

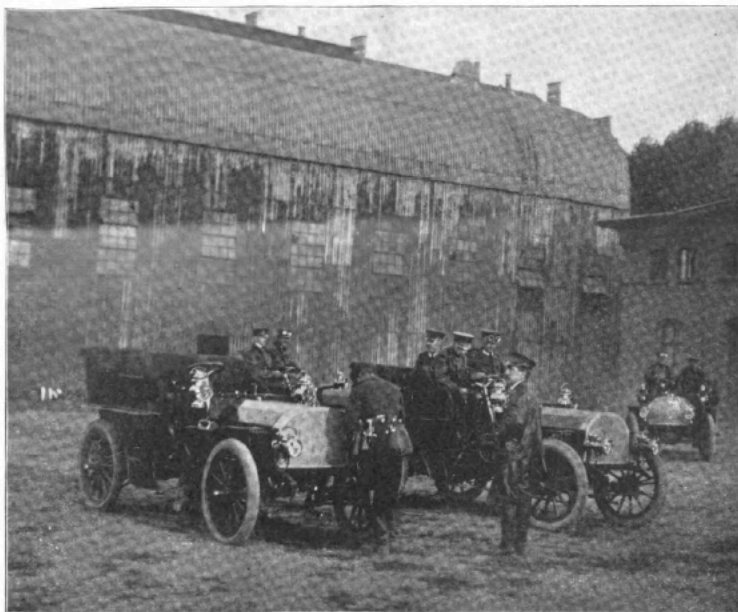
#### UTILITY OF AUTOMOBILES FOR WAR OPERATIONS.

The success which the automobiles had during the recent French military maneuvers is very encouraging, and it is recognized that they are a valuable auxiliary to the army. Every year sees a greater number of cars entered and the leading military authorities approve them highly. This year an unusually large

the army automobile corps, was charged with making a strategic experiment which gave excellent results. It was carried out as follows: Capt. Genty was attached to one of the cavalry divisions. In course of the maneuvers he served to unite the main body of the cavalry with the scouts, which were scattered in different directions, and he thus brought the information which the scouts obtained to the main body of the cavalry, and this very quickly. There is no doubt that

stubble three feet high, river bottoms, ditches, and mountain sides, having grades of 30 per cent. During the twenty-one days the car saw service in camp, it covered from 40 to 112 miles a day, yet not a minute's time was lost from repairs to the car or its mechanism. General McArthur stated that it would have taken him four days' tiresome riding on horseback to re-encounter the ground covered in the machine in six hours.

Major-General H. C. Corbin, who used a White steam car at Manassas, was equally well pleased. He left his headquarters at 6 A. M. (three hours after the members of his staff), yet notwithstanding the bad character of the roads, he reached the rendezvous before them. As a result of these trials, the probabilities are that automobiles will soon come into more general use in the American, as well as in foreign, armies.



AUTOS ABOUT TO START ON A RECONNOITERING EXPEDITION.

number of chauffeurs took part in the maneuvers. On his return, one of them gave his impression of the event in a recent interview. "The twenty-eight days were passed admirably, on my part, as I was attached in quality as chauffeur to Gen. Pendeze, Chief of the *Etat Major*, who is one of the first to appreciate the services which the cars can render to the army. With him I did not remain idle, seeing that I took in both the eastern and western maneuvers. Like all the chauffeurs who piloted one of the generals, my principal duties were to conduct the chief to the places where his presence was necessary, and of course as rapidly as possible. Where under the old system the generals started off on horseback to reach the ground at least an hour before the maneuvers took place, they now start only a quarter of an hour before the required time and upon reaching the field they find their horses, which have been brought there in advance. In my own case this kept me rather busy on account of the high grade occupied by Gen. Pendeze. As Chief of the *Etat Major* he was obliged to conduct both the East and the West maneuvers. This complication in the service was in reality a pleasure for me, as it took me over considerable ground." As to the use of the automobile not only for the above service, but also in

in next year's maneuvers the question will be further taken up and some interesting experiments may be looked for. What these are to be I am not at liberty to say at present."

The example first set by the French several years ago of the application of automobiles to war purposes has been followed by several other European nations, especially Germany, and also this year by the United States. Our illustrations depict some of the cars that were used this fall in the German maneuvers, where they were found of very great use for the speedy transportation of officers to different parts of the field. Even Emperor William himself made use of a fine large touring car as a conveyance to and from the field of operations.

Two of the best makes of American automobiles—the Winton gasoline and the White steam cars—were given severe tests by Generals McArthur and Corbin in the maneuvers this year at Paso Robles, Cal., in the West, and at Manassas, Va., in the East. At the former place a Winton touring car was used almost incessantly, while at the latter three White steam tonneaus did fine work. A specially-built Winton machine, with side seats like a bus, capable of accommodating six, also was found very serviceable by the

#### DEBRIS-RESTRAINING BARRIERS OF THE YUBA RIVER.\*

By CAPT. WM. W. HARTS, U. S. Corps of Engineers.

In the years following the discovery of gold in California, the processes of mining for this precious metal caused the removal of vast quantities of detritus from the western slopes of the Sierra Mountains into the streams and rivers of the valleys below. Gold was found in the beginning in gravel beds, where it had probably been deposited by rivers flowing in prehistoric times. These gravel beds exist in great numbers in a comparatively small area along the western slopes of the Sierra Mountains near the headwaters of streams draining into the Sacramento and San Joaquin valleys.

In securing gold from these mountains the sorting action of water was necessary, and in order to facilitate mining operations, ditches of great length and size were built, frequently at great expense, to carry water to the localities where gold had been discovered. Streams of water under great pressures were directed at these gravel banks through nozzles sometimes as large as nine inches in diameter, to break down the gravel banks and wash the detritus through sluiceways where the gold could be caught. Streams carrying as much as 3,500 miner's inches were not uncommon. It is thus easily seen that such powerful agencies would rapidly wash down whole hillsides, which would naturally be carried into the canyons and small streams in the vicinity of the mines, to be washed farther and farther down stream with each succeeding rainy season.

These mining operations were carried on for a number of years without interruption until the valley country below became more thickly populated, when the injuries caused to the rivers and the neighboring farm lands became important enough to cause those damaged to seek legal redress. By 1883 the action of the courts in California had completely stopped this sort of hydraulic mining, putting an end to an extensive industry that had originally been the principal cause in building up what was then an unknown region. Great bitterness arose between the miners on the one hand and the farmers on the other that apparently could not be settled by the State of California. Ten years afterward Congress enacted a law by which the California Debris Commission came into existence, which was to consist of three officers of the Corps of Engineers, United States Army, appointed by the President, who were to permit hydraulic mining under such conditions as not to allow injury to the navigable waters of the United States, if methods could be devised. The Commission was also charged with the duty of perfecting plans for such treatment of the rivers of the Sacramento and San Joaquin valleys that their former condition as to navigability would be restored as far as practicable and necessary. Incidentally any project adopted by the Commission for the protection of navigable streams from mining debris would also prevent the injurious filling up of the lower rivers



GERMAN WAR AUTOMOBILES READY TO START WITH OFFICERS FOR THE MANEUVERS.

the strategic part of the maneuvers, one of the leading officers (who did not wish to give his name) expressed the opinion that the cars would, no doubt, be very useful in this connection, and in fact, the question is now being considered. Some experiments have already been made, he says. "During the last maneuvers, Capt. Genty, mounted on a 24-horse-power car belonging to

United States Signal Corps, who used it as a movable telegraph station.

The Winton car used in the Western maneuvers covered the 283 miles from San Francisco to Camp Atascadero in a little over two days. Once on the field, it was used by General McArthur all over the field, which had no roads whatever, but consisted of wheat

that had already caused widespread damage to bordering farms by the floods due to the raising of the beds of the rivers. For this reason the State of California, realizing the benefit to the people in the great central valleys of the State, agreed to pay one-half the cost of any project that should be approved by the United

\*Specially prepared for the SCIENTIFIC AMERICAN SUPPLEMENT.