HISTORY OF AUTOMOBILE CARRIAGES.

About two years ago we gave a description of a steam carriage constructed in 1833, by Francois Macerone and Squire. We at that time recalled the fact that the first steam carriage was due to Joseph Cugnot, who was born in Lorraine, September 25, 1725. Cugnot passed his youth in Germany, where he studied mechanics with much ardor, and soon obtained employment as an engineer. He afterward lived in the Netherlands and made himself remarked by Marshal de Saxe, by devising a new style of gun, which was soon adopted for the army of the Uhlans. Encouraged by this first success, he went to Brussels, and resolved to construct steam vehicles which he called steam trucks, and which he designed for the carriage of guns and artillery material. In 1763, he went to Paris with the resolution of pursuing his labors, and there succeeded in constructing a style of steam carriage, which he finished in 1770. An old memoir of the Archives of Artillery informs us that Cugnot's apparatus was examined by General Gribeauval, and that Minister Choiseul proposed to request the inventor to have his apparatus operated in his presence; but the minister having soon afterward been exiled, "the carriage," says L. N. Rolland, the reporter, "remained where it still (1801) stands, in a covert of the arsenal."

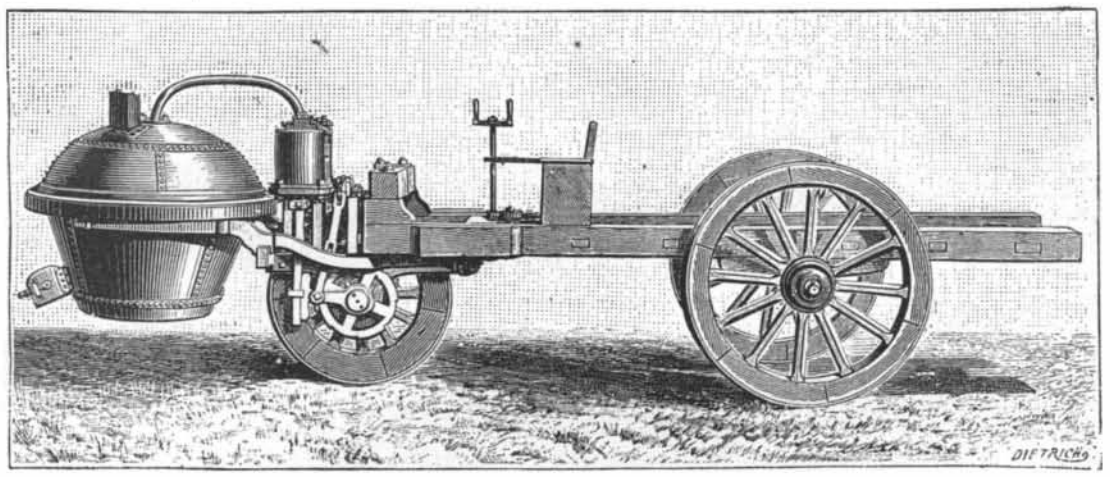

Fig. 1.—THE CUGNOT STEAM CARRIAGE OF 1770.

Tradition relates that Cugnot tried his machine and made it operate, but that in an unfortunate experiment the vehicle deviated from its route and ran against a wall, which upset it. The trials were thus interrupted. In 1793 the Committee of Public Safety was desirous of taking this machine apart in order to make arms of it, but it was spared by the artillery officers, and in 1799 was saved for good by Molard, the guardian of the Conservatoire des Arts et Metiers, who demanded it for the galleries of this establishment. It was not till 1801 that Cugnot's steam carriage reached the Conservatoire. It is still there, and visitors examine it with interest. We reproduce it herewith, from a photograph that we have had taken for our readers (Fig. 1). This carriage was run by a simple acting steam engine having two bronze cylinders. The boiler, which was mounted in front, was enveloped in refractory clay. The carriage, which had three wheels, constituted a true tricycle. Cugnot died in 1804, at the age of 79 years.

In 1786 an American, Oliver Evans, of Pennsylvania, who who had long been occupied with mechanics, constructed a high pressure steam engine that he desired to employ for the running of a carriage; but he was everywhere coldly received by his fellow citizens. He went to Philadelphia, and, after working there, earned enough money to make it possible to begin the construction of his steam carriage, which, in 1800, after spending all that he possessed, he had the satisfaction of seeing operate. He undertook the manufacture of his high pressure engines and succeeded in creating extensive factories in Philadelphia, but in 1819 his works were completely destroyed by fire. The unfortunate inventor, who had intended to take up his carriage again, died of a broken heart. Evans had often sent his plans to England, where they were known to a few engineers. In 1801, two mechanicians of Cornwall, Trevithick and Vivian, constructed some high pressure engines analogous to those of Evans, and were led also to construct steam carriages. Fig. 2 represents the carriage of these builders. The vehicle was very high above the ground. A strong iron frame was fixed to the axle behind, between the two wheels, and served as a support for the furnace, around which a reservoir filled with water became heated and furnished steam to a horizontal cylinder. This latter was provided with a rod which, through a system of gear wheels, caused the revolution of the wheels of the carriage. This apparatus exhibited some ingenious arrangements, but it was still far from constituting a practical system for operating upon roads. The inventors recognized the imperfections of their work and converted it into a car for running upon rails in mines. Success did not crown their efforts, which nevertheless merit mention.

The experiments of Trevithick and Vivian were much talked about in England, but it is not till 1827 that we reach the construction of another curious steam carriage, due to a mechanician named Gurney. Fig. 3, from an English engraving of the time, renders a long description of it unnecessary. We translate the legend found beneath the engraving:

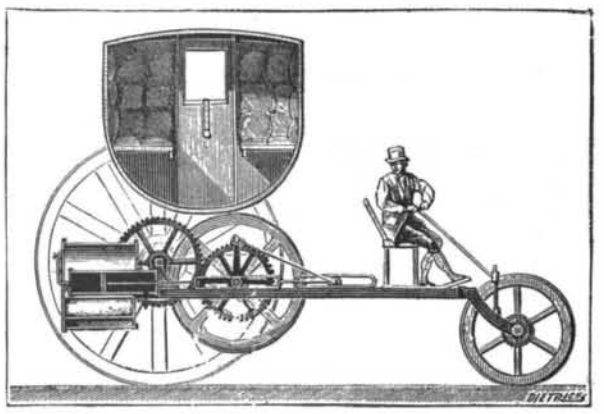

Fig. 2.—THE TREVITHICK AND VIVIAN STEAM CARRIAGE CONSTRUCTED IN 1801.

The driver is seated in front. He holds the steering bar of the two guide wheels, and has beneath his hand to the right a second bar connected with the main steam pipe. He thus assures the running of the vehicle. The back of the carriage contains the boiler producing the steam that passes through tubes into the cylinders placed beneath the carriage and sets the hind wheels in motion. The reservoir, which contains about 50 gallons of water, is inclosed in the box of the carriage, of which it occupies the entire length and breadth. The chimneys are behind, and, as coke is used, no smoke is produced, while the hot air is dissipated by the motion of the carriage. A supply of water and fuel is obtained at various relays. The length of the carriage is between 15 and 20 feet, and the weight about two tons. From one and a half to two leagues per hour can be made. The carriage has accommodations for six passengers in the inside and twelve on the outside. In front there is a receptacle for baggage. The inventor and builder is Mr. Goldsworthy Gurney.

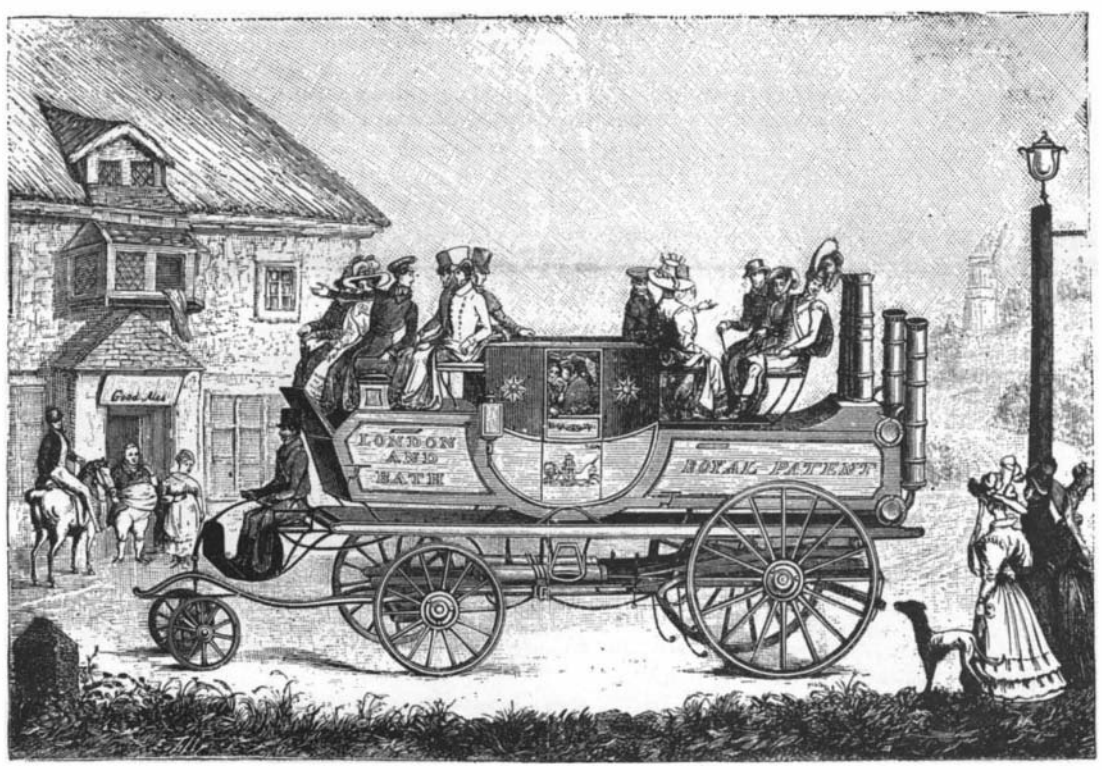

Fig. 3.—THE GURNEY STEAM CARRIAGE OF 1827.

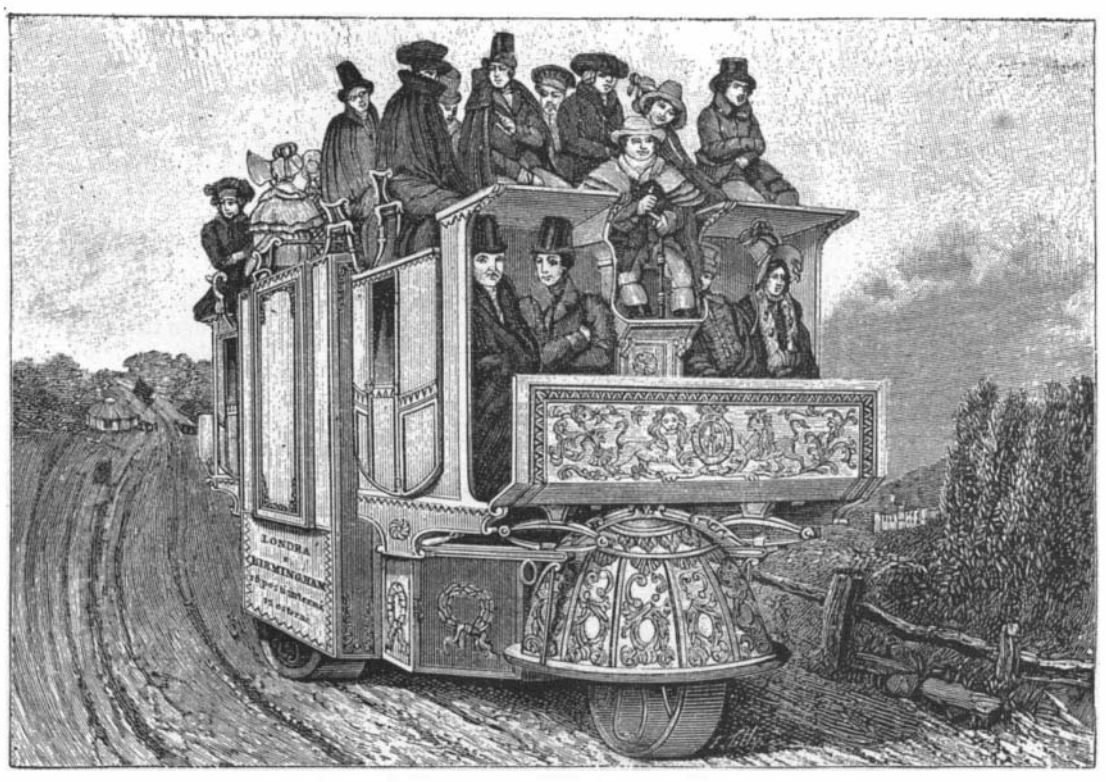

Fig. 4.—THE GHURCH AUTOMOBILE CARRIAGE OF 1833.

This carriage was operated, but we have in our possession only the engraving and its legend, which gives an incomplete description without mentioning the experiments or giving the least details whatever as to the motor. In this old engraving the reader will please observe the costumes of the passengers and the Bolivar hats. These were the fashions of 1827–1830. The lady seen in the group to the right wears a hat that was then called the "Tyrolian," and that was characteristic of the year 1827.

In 1833, six years after the construction of which we have just spoken, an Italian engineer brought out at Birmingham, England, the singular steam carriage that we reproduce in Fig. 4, from an Italian engraving printed in Milan. This vehicle was heavy and massive. It was actuated by a steam engine, and, according to the engraving, was capable of accom-

modating a large number of passengers. Like the Cugnot carriage, it was a tricycle. We have no details as to the experiments made or the arrangement of the mechanism. It has appeared to us to be of interest to recall the efforts of these old inventors of automobile carriages. It was they who prepared the way for the solution of a problem which may now be considered as solved.—La Nature.

Professor McMaster's History of the United States.*

The fourth volume of this most interesting and valuable work is now before us, and fully supports the high standard of excellence which has marked the preceding volumes. The present book embraces the period from 1812 to 1820; a short period truly, but so crowded with events of importance and interest that it has required a volume of 625 pages for their narration.

Professor McMaster's style of diction is at once luminous, flowing and attractive. His perfect familiarity with every subject touched upon is apparent on every page. The first half of the volume relates chiefly to events during the war with Great Britain.

The military operations on the Canadian frontier are graphically described, as well as the naval demonstrations on the lakes and the ocean. The effects of the many naval successes of Americans are lucidly set forth. We subjoin a few extracts. Referring to the results and effects of the American naval victories and the operations Professor McMaster says:

"In the course of twenty years England had met and destroyed the navies of every maritime power in Europe. The battle of Copenhagen, the battle of the Nile, the battle of Trafalgar, had given her a reputation for invincibility which a hundred smaller fights served but to justify. But now, on a sudden, the captains of a people concerning whom the nations of Europe knew absolutely nothing had five times humbled her flag on the sea, and had demonstrated that her supremacy could not endure one hour longer than she continued to deserve it. And this is the lasting value of the victories of Hull and Decatur, Bainbridge, Lawrence and Jones.

"Had Englishmen attributed their defeats to lack of discipline, to ignorance of gunnery, to the general demoralization of their sailors produced by uniform success, they would have done no more than trace back effects to their causes. But they did not, and nothing was more diverting to Americans than the attempts of the English press to explain the defeats. 'The loss of a single frigate by us,' said the London Times, referring to the Guerriere, 'when we consider how the other navies of the world have been treated, is but a small matter. When viewed as a part of the British navy, it is nothing; yet it has cast a gloom over the city which it is painful to see. The superior weight of metal thrown by the Constitution, the greater number of men, the loss of the mizzenmast at the very beginning of the action, were all urged. But people look only at the triumph of the Americans—a triumph small enough, and of no importance, save as a reason for a rigorous scrutiny of the behavior of those responsible for it.'"

"This new defeat," said one journal, "calls for serious reflection—all the more serious when we put with it the fact that Lloyd's list shows five hundred British merchantmen taken by the Americans in seven months. Five hundred merchantmen and three frigates! Can this be true? Will the English people read this unmoved? Any man who foretold such disasters this day last year would have been treated as a madman or a traitor. He would have been told that ere seven months had gone by the American flag would have been swept from the ocean, the American navy destroyed and the maritime arsenals of the United States reduced to ashes. Yet not one of the American frigates has struck. They leave their ports when they choose and return when it suits their convenience.

"They cross the Atlantic, they visit the West Indies, they come to the chops of the Channel, they parade along the coast of South America. Nothing chases them; nothing intercepts them—nay, nothing engages them but to yield in triumph."

Describing the operations of the Yankee privateers, the author says:

"Such was their boldness that it was all but impossible to secure a shilling of insurance at Halifax for a homeward bound voyage or get a policy underwritten at Lloyd's for a trip across the Irish Channel. Thirteen shillings on the hundred pounds were asked and paid by vessels compelled to make the voyage. Three frigates and fourteen sloops of war were guarding the English seas, yet the capture of a privateersman was of rare occurrence. Such experiences were new to Englishmen, and on the twelfth of August the London Assurance Corporations petitioned for a naval force large enough and active enough to clear the British Islands of the privateers. They were assured by John Wilson Croker, Secretary of the Admiralty, that there was afloat a force adequate for the protection of trade both in St. George's Channel and the Northern Sea. But the capture of five brigs between the Smalls and the Tuskar; the absolute refusal of the underwriters to insure vessels bound for Ireland; and the admission of the Morning Chronicle that 'the whole coast of Ireland, from Wexford round by Cape Clear to Carrickfergus,' was blockaded by 'a few petty fly-by-nights,' made the assurance of Croker ridiculous. Now, at last, the sneer of the London Times in 1807, that Americans could not sail from New York to Staten Island without British leave, was reversed, and made applicable to Englishmen on their voyages from port to port of the British Isles. Even Croker was forced to admit this, and in an answer to a memorial from Bristol he told the merchants that if the masters of British ships 'had availed themselves of the convoys appointed for their protection from foreign ports, or had not in other instances deserted from the convoys under whose protection they had sailed,' there would not have been so many captures in the Irish and Bristol Channels.

"In the address made soon after by the Liverpool merchants to the Lords of the Admiralty, they complain of the burning and destroying of merchant vessels by privateers as 'a new system of warfare,' and call loudly for protection against American capture. At Glasgow, the merchants, ship owners and underwriters were so put out with the conduct of the Admiralty that an address was made to the Throne. The number of American privateers, said the address, with which our channels have been infested, the audacity with which they have approached our coast, and the success with which their enterprise has been attended, have ruined our commerce, humbled our pride and discredited the naval power of Britain, whose flag, till of late, waved over every sea and triumphed over every enemy. In the short space of two years above eight hundred vessels have been taken by that power whose maritime strength we have hitherto held in contempt. It is distressing, it is mortifying, that, at a time when we are at peace with all the rest of the world, at a time when we have declared the whole American coast under blockade, when we pay so heavy a tax for protection in the form of convoy duty, and when our navy costs so great a sum, we cannot traverse our own channel in safety nor effect insurance without excessive premiums, and that a horde of American cruisers unheeded, unresisted, unmolested, seize, burn, sink, destroy, our ships in our own inlets and in sight of our own harbors. Lloyd's list for June 3, 1814, gives the names of thirty-seven merchantmen captured in a few weeks. The privateer Perry, of Baltimore, took twenty-two in a cruise of three months. The Surprise destroyed thirteeu ships and was chased sixteen times in the course of one hundred and three days. In another cruise of thirty days she captured twenty-one. The Governor Tompkins burned fourteen vessels in a cruise through the Channel. The Young Wasp was six months off the coast of England and Spain and the Harpy three months off the Irish coast and in the waters of the British Channel and the Bay of Biscay. Captain Thomas Boyle, who now commanded the Chasseur, was three months in British waters, and sent in a proclamation, to be posted at Lloyd's, blockading 'all the ports, harbors, bays, creeks, rivers, inlets, outlets, islands and sea coast of the United Kingdom.'"

* A History of the People of the United States, from the Revolution to the Civil War. By John Bach McMaster, University of Pennsylvania. In six volumes. New York: D. Appleton & Company, 72 Fifth Avenue.

A Ride Down a Lumber Flume.

In semi-tropical Fresno County there is a place which for risky, delightful sport beats all the toboggan slides on the continent. Think of the exhilarating joy of an uninterrupted slide of fifty miles through great forests, along the brinks of precipices and down rugged canyons, amid the wildest and most picturesque scenery to be found in the country—fifty miles without a break.

Such a thrilling experience has been made possible by the recent completion of the great Pine Ridge lumber flume. No other flume surpasses it, and it is doubtful if any other is equal to it, in length and grandeur of the scenery passed through in a journey from the summit of one of the high spurs of the Sierra Nevada to the plains beneath, fifty miles distant. The flume has just been completed to the little town of Clovis, twelve miles north of Fresno, and is fifty-two miles in length.

Flumes for floating lumber are so numerous in California that description is superfluous, except to say that this is in general like all others, consisting of boxes shaped like the letter V, and on trestles varying in height from a few feet to a hundred, depending on the character of the country traversed. The flume starts at Stephenson Creek, one of the tributaries of the San Joaquin River, at an elevation of nearly 6,000 feet above the sea, and after a winding course of fifty-two miles it terminates in a vineyard twelve miles out on the plains beyond the foot of the mountain. The V-shaped trough carries the water which floats the lumber.

The flume boats, in which the rapid journeys are made down the flumes, are simple. They are made the same shape as the V-boxes of the flumes. The upper end of the boats is closed by a board nailed across, but the lower end, which points down stream, is left open to let out the water which splashes over the sides of the boats from time to time. One, two or three short boards are laid across for seats, depending upon how many are to make the journey. A carpenter can manufacture one of these boats in less than half an hour. The boat is meant for only one journey, for none is ever hauled back for another voyage. Only a little preparation is necessary for a trip of this kind, and half a dollar will buy enough lumber for the boat, and a man is a poor carpenter indeed who cannot make his own vessel. The trip is made with but little danger. The principal trouble is, when once started, there are comparatively few places where one can stop. The current is generally so strong and so rapid that it makes landing impossible, and the voyager can only sit still and let the boat run.

The first ride down the Pine Ridge flume, from start to finish, was made in the winter, a few months ago. Many persons had passed over different parts of the distance as the flume was being built, but none had made the whole distance without stopping.—San Francisco Chronicle.

How Magnetism Affects Your Watch.

The general use of electric machinery, which has been brought about within comparatively a few years, has in many ways changed the previous arrangement of things. One of these changes has been in the manufacture of watches. When the first lighting plants were put in, they were visited by nearly every one in the vicinity. Then watch makers began to receive complaints that their watches would not keep good time. They would go too fast for a time and then would go too slow, and vice versa. It was some time before the real cause of the trouble was discovered; the parts of the watches had become magnetized by the powerful fields of the dynamo electric machines.

To demagnetize the watch would bring it back to its original condition, but a second visit to the lighting plant would again spoil its time-keeping qualities. The public soon learned to keep their watches away from the dynamo, and the watch makers have since found a way to make watches that are not affected by magnetism. Comparatively few of the timepieces in use, however, are non-magnetic, and the average watch is subject to these seasons of fickleness.

The exceedingly fine and exact construction of the watch is not realized by the average possessor of the article. An examination of the works of a watch shows the mechanism as now constructed, although very small in size, to be most accurately planned and executed. The changes of temperature are provided for, so that the movement is automatically adjusted. The main spring and train of gears are usually concealed, while the balance and hair springs are in full view when the case is open. Upon the regularity of the movement of the balance depends the time-keeping quality of the watch. On looking closely at the balance, you will observe that it is not a complete ring, but two halves supported at one end. These rings bear a number of large headed screws, placed at irregular distances, which give it the exact weight and balance required. These half rings will also be found, on looking closely, to be composed of two metals so closely joined that a difference in color alone gives evidence of the fact.

This arrangement of iron and brass, on account of their different coefficients of expansion and contraction with changes of temperature, has been so carefully constructed that with changes of temperature the balance assumes such forms as to give it a uniform rate of motion. The parts affected by magnetism are the balance and springs. The balance in an ordinary watch moves five times a second, eighteen thousand times an hour, and four hundred and thirty-two thousand times each day. But a slight change in the forces that move it are necessary to make a difference of several minutes each day. As the balance moves back and forth, the magnetism of the mainspring is pulling or pushing it. If this force was constant and always in the same direction, the watch would run uniformly. Such, however, is not the case. When the mainspring is tightly wound its magnetic poles are in a certain direction and in unwinding they are constantly changing, so that the direction of this force is also constantly changed. The effect on the balance is such as to cause the watch to run too fast sometimes and too slow other times.

Non-magnetic watches are made with these parts of a non-magnetic metal, so that they are not influenced by electric machinery. For testing watches a small compass is used. When placed over the balance, the needle will vibrate with the motion of the balance in proportion to its magnetism.—The Car.

A STATISTICAL bulletin just issued by the Treasury Department shows that in ten years there has been an increase of 1,257,554 American women "engaged in gainful occupations," while the increase of the number "employed in trade and transportation" reaches the surprising figures of 263 per cent.