a little before 300 B. C., near the time the Appian road was built, something happened that has not been fully understood.

The natural outlet of the waters in the depression between the city of Terracina and Mount Circeo was obstructed, probably through some seismic movement; a raising of the ground a few feet was quite sufficient to stop the outflow of the waters; and the sea increased the obstruction by piling up sand dunes.

In this way the great plain of Pometia became hemmed in on all sides by higher lands and converted into a large basin, into which the waters naturally converged from everywhere, but from which they could not flow except through the narrow channels dug near Terracina to connect the marshes with the sea.

The ground became water-soaked. The great Appian road, not a long time after being built, began to sink in places and had to be raised by Trajan and other Roman emperors. During the Eighth century it went completely under water and the road from Rome to Naples had to be shifted to the foothills, passing near Ninfa and Sermoneta. From that time to the present this waste but fertile region became the playground of unruly waters.

In winter over large tracts of land the yellow waters often rise as high as the tops of the fences; ducks, sea gulls and geese make it their home, diving in the shallow water for food.

In spring the waters subside and the fields become covered with a luxuriant growth of grass and flowers, where the sheep and the long-horned cattle of the Roman Campagna find ideal pasturage.

New Italy intends now to tackle the problem of draining the marshes that has baffled each succeeding generation for more than two thousand years. The government is approaching it with all the means and technical knowledge of modern times and will accomplish the work.

The ancient canal of Rio Martino will be opened again, the mountain streams will be placed under control by building a reservoir at the foot of the mountains, and large pumping stations are to be erected for draining the swampy land that is practically at sea level.

WHY

Mississippi Floods Present Grave Problem

The Mississippi is the crookedest great river in the world. It travels 868 miles from St. Louis to Natchez in covering a distance of 515 miles in a straight line. In many reaches of a 100 miles, the length could be cut nearly in half. The lessened friction on a straight course would save nearly half of the actual drop of 379 feet between St. Louis and New Orleans.

For hundreds of miles along the upper reaches of the Mississippi above St. Louis, the high bluffs on both sides of the river, varying from two miles to five miles apart, give evidence of an ancient river in pre-glacial times that was far more magnificent in width, depth and volume, than the present river; which as it shrunk in volume during the disappearance of the northern continental ice cap, and subsequent to the diversion to the eastward of the waters that now form the St. Lawrence, refilled its ancient bed with sediments to the depth of about 200 feet and shrunk in width so as to occupy only a fraction of its ancient channel.

The Mississippi presents problems on a scale found nowhere else in the world, unless it be along the Hwangho in China, or on some of the great rivers of India.

It is now an assured fact that the problem of flood protection for the reclaimed farm lands along the Mississippi and its lower tributaries is now largely in the hands of the federal government. It has become the biggest and most costly reclamation project in the world.—John R. Freeman in The Outlook.

How to Remove Putty

Objectionable marks on ground glass, when glazing a window frame, are made by the oil in putty, and are very difficult to remove. The best and simplest way to prevent them is to rub soap on the edges of the glass before the putty is applied, so that the film will keep all stains from the glass.

HOW

"ANNIHILATION" OF COAL WOULD CREATE ENERGY.—The secretary of the Royal Society of London, Dr. J. H. Jeans, says "a star is in effect but a huge X-ray apparatus." He believes the interior of a star is hotter and heavier than the exterior. According to his theory, heat in the stars is produced in the following manner: "Throughout a star's interior, electrons and protons must at intervals fall into one another and mutually destroy one another, the energy of their fall being set free as radiation. Each proton or atom, as it is annihilated, makes a splash of radiant energy which passes through the star until, after innumerable absorptions and re-emissions, it reaches the star's surface and wanders off into space."

The sun has a temperature of only about 6,000 degrees at its surface. This temperature can be attained in a laboratory. In the core of the sun, however, its temperature rises to something like 70,000,000 degrees. It is supposed that the Dog-star, Sirius, is twice as hot as the sun. Scientists believe that all matter consists of electrons and protons, negative and positive charges of electricity. They are of equal numbers, and when they come together, says Doctor Jeans, the opposite charges are neutralized and annihilated. The scientist continues: "Whereas the ordinary combustion of a ton of coal provides energy enough to drive a locomotive for an hour, the annihilation of a ton of coal would provide enough energy for all the heating, lighting, power and transport in Great Britain for a century."—Pathfinder Magazine.

How Skyrocket Stars Are Made to Scatter

How does the skyrocket go up and scatter its stars? People in China and India knew long ago. In the Sixteenth, Seventeenth and Eighteenth centuries Italian fetes were held with fireworks. The body of the rocket is a hollow tube with a strong pointed cap. A plug holding a smaller tube fits into the bottom containing the powder which shoots it off. Lighting the fuse starts the flame upward toward this powder. When the exploding powder blows out through the narrow opening it does so with great force. The "kick" of the discharge forces the rocket upward. The backward streaming flame forms its tail. Just as the propelling charge becomes exhausted the fire rushes through the tiny hole at the top, setting off the powder, which scatters and ignites the fine metallic fragments that become "stars." The purpose of the stick on the rocket is to guide it in a straight line.

How Sky Writing Is Done

The exact chemical process in producing the smoke used for sky writing is a secret. Dr. J. P. Simmons of New York university has suggested that the process is simply one based on a chemical combination, such as that of hydrochloric acid and ammonia, producing a smoke of solid particles of ammonium chloride. Professor Simmons said that a tank placed in the airplane would have to have two containers, one of the acid and one of the ammonia, both in liquid form. This tank would be connected to the exhaust pipe of the engine and the pipe carried to the tail of the airplane. The engine exhaust would provide a draught which would suck on the hydrochloric acid. The vapor of the acid would pass into the second container and mix with the vapor of ammonia and the resulting ammonium chloride would be carried off into the exhaust pipe.

How Golf Balls Are Made

Golf balls are made with indentations so as to make the surface of them rough so that the iron heads of clubs will not slip or glance off of them.

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