which the matrices are received and by which they are delivered to the vertically-movable assembling-block I, against a yielding resistant J.

K is a reservoir or receptacle in which the space-bars are held, and from which they are dropped, one at a time, into the assembling-block I.

LL′ are transferring or shifting arms, which carry the matrices from the elevated assembling-block through a stationary guide-block M to a vertically-movable yoke N, by which they are first lowered to the vertical mold-wheel O, and thereafter lifted within reach of the assorting devices.

P is the "vise," so called, a frame supporting the matrix-clamps and sliding mechanism Q operating the space-bars.

R are stationary rails or supports to receive the line of matrices and space-bars.

S is a slide to transfer said line to said rails from the yoke N after the latter is elevated.

T is a vertically-swinging arm provided with means for lifting the matrices from the rail R to the distributer, leaving the space-bars behind.

U is a device for carrying the space-bars from the rails into their receptacle or magazine K.

W is a slide at the top of the machine to carry the matrices from the lifting device T into the distributer X, whence they return to the magazine.

Operation.—The machine is operated as follows: The attendant depressing successively the finger-keys, which represent the required characters, thereby causes the matrices to be discharged from the mouth of the magazine B, whence they descend through the channel G to the belt H, by which they are delivered one after another in an upright position side by side into the assembling-block I, in which they are advanced in close order by the rotary block b^2 acting against the last matrix. From time to time space-bars are delivered into the line by means of the appropriate finger-key. After the composition of the line is completed the assembling-block I is lifted and the line of matrices thereby carried within the grasp of the shifter-arms LL′, which immediately carry the matrices to the left through the guide M into the yoke N, which at once descends with them to the front of the mold, which assumes it normal position. As soon as the matrix-line has completed its descent, the mold moves forward toward the matrices. The first steps in the justification—that is to say, in the lifting of the space-bars—now occur. It is frequently desirable to have the machine cast a number of bars in duplicate from the one line of matrices before they are distributed. This is accomplished by the use of a latch a^{20}, (shown in Figs. 1, 36, 43, and 45,) pivoted to the main frame, so that it may be set at will in the path of slide U to lock the same in its extreme position at the right of the machine. As this slide is connected by the intermediate parts with the slide S, the latter is prevented from moving to the right, and thus prevented from shifting the matrices out of the yoke when the latter rises. Thus it is that the matrices are again presented by the yoke to the mold without being distributed. The pot advances against the rear face of the mold, the matrices are tightly clamped, the justification completed, and the pump acts to fill the mold with molten metal. The justifying devices now descend, the pump-plunger is lifted, the melting-pot recedes from the mold, and the mold recedes from the matrices. The mold revolves to present the contained linotype in front of the ejector, the elevator-arm T descends to its lower position, and the ejector advances to deliver the linotype. About this time the yoke lifts the matrices and space-bars from the mold to the level of the upper guide R, and the slide S acts to carry the line into said guide to deliver the matrices upon the plate *t* on the end of the arm T. The arm T now swings upward, carrying the matrices, which are shifted by slide W to the distributer, while the hook *u*, moving to the right, carries the space-bars remaining in the guide R to their receptacle K. In due course the matrices will be distributed, the ejector withdrawn, and the mold rotated to its original position. It is to be observed that the operations of assembling one line of casting from a second and distributing a third are carried on concurrently.

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ARCHAEOLOGY

Contorted Human Forms Adorn Temple at Monte Alban

STRANGE people lived in Monte Alban, Indian city of treasure tombs and secret passages.

On the walls of a temple now being unearthed by Mexican archaeologists, appear carved human figures in inexplicable postures. Some of the persons shown here are crawling or swimming. Some lie on their backs. One lies in an abandoned pose, head thrown back, and with an object to his lips as if he were drinking. Sex is in many cases emphasized, as if it had special significance here.

Some of the figures appear crippled. One archaeologist suggested that the scene represents sick people going to some sacred shrine of miraculous healing. But to other archaeologists, the contorted figures recall religious rites of Zapotecan Indians. Monte Alban was a Zapotecan city.

Early Dominican monks who lived among the Indians in this part of Mexico left descriptions of the rites of the Zapotecans. During sacred celebrations, they said, Zapotecan high priests drank the holy but fermented juice of tropic fruits which was forbidden to the common herd. The priests then danced, twisting their bodies into horrible shapes and groaning so frightfully that the ordinary worshippers were terrified.

During these religious functions, too, the priests were expected to break their ordinary vows of celibacy in order to provide for their succession.

The temple on which the gyrating figures are carved was named "The Temple of the Dancers" years ago, when treasure hunters probed the earth-covered mound in which the temple lies buried, and found a tunnel inside. The tunnel had a lining of stone slabs carved in human figures in curious, dance-like postures.

The first paintings known to have

been done by Zapotecan Indians have been found within an oddly-shaped tomb, apparently guarded by a headless skeleton. Paintings in red, green, and yellow cover the front of the tomb. There are more underneath the lintel, on the door jambs, and on the stone floor of the entrance.

Already, the archaeologists have identified those on the lintel front as Zapotecan picture writings dealing with the calendar. The central one is read as "Twelve Flower" which was either the name or the date, as Mexican Indians were called after their birthdays. Other picture writings painted on the tomb represent year and day names in Zapotecan or in Mayan.

Science News Letter, December 3, 1932

ENGINEERING

Sand and Weather Affect Life of Auto Tires

WHEN a visiting motorist tells about the good mileage his tires give him, which happens to be a better figure than you can boast for your own car, do not immediately become disgruntled with your dealer and the kind of tires you are using.

For sand and weather may be the cause of the mileage difference.

Suppose you live in Florida, and the visitor in Akron, Ohio. Because the sand used in making roads in Florida is sharper than that near Akron, the tread of your tires will last only 60 per cent. as long as in northern Ohio. This is the estimate of Burgess Darrow, manager of the development department for the Goodyear Tire and Rubber Co., which was given in a paper read before the Society of Automotive Engineers.

Mr. Darrow stated that tires of the Arizona motorist, whose roads are built with smooth desert sand, will last 60 per cent. longer than those of the Akron resident. Thus, for all sand has to do with it, tire mileage in Arizona is almost three times as great as in Florida.

But sand is not the only thing that causes tires to wear. The temperature at which a tire operates has a lot to do with the length of its life. Mr. Darrow's paper estimated that motorcoach tires which give 28,000 miles in such northern states as Ohio, Michigan and Minnesota will last for only 20,000 to 22,000 miles in the South.

It was also pointed out that hills and curves have an important effect on tread wear.

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BIOGRAPHY

A New Introduction to The Father of Bacteriology

IT IS NOT OFTEN that one can meet a modest but great explorer of a new world who was born 300 years ago, yet Clifford Dobell, F.R.S., protistologist to the Medical Research Council, London, arranges the introduction pleasantly in his erudite and charming volume: Antony van Leeuwenhoek and his "Little Animals" (Harcourt, Brace and Co.).

A draper by trade, Dutchman by nationality, maker of lenses and inquisitor of the microscopic world by desire, Leeuwenhoek was the father of protozoology and bacteriology. Devoting only spare time to the "very little animalcules" that he probably first found in the water of an inland lake in 1674, he reported all his interesting observations in letters to the Royal Society of London, which was not very old at the time. His famous "Letter on Protozoa," his eighteenth scientific epistle to the Royal Society, dated "Delft in Holland, 9th October 1676," has been translated by Dr. Dobell in full for the first time. This will amaze the thousands of scientists who are studying the protozoa and bacteria that Leeuwenhoek first saw. Only a part of the letter was published in the Philosophical Transactions in 1677 as "English'd" by the energetic and first Royal Society secretary, Henry Oldenburg. This famous document, still preserved in the Royal Society's archives, has been long regarded as the first paper ever written upon protozoology, and Dr. Dobell, who patiently translated it out of its difficult Dutch script, discovered that it also contains the first account ever written of the bacteria as well as many other original observations.

With rare discernment the Royal Society elected Leeuwenhoek a fellow. It must be remembered that he was a Dutchman and not long since England and Holland had been at war. This international rapport in science has a lesson for today, as Dr. Dobell interprets:

"In reintroducing plain Mr. van Leeuwenhoek, the Dutch draper and amateur micrographer, I want also to impress upon you that there are still blood-brothers in every different nation. Barriers erected by birth and prejudice and education are blown sky-high before the fire of common human aims and interests. Language and land and lineage are no bars to mutual and native understanding. An honest man in any country is linked to all other honest men in all other countries. When a true man like Antony van Leeuwenhoek is born, the heavens are opened. Even when he dies he is not dead; his spirit glows with the divine light forever, and will forever be seen and understood—somewhere, sometime, by somebody. No Princes, Popes, politicians, or even prophets, can unite mankind in universal brotherhood; but the disinterested and simple men everywhere can (and perhaps eventually will) unknowingly draw warring nations together, and may ultimately save humanity from the fate of the Triassic reptiles."

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SEISMOLOGY

Gulf of Tartary Gets Second Earthquake Shock

THE REGION around the Gulf of Tartary, off the coast of eastern Asia, got its second earthquake shaking in a fortnight just before midnight on Friday, Nov. 25, according to calculations made by the Jesuit Seismological Association, based on data gathered by Science Service.

The time of origin was about 11:30 p. m., eastern standard time, and the epicenter was in latitude 48 degrees north longitude 141 degrees east. On Nov. 12, an earthquake had been recorded from the same region.

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A shipment of mercury large enough to supply 50,000,000 ordinary thermometers—the commonest use of mercury—has arrived in New York to be used by the General Electric Company in generating power in a new 20,000 kilowatt mercury turbine in New Jersey.

The Field Museum has on exhibit the only complete skeleton ever discovered of the prehistoric South American ground sloth, *Pronothrotherium.*