

A second textile mill in the South, at Pelzer, South Carolina, was about to undergo electrification. Even yet, the owners required courage to sign a contract for electric motors rather than for a form of mechanical rope drive. In Charleston, where most of the capital stock for the Pelzer Mills was subscribed, the news that the electric drive was going in caused the stock to drop \$25 a share. The mill hands protested flatly, "The mill never will run with those little wires to pull it." On the day the mill started operation, a kind friend approached Captain Smythe, who was responsible for the contract, and offered his condolences on the failure of the electrical transmission system. "I've watched those wires all day," he said, "and they haven't moved yet."

Twenty-five General Electric motors drove the spindles in that mill in 1895, and now one textile mill after another sent in orders. In one week of that year, McKee's bulletin reports that motors were sold for use in mines, shoe factories, yarn mills, tanneries, powder mills, watch factories, and even for blowing church organs.

Meanwhile, the annual sales of the incandescent lamp had reached the six million mark, despite the fact that the Edison patent expired in the previous November. The directors, in their annual report for that year, outlined their policy as follows:

"Your company will chiefly rely upon the high quality of the lamp manufactured by it and its facilities for manufacturing at a low cost to maintain its commanding position in the lamp business, irrespective of patent control. Lamp prices have been greatly reduced. While the volume of this important part of your business will without doubt be largely increased in the future, the profit thereon will be less."

This amounted to an announcement that General Electric intended to hold its own in competition for business by sheer

efficiency of methods. Competition was quick to show itself. The independent lamp manufacturers who had been forced to discontinue their infringing lamps now swarmed into the field.

Local light and power companies equipped by General Electric in 1894 aggregated nearly 1,500. They still had financial problems, and the parent company still accepted, to some extent, negotiable paper in lieu of full cash payments, especially in the form of bonds of the local companies. This revived the need of an agency for handling the bonds as they accumulated, and so there was organized in 1894 the Electrical Securities Corporation. It bought from General Electric the bonds of local companies—which were not readily marketable—and issued against them its own collateral trust bonds.

Almost completely had the memory of the fearsome days of 'ninety-three faded from the minds of men. The manager of the Metropolitan Telephone Company in New York reported that more telephone messages were handled daily for General Electric than for any two other concerns in the city.

About this time Coffin proposed to Griffin a trip to the Pacific Coast. "But think of the expense," protested Griffin.

"I think it would be worth while," said Coffin, thoughtfully. "I should like to show you what we are doing on the coast, these transmission enterprises, the outlook in that region."

And so a cross-continent trip, which causes so little concern to business today, was carefully weighed and pondered by the leaders of a young industrial concern. Indeed, there were events of vast significance taking place on the coast, among the foothills of the lofty ranges where a giant's energy awaited the harness of the pioneer.

Into the mountain hinterland of California went this new

explorer, the electrical engineer, making his way into regions where human habitation was scant or nonexistent. Miners had already discovered gold in those heaved-up mountains. But the new explorer sought treasure of a different sort, though scarcely less valuable than the metal for which the forty-niners struggled. It was treasure as old in the ranges as gold, yet more difficult to extract—white coal.

This treasure, too, had its boom, when the mining camp of other days gave place to the bustling construction camp of hydraulic engineers. Invasion of the mountain solitudes went on without cessation. The initial project at Redlands was scarcely in operation when the city of Sacramento sent engineers to the falls of the American River, twenty-five miles distant, to prospect for a waterpower site. In the powerhouse erected by the Folsom Falls, General Electric installed four generators, each of 750 kilowatts capacity, producing three-phase alternating current, to which the company had now committed itself. Over the intervening miles a transmission line was built to Sacramento and energy was first delivered in that city on July 14, 1895, at 11,000 volts. Electric streetcars, a city-wide system of arc lights and incandescent lights, and a variety of motors for stationary power drew energy from the falls at Folsom.

The *Sacramento News* proclaimed jubilantly: "The Folsom power is herel It came early yesterday morning, and a hundred guns awakened the town, proclaiming the glad news. . . . The Sacramento plant is the most extensive yet put in place anywhere. . . . No event ever occurred in Sacramento that has been heralded to her greater advantage than the splendid industrial feat of yesterday."

Thereupon one after another of those western white coal centers yielded up its energy. Competition among the electrical companies was keen. General Electric, in the following

year, built an 11,000-volt line from the Kern River fourteen miles to Bakersfield; another extending fourteen miles from the Big Cottonwood River to Salt Lake City to work at 10,000 volts; and a third from the Ogden River thirty-six miles to Salt Lake City, at 15,000 volts. In 1897 a transmission project of eighty-one miles and 33,000 volts was undertaken, the longest commercial electric power transmission system and the highest voltage yet attempted. It stretched from the Santa Ana Canyon to Los Angeles and Pasadena.

Triumph indeed. Yet in the midst of it the *Journal of Electricity*, under date of May 1897, noted that all was not yet under full control. "Not to that trustworthy servant, the transformer, may the present limitations of electric transmission be ascribed," it said, "the barrier is embodied in the insulator alone. In addition to being a practically perfect nonconductor, the insulator should be wind, rain, snow, sleet, dust, and insect-proof. . . . Truly may it be said that unlimited reward awaits the inventor of a perfect high-tension insulator."

Nevertheless, General Electric struggled along with the insulators that were at hand—and transmission and voltages in California crept slowly upward. The fight for the business grew intense. And those bold specialists, the SKC trio, shone in one of the daring projects of the white coal region.

DEVELOPMENTS AT SCHENECTADY now shift our scene from the far west to the city of Washington, where smart naval uniforms color the streets and the corridors of the federal buildings. In the office of the Bureau of Ordnance, United States Navy, early in 1894, Captain W. T. Sampson, head of the bureau was talking to Lieutenant Bradley A. Fiske and an associate. Sampson suddenly inquired, "Do you think you could turn gun turrets by electricity?"