

low the surface while a hot flame from a gasoline torch is directed against it. Experiments have been made with the new brick, of which a report has been presented to the Merchants' Association of Monterey. The deposits of clay from which the brick is made are very extensive and the brick can be manufactured cheaply.

The Merchants' Association will conduct further experiments, and, if the bricks prove to be satisfactory, the building of fireproof structures will be revolutionized.

One of the remarkable incidents of the great fire of San Francisco was the immunity from damage of an old wooden shack owned by the American Marine Paint Company at the corner of Main and Harrison Streets. The ramshackle, half-century-old building stands unharmed, a little island in a sea of desolation. It reeks with oil and is filled with highly inflammable materials. Quite near to it a great pile of coal caught fire and burned for nearly a week. The officials of the company felt so certain that the place had fallen a victim to the devouring flames that they did not even attempt to visit it until two weeks or so after the conflagration, and then it was mere curiosity to see what the ruins looked like that led them there. Their astonishment when they saw their oil-soaked wooden store standing unharmed amid the ruins of "fireproof" buildings can easily be imagined.

California Fruit as Affected by the Earthquake.

The writer has made careful inquiry concerning the present prospects of the California fruit crop, and the response to each inquiry is to the effect that the recent convulsion will not diminish its value by a single dollar. The only considerable locality where fruit was the leading commercial interest was in the Santa Clara Valley, where the property losses were large, but fruit suffered no injury whatever. Apricots, the earliest fruit to ripen, will not be in large supply this year on account of climatic peculiarities, the result of too abundant rains, unseasonably prolonged. Cherries, at the present moment, are in splendid condition and the prospect, barring future eventualities, is most excellent. Plums, should every indication be fulfilled, will be in larger supply and better in quality than for many years. In each of these fruits, now in an advanced stage, a careful inspection of the orchards over a wide area fails to show that a single apricot, peach (also in large prospective supply), cherry, or plum, was shaken from the branches by the shock which prostrated some of the finest and largest buildings in every community where its violence was greatest. It is yet too early to make observations on the future of the grape crop. It is invariably the rule in European countries, that "an earthquake year always assures a full vineyard," and if the rule proves good in California, the grape crop of the present year should prove a phenomenal one. A competent authority estimates the quantity of wine consumed in the late San Francisco fire as exceeding 20,000,000 gallons, or nearly one-half year's production, mostly of old, high-quality wines; therefore there will be demand for every gallon which the vineyards can produce. The excellent prospect in every agricultural product is distinctly encouraging to the State, though many months must elapse before mercantile interests will benefit from the new supplies.

The Current Supplement.

The current SUPPLEMENT, No. 1586, opens with an article on the damage sustained by the Leland Stanford, Jr., University during the recent earthquake. Very striking pictures accompany the article showing the condition of the University buildings before and after the catastrophe. Some simple tests for the detection of food adulterants are published, which will enable the housewife to ascertain whether or not her provisions are pure. Mr. James P. Maginnis's article on Reservoir, Fountain, and Stylographic Pens is continued. An excellent article is published on the utilization of solar heat for industrial purposes by means of a new plane mirror reflector. A novel device for the making of curved stereotype printing plates for newspapers is described and illustrated. A new seating arrangement for street cars is described and illustrated. Mr. William L. Larkin presents a very complete account of concrete mixing machinery. A scientific account of the San Francisco earthquakes is published.

Paper Gas Pipes.

An interesting employment of paper relates to the production of gas pipes. Manila paper cut in strips, of a width equal to the length of the pipes to be made, is put in a receiver filled with fused asphalt and rolled solidly and uniformly around a rod or core of iron until the desired thickness is obtained. After the pipe thus produced has been submitted to strong pressure, the exterior is covered with sand and the whole cooled in water. The core is removed and the outer surface covered with a water-proof product. These pipes, it appears, are perfectly tight and more economical than metal pipes.—Rev. de Chimie Industrielle.

Correspondence.

Spontaneous Combustion.

To the Editor of the SCIENTIFIC AMERICAN:

A curious case of spontaneous combustion came under my notice a few days ago. A number of matches which were lying loose upon a shelf ignited and burned without apparent friction or contact with a flame of any kind. The day, March 30, about 11 A. M., was foggy and cloudy. I was seated with my back toward the shelf, when I suddenly noticed a flash not unlike that which takes place when a large lamp is lighted, and on looking around I saw the matches blazing on the shelf.

Had this occurrence taken place at night among papers, or in some person's pocket, it might have been the origin of one of those unaccountable fires which appear to be unpleasantly prevalent. Of course, spontaneous combustion is neither novel nor always unexplainable, and possibly may occur more easily with matches than with other articles. This appears to prove, however, that matches should be packed and handled with greater care than is usually given to them.

At the time that the case I mention took place, there was no fire near the shelf, nor anything on the same that would appear to be capable of causing friction. Is it possible that the ignition was due to an atmospheric cause, or could it be owing in any way to the chemical composition of the match or matches which ignited first?

This seems to me to be a rather serious question for fire insurance companies, as well as factory owners and householders generally. Matches should be handled with far greater care than is usually the case, and should, for instance, be kept entirely out of reach of children. I am convinced from what I saw in this case that certain kinds of matches at least are extremely liable to be ignited spontaneously.

East Orange, N. J.

WILLIAM DEWART.

Fertilizing Power of the White Ant.

To the Editor of the SCIENTIFIC AMERICAN:

Your article of February 17 last regarding the fertilizing powers of the white ant is correct. I left Montpelier, Idaho, in 1887, and since then have lived among the natives of this African east coast. Every season I have seen the wonderful effects the white ant hill produces on the Kafirs' maize and corn. Whenever there happens to be an ant hill in their gardens, its immediate vicinity can be at once distinguished, as the maize and corn are fully double the size of the surrounding crop. The statement that some parts of the country are uninhabitable on account of the white ants is incorrect so far as this vicinity is concerned, as they are easily prevented from entering buildings, and do not attack green crops to any extent. The bush country a few miles from this place is swarming with white ants, and has also a large native population, and my experience is that the ants do more good than harm if necessary precautions are taken with buildings.

REG. SPRINGLE.

Mbabane, Swaziland, South Africa.

Earthquake at the Home of Luther Burbank.

BY ENOS BROWN, CALIFORNIA CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

Nowhere in the limited area to which the late California earthquake was confined were the terrific destructive powers of the convulsion manifested with greater violence than at Santa Rosa, the capital of Sonoma County and one of the most beautiful rural communities in the State. Santa Rosa has been the home of the most wonderful of horticulturists for over thirty years, and the scene of all those remarkable developments which have, in recent years, astonished naturalists throughout the civilized world. Notwithstanding the appalling catastrophe which has brought misery and misfortune to many friends and neighbors, the renowned scientist welcomed the representative of the SCIENTIFIC AMERICAN with great cordiality, and proceeded at once, to the exclusion of all other subjects, to talk upon the strange features of the shock as exhibited under his own personal observation. "I arose at 5 o'clock, as invariably my custom," said Mr. Burbank, "and was looking out of my window at the moment the shock began. A great spreading elm tree in the back yard seemed trying to uproot itself, and swayed in every direction. First the branches turned half way around to the right, and then reversed in the contrary direction; again the great tree marched toward the east, and then back to the west. The trunk then appeared to rise from the ground and try to eject itself from the earth, and did not cease from its extraordinary motions until all movement of the ground had stopped. I then rushed into the garden, and naturally expected that a terrible scene of destruction would meet my gaze, but to my amazement not the tenderest leaf or the most delicate plant had been broken. Not even a single pane of glass in any of my greenhouses suffered from

fracture, neither had a solitary flower-pot been thrown from the shelves, yet within two blocks of my house, right in sight, a mile of the most substantial brick buildings in the county had been prostrated to the ground and were a few minutes later in a blaze. The beautiful court house was all but destroyed, while hotels, business blocks, theaters, and many private dwellings shared in the common ruin, all this happening in a space not exceeding one and one-quarter minutes.

"The first shock came from the west and then turned and came back from the east, afterward appearing to twist around in a circle, racking the buildings and involving them in utter destruction."

Not a brick or stone structure in a space 3,000 feet in length and 600 feet wide escaped destruction; the heart of the city was involved in a minute and one-quarter in total ruin. Strangely enough, frame buildings, those even of the lightest construction, were comparatively unharmed, suffering no greater damage than from broken plaster or breakage of rotten timbers. The financial loss to the beautiful city will reach from \$3,500,000 to \$4,000,000 but a more dreadful consequence was the fatality attending the catastrophe, which cannot be accurately determined. Seventy-eight bodies were recovered. Had Santa Rosa been the only locality involved in the catastrophe, the loss of life and property would have caused it to have been recorded as the most terrible earthquake visitation known to the history of the State; but, overshadowed by the tremendous upheaval at San Francisco, the magnitude of the Santa Rosa cataclysm is almost lost to sight.

The work of rebuilding is now proceeding in energetic fashion, and a different aspect than at present afflicts the spectator will soon be presented. Hundreds of workmen are busily engaged in erecting one, two, and three-story buildings, and it will not be many months before all visible signs of the disaster will have vanished. Every hotel of any pretension—and there were a number of them—was either destroyed by the shock or by fire, but the proprietor of one was equal to the emergency. The new St. Rose is the first to rise from its ashes, not as a structure of brick or mortar as before, but in the shape of a great tent, capacious enough for 250 bedrooms and fitted with every appurtenance of modern travel and comfort, with the added novelty of perfect ventilation and safety from seismic disturbances. The energetic citizens have determined on a new plan for their city, in which wide streets will be a prominent feature.

AN AUTOMOBILE SCHOOL.

The remarkable development in the automobile industry, and the swift advances in automobile construction within recent years, have produced unexpected and unforeseen conditions, and one of the most striking phases in the situation is the lack of men trained to manage and care for the high-powered cars which are being turned out of the factories by the thousand here and imported from abroad. The high salaries that have been offered for drivers and experts, and the pleasant character of the work itself, have attracted the attention of young men of all classes, and hundreds of these have applied to factories and garages with offers to work without compensation merely in order to acquire mechanical training in this line. The superficial automobile engineering education thus obtained has been accepted on the principle that a half-trained chauffeur is better than none at all. Manufacturers of popular cars have estimated that three-quarters of the troubles reported to them by automobile owners are the results of inefficient handling rather than of inherent defects in the mechanism; and to-day the selection of a driver has become almost as important as the choosing of the car. It was to relieve this condition that the New York School of Automobile Engineers in New York city was incorporated, and Prof. Charles E. Lucke, of the Department of Engineering of Columbia University, was invited to plan courses and to supervise a general scheme of instruction that would give thorough training in the principles involved in the construction and handling of automobiles of all types, as well as in the solution of the many practical problems confronting the chauffeur. That the plan of the school has been successful in attaining the object for which it was designed, is attested by the fact that of over a hundred students who have completed the course, none has failed to give satisfaction to his employer.

The building occupied by the school is equipped with shops and laboratories that cover the entire field, and students are accepted for the eight weeks' course only after an examination that proves sufficient ability to grasp the work. Various departments of the school are illustrated in the accompanying engravings.

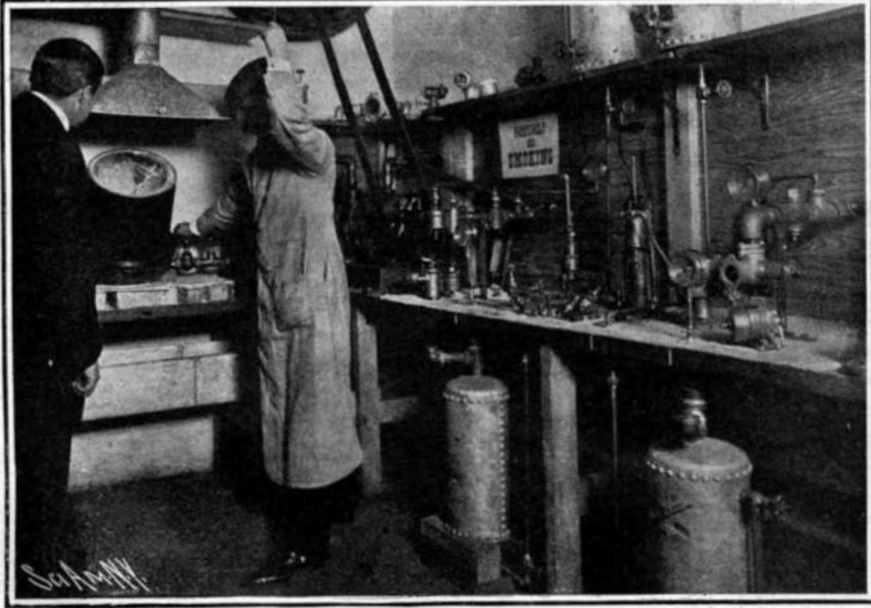
The men are formed into graded squads of from twelve to fifteen each, and the course is divided into five departments, which include lectures and recitations, practice in the workshops, and the study of transmissions and engines, of carburetion and lubrication, and of ignition. The men pass through this cycle four times a week. Various other phases of automo-

ble engineering are, of course, included in one or the other of the five general divisions, and the student is unfamiliar with no detail of the automobile at the end of the course.

Each of the general departments is in charge of an experienced instructor, who begins his work with extended lectures on the elementary principles involved, advancing at each period and holding occasional examinations to assure himself that every step has been thoroughly comprehended. For example, a squad in the carburetion department will study the primary action of the liquid seeking its own level, and will follow that with the application of the principle as

tered under all conditions of faulty lubrication, loss of compression, etc., and the motors and gear systems are isolated, so that in studying them the pupil's attention is not distracted by other parts of the car's mechanism. Engines of many types are provided for the purpose of familiarizing the student with them, and to facilitate this portion of the instruction the models are partially cut away, more clearly to illustrate their interior construction. Where a model of a particular type of engine has not been obtained, the students are provided with detailed plans and concise descriptions which they must study thoroughly. Various types of transmissions are mounted in frames and belt-driven,

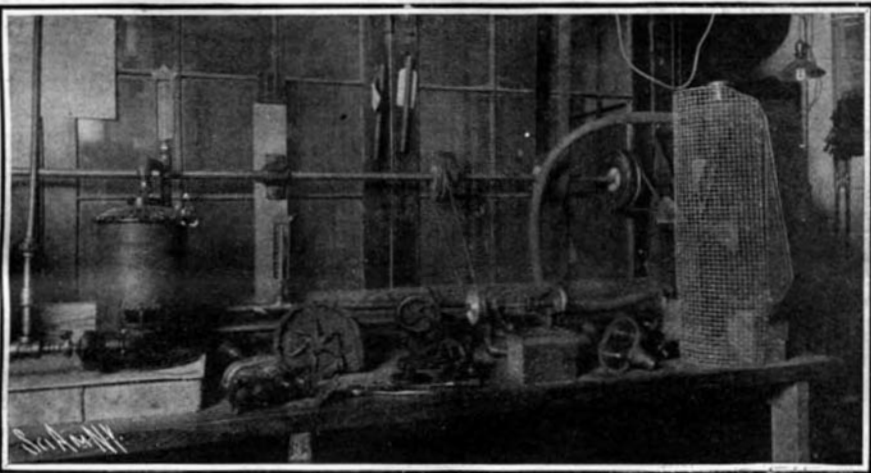
given to the student in a complete car set on rollers, and in this way control of the car—starting, stopping, reversing, and braking—can be learned with greater rapidity, for the student is independent of the worries incident to steering and the speed limits. The first instruction in the handling of cars on the road is given on Morris Park race track, where for a week the students have simple running conditions, but are incidentally—and purposely—introduced to all kinds of possible trouble. Every difficulty will be encountered, and the failure of a student to get his car running and keep it running, will count against him in the granting of his certificate of graduation. The experience at



Burning Mixture From a Carbureter in an Open Crucible.



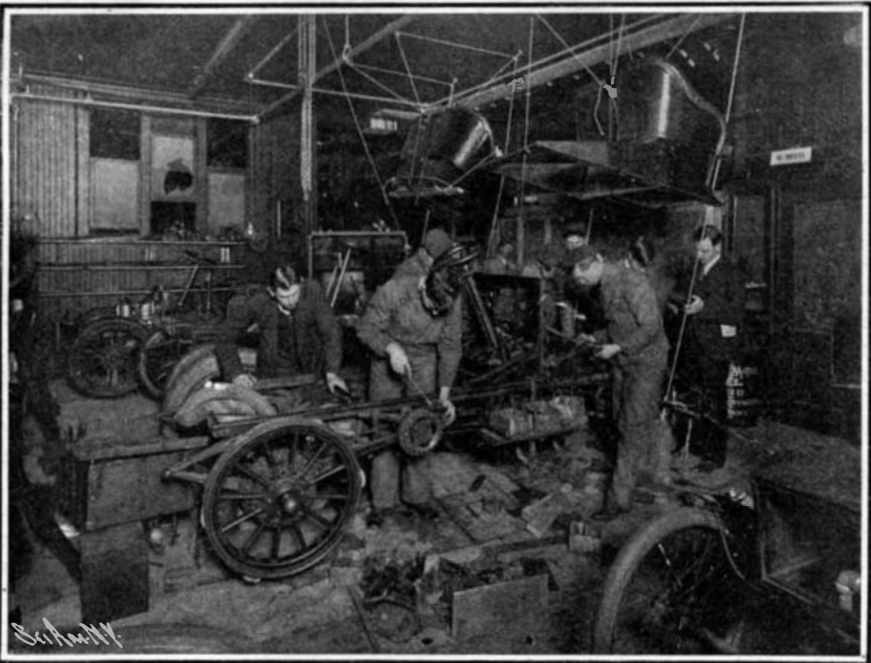
Overhauling a Car Prior to Traffic Practice.



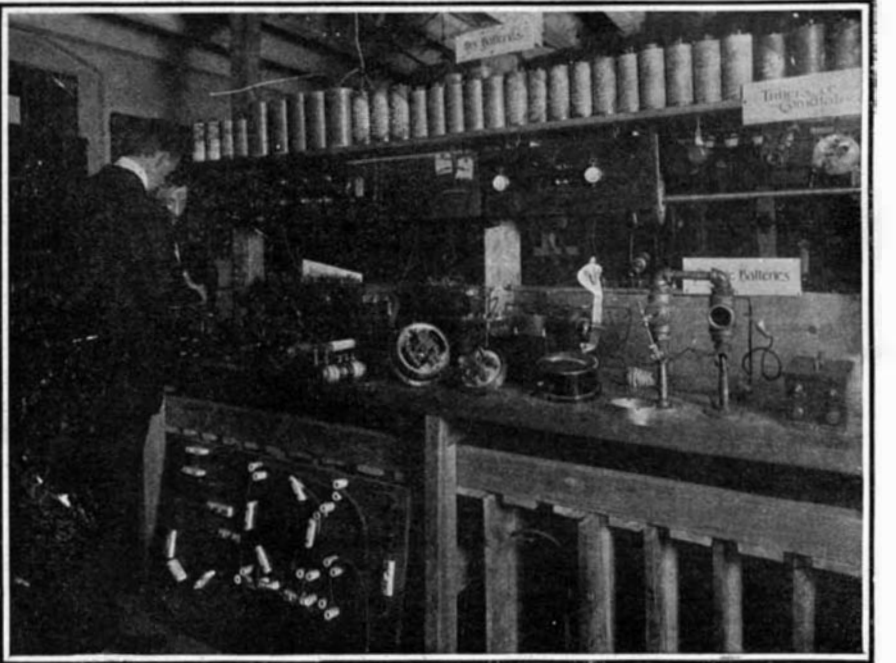
Circulating Pumps and Radiator Department.



Theoretical Work in the Lecture Room Before Studying the Principles in Practice.



Practice in Assembling Parts of an Automobile.



Studying Various Systems of Ignition.

AN AUTOMOBILE SCHOOL.

worked out in the various designs, finally taking each type of carburetor in action. For this purpose an exhaust fan with variable speed draws either warm or cold air through the carburetor in question, and the mixture is then burned in an open crucible, where the actual difference between good and faulty adjustment is illustrated by the color of the flames. The ignition department has been worked out with the special care which the importance of this detail of the subject warrants, and each step is so thoroughly explained and illustrated in each of the various systems, that the principles can readily be grasped and applied.

Engines and transmissions of all types must be mas-

that they may be studied in motion and with any combination of gears. All classes of repairs, temporary and permanent, are taught in the machine tool shop, where practice with forges, lathes, drill presses, and shapers, supplemented with bench work, is included in the instruction. The students are taught how to make brake horse-power tests of engines, and in these tests the effect of various conditions, such as absence of muffler or jacket water, upon the engine are studied. One interesting feature of the course is the instruction in the avoidance of tire trouble and in the methods of making repairs when it occurs.

The first practice in handling change-speed gears is

the race track is followed by a week's experience operating through traffic and among city conditions, and beyond that the student only requires practice to become thoroughly competent for any work in driving or manufacturing that may be offered.

In the organization of the school's equipment the manufacturers of cars and parts, recognizing the advantage of having men trained in their designs, have offered all their specialties, and for this reason the course is remarkably complete and of the most practical benefit. One interesting feature of the situation is the eagerness with which owners of automobiles have taken up the special course open for them.