

# Making Roads by Machinery

By Waldon Fawcett.

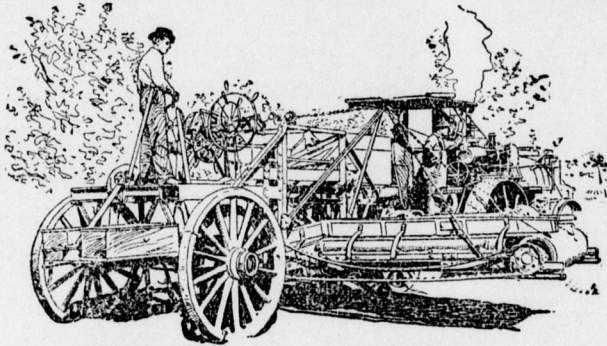
THE immense number of crude and frequently impassable roads to be found in all parts of the United States and the serious extent to which they have handicapped the marketing of farm products in various sections of the country lend especial significance to the crusade in favor of good roads, which is being conducted by the Office of Road Inquiry, a division of the Department of Agriculture. As yet there have not been secured appropriations of sufficient size to enable the Government to undertake on its own account the provision of better highways, but this will come in time, and meanwhile highly important results are being accomplished solely by the presentation of forceful object lessons.

The investigations of the Office of Road Inquiry are mainly directed in seven general fields, namely: to ascertain as nearly as practicable the actual cost of bad roads and the benefit of good roads; to demonstrate the interest of cities and towns and the owners of property of all kinds wherever situated, in the improvement of country roads; to develop the methods whereby all of these interests may co-operate

three-quarter inch stone and dust, is put in place.

The sand road is formed by placing six inches of river sand on a bed of natural clay, neither the bed nor the surface of the road being rolled. The dirt road is made by grading in the usual manner. As a rule neither of these latter classes of highways is constructed save to demonstrate the superiority of the macadam road. Considerable attention has been given to the construction of steel-track wagon road—decidedly the most novel type of highway yet introduced in any country. The steel road might be compared to a street car track of modified design, and the plan for its utilization was doubtless suggested by the well-known tendency of teamsters to make use of urban and inter-urban trolley and cable lines on highways where locomotion would otherwise be difficult.

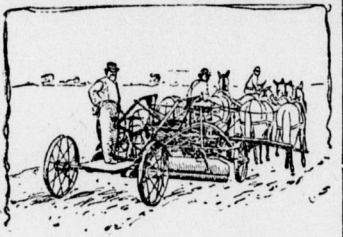
The steel-track wagon road consists of two parallel lines of steel plates or rails each eight inches in width and not supported on wooden cross-ties, but simply made solid in the road by flanges projecting into the concrete of the roadbed. The rails are accurately spaced so as to receive the wheels



GRADER DRAWN BY TRACTION ENGINE.

ate with the farmers in the work of road improvement; to discover what actual and systematic road improvement is being carried on in any part of the United States, and how the same or modified methods may be applied to other sections; to discover road materials in various sections of the country; to discuss new plans for road construction and encourage experiment in this direction and, finally, to actually construct sample roads.

The governmental experts have incidentally devoted much attention to the subject of wide tires; have investigated the use of convict labor in road construction, and encouraged the organization of State and local road as-



ROAD SCRAPER AT WORK.

sociations. In this connection many important experiments have been made to test the power required in hauling over various kinds of roads. The Government has learned, too, by consultation with many thousands of the most intelligent farmers of the country that the expense of moving farm products and supplies averages on all the American country roads twenty-five cents per ton mile, whereas the charge in the good roads districts of this and other countries is less than one-third that amount. This extra expense amounts in the aggregate to more than the entire expenditures of the National Government, and taking into account all of the hauling done on the public roads the loss is equal to one-fourth of the home value of all the farm products of the United States.

Probably the most interesting phase of the work has been found, however, in the construction of specimen roads of various kinds in different parts of the country. Ordinarily three styles of road have been represented in this experimental work—a modern macadam, a sand and a dirt road. Of these three the macadam highway is the most interesting from the point of con-



ELEVATING HORSE DRAWN GRADER AT WORK.

struction. After a uniform grade has been secured by the use of wheeled scrapers, drag scrapers and plows, and possibly road graders as well, there are placed upon this foundation three separate layers of the best quality of stone that is procurable in the vicinity. The foundation course, which is about five inches in thickness and made up of two and one-half inch stone, is thoroughly rolled before the second course, composed of one and one-half inch stone, is put on, and this layer in turn is sprinkled and rolled before the surface layer or "binder," as it is commonly called, consisting of

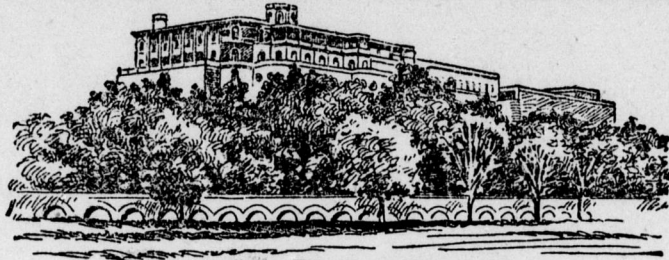
of glaring business announcements on picturesque rocks, along rustic roadways, on buses and on huge billboards. They declare that the newspaper is the proper place for advertisements since the latter are intended to convey information of a news character. Moreover, they say, better results can be achieved by newspaper advertisements than by objectionable signs and posters.

A Lisbon lady was being buried when a cry from the coffin disclosed the fact that she was still alive. Five hours afterward she died from fright.

## THE PAN-AMERICAN CONGRESS.

Would Save the Ancient Ruins of All the Countries of America.

President Diaz, of Mexico, has used his influence toward promoting the friendliness of all the nations of America. Representatives of the republics have been enjoying the hospitality of Mexico in the City of Mexico, where they have been holding a Pan-American Congress for the purpose of unit-

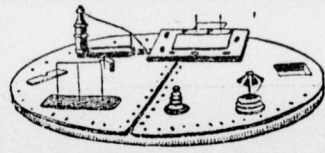


THE OFFICIAL RESIDENCE OF PRESIDENT DIAZ, OF MEXICO.

ing their countries by common ties and interests and of preserving the peace of the American continent. Among the resolutions which have been adopted by the Congress is one looking to the preservation of archaeological monuments in the countries of America. The resolution proposed the appointment of an international commission, and continues: "It is the intention of the conference, in providing for the creation of this commission, that its labors shall result in the establishment at some place, to be designated by the majority of the republics approving this recommendation, of an international American museum, which shall be made the centre for works of investigation and interpretation and the receptacle for the materials gathered together by the said commission, and that committees shall be likewise appointed by the said commission to preserve the ruins of the principal ancient cities existing within the American republics and establish in each republic a museum of objects collected in such cities, and so far as practicable to provide conveniences for the visiting public."

### A Flea Circus.

A circus, in which all the performers are fleas, is amusing the patrons of the Panopticon at Berlin, this season. The arena of the circus is about the size of an ordinary dining-room table, and Professor Karutsch, the director,



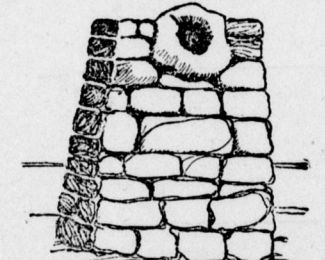
THE FLEA CIRCUS, BERLIN.

provides each one in his audience with a large microscope for a consideration. To the spectators it seems as if the little animals understand the oral instructions of the director, for they obey with astounding docility. They draw little wagons and coaches, turn merry-go-rounds, engage in sham battles and wind up by dancing a costumed ballet. Even the circus clown, who excites boisterous laughter by clumsily imitating the effete tricks of his comrades, is not missing.

Fleas are the beasts of prey of the insect world, malicious, carnivorous demons who are always thirsting for blood. Herr Karutsch allows his pets to feed on his naked arm to their stomachs' content, not forgetting, of course, to have an antiseptic application on hand at each meal.

### A Plighting Stone.

The canny Scot, as we all know, says the World Wide Magazine, is found all over the world, but it comes to one as somewhat of a surprise to find a genuine old Scotch "plighting stone" in a museum in Toronto, Canada. It bears the inscription: "Plighting Stone of Laird, Sutherlandshire, Scotland," and



TORONTO PLIGHTING STONE.

was presented by a Scotch gentleman resident in Ontario. Troths plighted and promises made by grasping hands through the stone seen in our photo were inviolate in matters of love, business and all social relations. The custom was kept up until quite recently, and was probably of Druidical origin.

### The Black Handkerchief in the Navy.

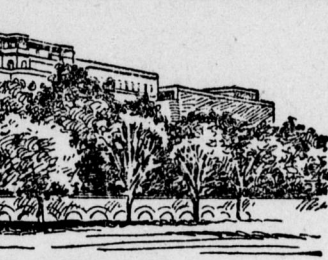
The black handkerchief which the sailor of the English navy knots around his throat was first worn as mourning by Nelson, and has ever since been retained; while the bright stripes around the broad blue collar of the sailor's jumper commemorate the victories of Trafalgar, Copenhagen and the Nile. The broad blue collar itself is older than Nelson, and was first adopted at that period when sailors plastered their hair into a stiff pigtail with grease and powder.

### To Have Pure Water.

To prevent water from becoming impure in passing through lead pipe a tin lining is placed inside, the space between the tin and lead being filled with cement.

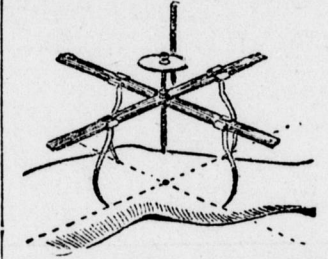
## Bullet-Locating Apparatus.

The apparatus shown in the accompanying drawing is not an instrument of torture, but rather an appliance to remove the cause of much suffering. It is the invention of William H. Jakway, and is designed for the easy location of bullets or other foreign substances lodged in the anatomy. It provides a simple means whereby the surgeon may readily locate the position



FOR USE WITH AN X-RAY MACHINE.

and depth beneath the surface of the bullet, so that the necessary incision for removing it can be made with accuracy and without undue mutilation of the surrounding flesh. In connection with the apparatus an X-ray machine is used, but the photographic plates, hitherto so necessary, are replaced by this new indicating device. The illustration shows the two paths of the X-rays through the limb in which the bullet is located, the two lines being at nearly right angles and crossing the bullet and each other at



FOR USE WITH AN X-RAY MACHINE.

the same point. While the surgeon is looking at the bullet he adjusts two points of the indicator into the same plane as the line of vision, treating the opposite points after the same manner. Then the central indicating screw is lowered to the flesh, standing directly over the foreign substance located inside.

### Marring a Baseball.

Unusual humor was displayed by the Rev. C. F. Thomas in his remarks before the marriage ceremony of the well known baseball player, John J. McGraw, and Miss Blanche Sindall, at St. Ann's Catholic Church, at Baltimore, Md. He said in part:

"Let selfishness be no barrier to your happiness, but understand that each must often give up much, renounce himself, that both may enjoy it. For you know that sacrifice hits add to the number of runs and win the game. Don't try to jump this contract. The reserve clause is binding.

"Fear not the adversaries that are many and strong, that they seek to rob you of this result of your union. The game will not be lost as long as you work together. Bunch your hits, and victory is yours. She will cheer you, aid you, support you, and share your triumphs and participate in your defeats. You will keep in spirit and letter the terms of this holy contract. Coach her around the hard bases of life. Make her steal her way under the watchful eye of the enemy, until she reaches the home of happiness.

"Make her score many bright and joyous days, that the pennant of prosperity may continuously wave over your heads."

### Coronation Designs.

The craze for coronation designs is spreading, says the London Graphic. Not only shall we be deluged with jeweled crowns in many forms, such as brooches and charms, but the tapestry and even cretonne for upholstery furniture shows the crown, shamrock, rose and thistle, and perchance, our wall papers will be turned out en suite. These topical designs never remain in favor, and if any one were so rash as to stamp a room with coronation symbols, he would most surely very soon tire of the design and make a change.

### British Blockhouses.

Similar blockhouses to these are being raised in long lines throughout the Transvaal and Orange River Colony, on Lord Kitchener's cordun system, at distances of 1000 yards, and with



easy means of communication. They have proved exceedingly effective in hemming in many of the minor commandos, whose attacks without artillery on their massive walls have often ended in discomfiture.

The sun is traveling at forty miles a second, about 40,000 times as fast as an express train.

## DR. TALMAGE'S SERMON

SUNDAY'S DISCOURSE BY THE NOTED DIVINE.

Subject: The Milestones of Life—Duties and Trials Which Belong to the Different Decades—Advice to the Twenties—The Waiting Age—The Last Haven.

WASHINGTON, D. C.—From an unusual standpoint Dr. Talmage in this discourse looks at the duties and trials which belong to the different decades of human life; text, Psalms xc, 10, "The days of our years are threescore years and ten."

The seventieth milestone of life is here planted as at the end of the journey. A few go beyond it. Multitudes never reach it. The oldest person of modern times expired at 169 years. A Greek of the name of Stravade lived to 132 years. An Englishman of the name of Thomas Parr lived 152 years. Before the time of Moses people lived 150 years, and if you go far enough back they lived 900 years. Well, that was necessary, because the story of the world must come down by tradition, and it needed long life ages to transmit the news of the past. If the generations had been short lived the story would so often have changed lips that it might have got all astray. But after Moses began to write it down and parchment told it from century to century it was not necessary that people live so long in order to authenticate the events of the past. If in our time people lived only twenty-five years, that would not affect history, since it is put in print and is no longer dependent on tradition. Whatever your age, I will to-day directly address you, and I shall speak to those who are in the twenties, the thirties, the forties, the fifties, the sixties, and to those who are in the seventies and beyond.

First, then, I accost those of you who are in the twenties. You are full of expectation. You are ambitious—that is, you amount to nothing—except every kind of success, commercial or mechanical or professional or literary or agricultural or social or moral. If I find some one in the twenties without any sort of ambition, I feel like saying, "My friend, you have got on the wrong planet. This is not the world for you. You are going to be in the way. Have you made your choice in your porches? You will never be able to pay for your cradle. Who is going to settle for your board? There is a mistake about the fact that you were born at all."

But, supposing you have ambition, let me say to all the twenties, except every kind of success, commercial or mechanical or professional or literary or agricultural or social or moral. If I find some one in the twenties without any sort of ambition, I feel like saying, "My friend, you have got on the wrong planet. This is not the world for you. You are going to be in the way. Have you made your choice in your porches? You will never be able to pay for your cradle. Who is going to settle for your board? There is a mistake about the fact that you were born at all."

Well, remember that God controls the money markets, the harvests, the droughts, the caterpillars, the locusts, the sunshine, the storm, the land, the sea, and you will get wealth, perhaps not that which is stored up in the banks, in safe deposits, in United States securities, in houses and lands, but your clothing and board and shelter, and that is about all you can appropriate anyhow. You cost the Lord a great deal. To feed and clothe and shelter you for a lifetime requires a great deal of money, and if you get nothing more than the absolute necessities you get an enormous amount of supply. Expect as much as you will of any kind of success, if you expect it from the Lord you are safe. Depend on any other resource, and you may be badly chastened, but depend on God, and all will be well. It is a good thing in the crisis of life to have a man of large means back you up. It is a great thing to have a moneyed institution stand behind you in your undertaking. But it is a mightier thing to have the God of heaven and earth your coadjutor, and you may have Him. I am glad to see that you are while you are in the twenties. You are laying out your plans, and all your life in this world and the next for 500 million years of your existence will be affected by those plans. It is about 8 o'clock in the morning of your life, and you are just starting out. Which way are you going to start? Oh, the twenties!

"Twenty" is a great word in the Bible. Joseph was sold for twenty pieces of silver; Samson judged Israel twenty years; Solomon gave Hiram twenty cities; the flying roll that Zechariah saw was twenty cubits; when the sailors of the ship on which Paul sailed sounded the Mediterranean Sea, it was twenty fathoms. What mighty things have been done in the twenties! Romulus founded Rome when he was twenty; Keats finished his life at twenty-five. Lafayette was a world-renowned soldier at twenty-four. The greatest chief work at twenty-six; Bonaparte was victor over Italy at twenty-six; Pitt was prime minister of England at twenty-two; Calvin had completed his immortal "Institutes" by the time he was twenty-six; Grotius was attorney general at twenty-four. The mightiest thing for God and eternity have been done in the twenties. As long as you can put the figure 2 before the other figure that helps describe your age I have high hopes about him. Look out for that figure 2. Watch its continuance with as much earnestness as you ever watched anything that has cheered you or gratified your heart. What a critical time—the twenties!

While they continue you decide your occupation and the principles by which you will be guided; you make your most abiding friendships; you arrange your home life; you fix your habits, your mode of thought, for Jesus Christ's sake, have mercy on all the men and women in the twenties!

Next I accost those in the thirties. You are at an age when you find what a tough thing it is to get recognized and established in your occupation or profession. Ten years ago you thought all that was necessary for success was to put on your shutter the sign of physician or dentist or attorney or broker or agent and you would have plenty of business. How many hours you sat and waited for business, and waited in vain, three persons only came to see you. You are now in the thirties, and your commercial life you have not had the promotion and the increase in salary you anticipated, or the place you expected to occupy in the firm has not been vacated. The produce of the farm with which you expected to support yourself and those depending on you and to pay the interest on the mortgage has been far less than you anticipated, or the prices were down, or special expenses for sickness made drafts on your resources that you could not have expected. In some respects the hardest decade of life is the thirties, because the results are generally so far behind the anticipations. It is very rare indeed that a young man does as did the young man one Sunday night when he came to me and said, "I have been so marvelously prospered since I came to this country that I feel as a matter of gratitude that I ought to dedicate myself to God."

Nine-tenths of the poetry of life has been knocked out of you since you came into the thirties. Men in the different professions and occupations saw that you were rising, and they must put an estoppel on you or you might somehow stand in the way. They think you must be suppressed.

From thirty to forty is an especially hard time for young doctors, young lawyers, young merchants, young farmers, young mechanics, young ministers. The struggle of the thirties is for honest and helpful and remunerative recognition. But few old people know how to treat young people without patronizing them on the one hand or snubbing them on the other.

Oh, the thirties! Joseph stood before Pharaoh at thirty; David was thirty years old when he began to reign; the height of Solomon's temple was thirty cubits; Christ entered upon His active ministry

at thirty years of age; Judas sold Him for thirty pieces of silver. Oh, the thirties! What a word suggestive of triumph or disaster!

Your decade is the one that will probably afford the greatest opportunity for victory because there is the greatest necessity for struggle. Read the world's history and know what are the thirties for good or bad. Alexander the Great closed his career at thirty-two; Frederick the Great made Europe tremble with his arms at thirty; Napoleon was crowned Emperor of France at thirty; Grant fought Shiloh and Donelson when thirty-eight; Raphael died at thirty-seven; Luther was the hero of the reformation at thirty-five; Sir Philip Sidney got through by thirty-two. The greatest deeds for God and against Him were done within the thirties, and your greatest battles are now and between the time when you cease expressing your age by putting first a figure 2 and the time when you will cease expressing it by putting first a figure 3. As it is the greatest time of the struggle, I adjure you, in God's name and by God's grace, make it the greatest achievement. My prayer is for all those in the tremendous crisis of the thirties. The fact is that by the way you decide the present decade of your history you decide all the following decades.

Next I accost the forties. Yours is the decade of discovery. I do not mean the discovery of the outside, but the discovery of yourself. No man knows himself until he is forty. He overestimates or underestimates himself. By that time he has learned what he can do or what he cannot do. He thought he had commercial genius enough to become a millionaire, but now he is satisfied to make a comfortable living. He thought he had rhetorical power that would bring him into the United States Senate; now he is content if he can successfully argue a common case before a petty jury. He thought he had medical skill that would make him a Mott or a Grosse or a Willard Parker or a Sims; now he finds his sphere is that of a family physician, prescribing for the ordinary ailments that afflict our race. He was sailing on in a fog, and could not take a reckoning, but now it clears up enough to allow him to find out his real latitude and longitude. He has been climbing, but now he has got to the top of the hill, and he takes a long breath. He is half way through the journey at least, and he is in a position to look backward or forward. He has more good sense than he ever had. He knows human nature, for he has been cheated often enough to see the bad side of it, and he has met so many gracious and kindly and splendid souls he also knows the good side of it. Now, calm yourself. Thank God for the past and deliberately set your compass for another voyage.

You have chased enough thistle-down; you have blown enough soap bubbles; you have seen the unsatisfying nature of all earthly things. Open a new chapter with God and the great God of the ages. The battle of Waterloo was not made until 8 o'clock in the evening, but some of you propose to go into camp at 2 o'clock in the afternoon.

My subject next accosts those in the seventies and beyond. My word to them is congratulation. You have nearly if not quite through. You have safely crossed the sea of life and are about to enter the harbor. You have fought at Gettysburg, and the war is over—here and there a skirmish with the remaining sin of your own heart and the sin of the world, but I guess you are about to get into the harbor. Some work for you yet on a small or large scale. Bismarck of Germany vigorous in the eighties. The Prime Minister of England strong at seventy-two. Haydn composing his oratorio, "The Creation," at seventy years of age. Isocrates doing some of his best work at seventy. The great busy thinking for all succeeding centuries at eighty-one. Noah Webster, after making his world-renowned dictionary, hard at work until eighty-five years old. Rev. Daniel Waldo praying in his pulpit at 100 years of age. Humboldt producing the immortal "Cosmos" at seventy-six years. William Blake at sixty-seven learning Italian so as to read Dante in the original. Lord Cockburn at eighty-seven writing his best treatise. John Wesley stirring great audiences at eighty-five. William C. Bryant, without spectacles, reading in my house "Thantaposis" at eighty-three years of age. Christian men and women in the seventies serving God after becoming septuagenarians and nonagenarians prove that there are possibilities of work for the aged, but I think you who are passed the seventies are near being through.

How do you feel about it? You ought to be jubilant, but you are not. You are in a struggle, and if you have got through respectfully and usefully you ought to feel like people toward the close of a summer day seated on the rocks watching the sunset at Bar Harbor or Cape May or Look-out Mountain. I am glad to say that most Christian men and women in the seventies visited John Adams a short time before his death and found him in very infirm health. He said to Mr. Adams: "I am glad to see you. I hope you are getting along pretty well." The reply was: "Ah, sir, quite the contrary. I find I am a poor tenant, occupying a house that is being rented by time. It is a very bad tenant, and what is worse, sir, the landlord, as near as I can make out, does not intend to make any repairs."

An aged woman sent to her physician and told him of her ailments, and the doctor said: "What would you have me do, madam? I can do nothing for you." She replied: "I know that, doctor. What I want you to do is to help me to grow old a little longer." The young men have their troubles behind them; the old have their troubles ahead of them. You have got about all out of this earth that there is in it. Be glad that you are in the hands of God, and are going to try another life and amid better surroundings. Stop looking back and look ahead. O ye in the seventies and eighties and the nineties, your best days are yet to come, your grandest associations are yet to be formed, your best eyesight is yet to be used, your best hearing is yet to be awakened, your greatest speed is yet to be traveled, your gladdest song is yet to be sung. The most of your friends have gone over the border, and you are going to join them very soon. They are waiting for you; they are watching the golden shore to see you land; they are watching the shining gate to see you come through; they are standing by the throne to see you mount.

What a glad hour when you drop the staff and take the scepter, when you quit the stiffened joints and become an immortal athlete! But hear, ye men, a remark pertinent to all people, whether in the twenties, the thirties, the forties, the fifties, the sixties, the seventies or beyond.

But the most of you will never reach the eighties or the seventies or the sixties or the fifties or the forties. He who passes into the forties has gone far beyond the average of human life. Amid the uncertainties take God through Jesus Christ as your present and eternal safety. The longest life is only a small fragment of the great eternity. We will all of us soon be there.

Eternity, how near it rolls! Count the vast value of your souls. Beware as you count the minutes of your life, that you may not lose them. What they have gained whose souls are lost.

(Copyright, 1902, L. Klopsch.)

Many a man who is honored with a college degree would find it necessary to do some reviewing before he could pass a civil service examination.