

started and stopped without the use of brakes in the space of three or four inches, and, when making the normal running speed, can, in an emergency, be stopped and reversed without brakes within less than a quarter of a car length. This is especially advantageous in crowded thoroughfares, and shows the superiority of the electrical car over the horse or cable cars. The control over the car seems marvellous, for one sees little or nothing save an almost imperceptible movement of the hand of the motor-man; and the starting, although prompt, is very gradual and without shock or jar. The ordinary driver can operate one of these cars without the slightest trouble, after a very brief instruction. The saving on the operating cost of the Sprague system, owing to the superior quality of the apparatus, over an ordinary horse-car line, constitutes a no inconsiderable item. It has been found that the average cost of motive power per car a day throughout the United States — that is, for from ten to eleven hours, and trips aggregating from forty-five to fifty miles — is about four dollars, and this counts only those horses on actual duty on the road. The cost of motive power per day per car for equal mileage in Richmond is less than two dollars on the heaviest sort of grade-work, and at Boston it is estimated that even this low cost of operation will be reduced. For winter use upon this road the Sprague Company is equipping three electric 'working-cars,' furnished with snow-ploughs, brushes, ice-cutter,

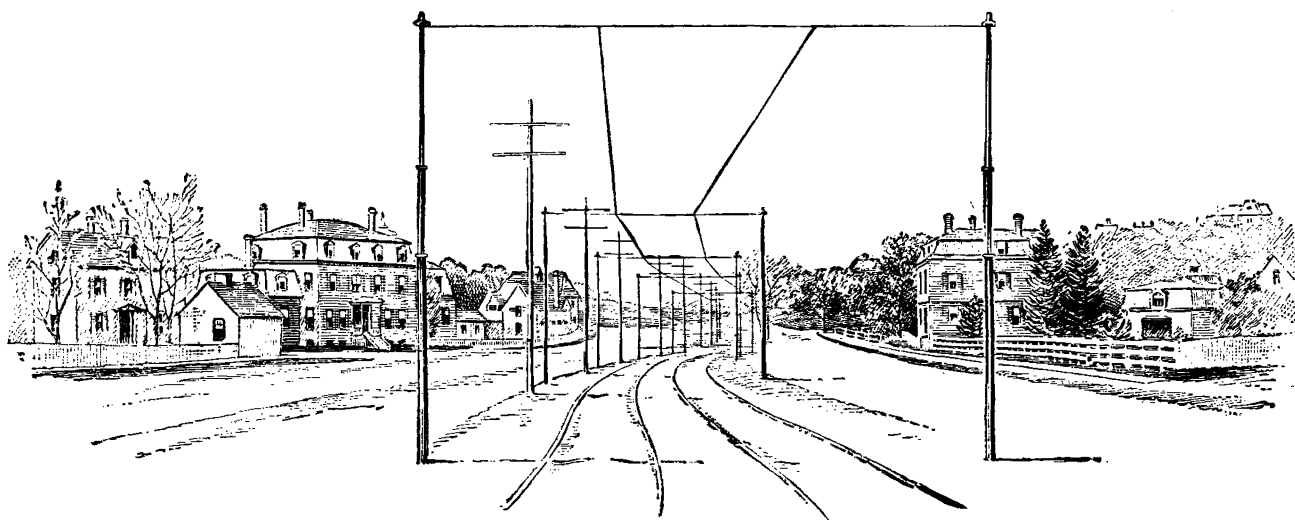
In switching, two ordinary tongue-switches are used, — one in the conduit, and one on the rail. Brushes attached to the snow-ploughs and cars easily keep the conduit and tracks clear, even in the severest snow-storm or in case of slushy and muddy weather.

The change from the overhead system to the conduit is made while the car is in motion, and without the slightest delay in travel or inconvenience to passengers; so that the Sprague cars run over the entire distance.

The kind of truck used upon this road is the latest Sprague improved truck, which has been fully described in these columns. The equipment of this truck includes the new Sprague 'Boston' motor, which will be used, for the first time in commercial work, upon this road.

MOHAMMEDANISM AND SLAVE-TRADE IN AFRICA.

THE recent events in Africa have shown the enormous power Mohammedanism exerts in that continent. The growth of the empire of the Mahdi, the foundation of states by the Fulbe, the steady progress of Mohammedanism in the Galla country, prove its vast historical importance in Africa. We have shown on the accompanying map the distribution and growth of Mohammedan power in Africa according to an interesting study by A. Oppel, published in the Journal of the Geographical Society of Berlin.



BEACON STREET, WEST FROM HARVARD STREET.

and salt-distributor, and each propelled by two powerful 30-horse-power motors. In front of the car is a revolving wheel which breaks up the snow-crust completely, and behind are revolving brushes which sweep the tracks clean. It is estimated that this 'working-car' will clear a street-railway track after a heavy storm more quickly than the ordinary snow-plough drawn by 12 horses.

The system of wiring which the West End management has adopted for the crowded city streets is the Bentley-Knight conduit, now in use in Allegheny City, Penn. Here the conduit is laid midway between the tracks, and is strongly bolted to the stringers and sleepers. Its cross-section is about a foot square, and its upper part has a slot similar to that used in cable-railways; its width, however, being only five-eighths of an inch, giving an opening so small that carriage-wheels will not catch in it. Besides this, it is so bevelled that horseshoe calks will not be held in it. Copper bars an inch and a quarter thick, one on each side of the slot, firmly insulated beneath it, carry the current, — one from the dynamo, and the other returning from the motors. The current is taken from the conductors to the motors by 'ploughs,' as they are called, two to each car. These ploughs are thin iron plates about ten inches square, hung from a framework over the middle of the track, and projecting into the slot. The motors are connected by controlling-switches, and the car is operated substantially as is the overhead system. The ploughs are so arranged that they can be lifted out of the slot when any obstruction is reached. The current is taken up and returned by spring-plates, which slide along the copper conductors at the bottom of the plough.

Christianity early penetrated into Egypt, and from this point spread rapidly up the Nile as far as Abyssinia, and all over the north coast of the continent. In Egypt many of its dogmas were developed under the influence of Alexandrian philosophy, while some of the ceremonies of ancient Egyptian worship found their way into the Christian cult. Here, also, many dogmatic controversies originated, which were the cause of long-continued wars. The Christian Church in Africa disintegrated, and at the same time was degraded by assimilating numerous heathenish elements. When, therefore, Mohammedanism first entered African territory, the ancient Christianity was swept away. In 640 A.D., Omar's general, Amru Ibn al Assi, invaded Egypt, which had been a province of Byzantium, and in 641 conquered Alexandria. In order to secure his hold upon the newly conquered province, Omar settled a number of Arabian tribes in Egypt, and through their influence numerous natives adopted the Mohammedan faith. Amru next subjected the western borderland of Egypt, and his successor, in 664, conquered Fezzan. In 711 the whole of North Africa was under Arabian sway. The native Berbers as well as the descendants of the Greeks and Romans, soon adopted their faith and language.

In the sixteenth century the power of the Berbers had increased considerably, and by acknowledging the authority of a Berber caliph they became independent of the Oriental Empire. As the number of Arab immigrants was originally small, they began to be merged into the Berbers; but in the middle of the eleventh century several nomadic tribes who had lived in upper Egypt

emigrated westward, and penetrated far into the interior, thus giving Mohammedanism and Arabian influence a new impetus. In the beginning of the eleventh century the new religion had reached the great northern bend of the Niger, and since that time this region has been one of the central points and strongholds of Mohammedanism, and at one time the seat of high culture and of science. It seems that about this time the Fulbe adopted Mohammedanism. Arabian immigrants began to settle also on the eastern slope of Abyssinia. They intermarried with the natives, and founded a Mohammedan empire. The progress in Central Sudan was steady. About the year 1600 Baghirmi had become a powerful Islamic state, and a little later Wadai had embraced the same faith. While in the eighteenth century little progress was made, a new period of advance dates back to the early days of our century, when the Fulbe, led by the fanatical priest, Otmann dan Fodio, attacked the heathenish Haussa States, and subjected them. The two states Gando and Sokoto, and, later on, Adamaua, which forms a portion of Sokoto, were founded. On the upper Niger Mohammedanism made progress in consequence of the uprising of the fanatical marabout El Hadj Omar, who subjected the region on the upper Senegal and Niger, and converted a great part of the Mandingo.

The Arabian supremacy over the east coast of Africa, which was first gained about 1700 A.D., was lost again in consequence of disagreements among the conquerors; but about the end of the last century the Sultan of Oman made an effort to re-occupy the coast, which has been held by the Arabs since 1838.

We have thus outlined the limits of Mohammedan Africa. Mohammedan traders, however, penetrate much farther into the interior, and with them the devastating slave-trade. It will be seen from our map that the area of slave-trade in a general way adjoins the Mohammedan area, and that it has almost invariably its outlet in Mohammedan countries. The demand for slaves arises principally from two sources, — from the domestic wants of the Mohammedan peoples, and from the necessity of obtaining carriers for the ivory-trade. In describing the extent of this trade we follow A. J. Wauters's sketches in the *Mouvement géographique*.

In the period following the Conquest and the establishment of plantations in America, the American land-owners who needed workmen began to import slaves from the west coast of Africa. Some figures will best show the extent of this trade. In 1600 the government of Philip II. made a treaty with the governor of Angola, according to which the latter engaged to furnish to the Spanish colonies 4,250 slaves annually. The price paid for this monopoly was 162,000 ducats. In 1701 this monopoly was held by the Portuguese Guinea Company, who had to furnish "10,000 tons of negroes" annually. The number of slaves furnished by the various companies holding the monopoly increased steadily, and in 1786 not less than 38,000 slaves were imported into Spanish America. From 1811 to 1820 Cuba received over 116,000 negroes, and in Brazil as many as 50,000 were imported in 1849.

From these figures it is easily understood why, even at the present time, many parts of the west coast are still depopulated. One of the principal regions of slave-hunting was the lower Kongo, whence, according to Monteiro, 100,000 slaves were exported annually. The trade on the east coast was not less flourishing, the principal market being Zanzibar. As is well known, this maritime trade has ceased to exist. Owing to the abolition of slavery in all Christian countries, the demand, and at the same time the necessity of supplying it, have ceased. On the east coast it has also become very insignificant owing to the endeavors of European nations, except on the coast of the Red Sea, whence Arabia and Persia continue to be supplied.

While thus Africa has ceased to supply foreign markets, the internal demand continues to be very large, and causes the continual spread of the area devastated by slave-hunters. We may distinguish four areas, — the western Sudan, the upper Nile, the lake region, and Lunda.

In western Sudan the sultans of the Haussa States frequently wage war upon their southern neighbors in order to obtain slaves, which are used for paying tributes, for building new residences, or for sale in order to fill the treasuries of the states. Kuka, the capital of Bornu, west of Lake Tsad, is one of the important slave-

markets. Rohlfs states that he saw there a caravan of four thousand captives, which was about to be sent northward for sale. The surplus of slaves of this region is sent across the Sahara. For a long time Morocco was the chief consumer of these slaves, but the trade with that country is declining. Fifteen years ago Rohlfs estimated the annual import at ten thousand heads. The trade with Egypt has almost ceased, but now and then caravans reach its western boundary. Thus in 1871 a convoy of two thousand slaves arrived from Wadai, and even as late as 1880 slaves were sent there from western Sudan.

In eastern Sudan the slave-trade is not less flourishing, but here it is due to other causes. The region devastated by it embraces Bahr-el-Gazal, Jebel-Nuba, Dar-Fertit, and the country of the Shilluk and Niam-Niam. The ivory-trade created here the demand for slaves. Every year the merchants of Khartum sent armed expeditions into this region in order to collect ivory. These expeditions ascended the Nile, and began their transactions in the region of the tributaries of the Bahr-el-Gazal. They established at short distances stockades, called 'seribas,' which served as the basis of their operations. They subjected the natives, and compelled them to serve their purposes. In course of time these seribas became centres of slave-hunting, the negroes being not only compelled to assist in the ivory-hunting expeditions, but being exported for sale. During the time of Gordon's administration there was a slight relax; but, since the Mahdi has obtained control of the whole region, slave-hunting is once more flourishing. It is estimated that annually 30,000 slaves are taken from this region. This state of affairs is the more to be regretted, as this is one of the most densely populated and highly cultivated regions of Africa. The slaves are sold to the upper Nile provinces, Nubia, upper Egypt, and Darfor. They are also sent to the Red Sea, whence they are exported to Arabia.

At the present time, particular attention is called to the slave-trade in the Tanganyika basin and on the upper Kongo. Tabora, Ujidi, and Nyangwe are the principal markets in this region. It is only since a recent date that this territory has been devastated by the Arabs. Towards 1830 they reached Tabora in extending their commercial enterprises inland, and in 1840 they established a factory on the Tanganyika. In 1868 they had reached Nyangwe on the upper Kongo. From 1830 to 1870 immense caravans of slaves were transported to Zanzibar, and large tracts of land were devastated. The endeavors of the European nations to prevent the exportation of slaves have suppressed this export, but the ivory-trade still demands enormous numbers of carriers. The Arabs in Africa are also agriculturists, and enslave negroes in order to cultivate their fields. To fill these demands, they continue their razzias, and these are of course most devastating in territories into which the Arabs have recently penetrated, and where they have no workmen at their disposal. As soon as new means of transporting the ivory from the interior to the coast are found, the slave-trade will become less extensive. For this reason it is to be hoped that the Kongo Free State will soon succeed in opening a regular service between Stanley Falls and Leopoldville, as this will save the upper Kongo basin from a great part of the devastations of the slave-trade.

The last important territory subjected to the ravages of slave-hunters is the empire of Lunda. Here Portuguese half-breeds take the place of the Arabs of East Africa. It seems, however, that, in consequence of energetic measures of the Portuguese Government, this trade will rapidly decline.

It is to be hoped that the steps recently taken by many European nations to finally suppress the export of slaves will tend to diminish the demand; but a total suppression of the slave-trade cannot be effected without new means of communication in Central Africa. The social institutions of Mohammedan North Africa are such, that any attempt to prevent slave-hunting in western Sudan must fail, as it is impossible to influence the peoples who create the demand for slaves.

THE Congress of Americanists, composed of some of the most distinguished scientists of Europe engaged in the study of the prehistoric nations of America, which recently completed a very important and successful session in Berlin, voted to meet in Washington in 1890.





MAP OF AFRICA,
Showing the Spread of Mohammedanism and the Extent of Slave-Trade.