

points out the time of the first high water, and the index on the left hand side of the face of the machine, read off on the left part of the scale, gives the height of this high water. Then by turning until the lunar index comes in conjunction with the lower end of the needle, the time of the next low water is given. The solar index points out the time of this low water, and the index on the side, read off now from the right hand part of the scale, gives the height of this low water. Turning until the lunar index comes in conjunction again with the upper end of the needle, gives the time of the second high water, the height of which is read off as before. Thus the computation is made through the year from high to low and from low to high water, by reading and recording the results as read off. Where the range of the mean tide is less than about 5 feet, as is the case mostly on all stations south of Cape Cod, the pulleys on the cranks can be thrown out to double the distance of the amplitudes, and the heights then read from the inner graduation of the scales, which is two inches of the scale to a foot of tide.



EXTERIOR OF A PUEBLO HOUSE, ZUNI.

ZUNI, AN ANCIENT CITY OF THE PUEBLOS.

High up on the western slope of the Sierra Madres, between 7,000 and 8,000 feet above sea level, stands Zuni, the ancient city of the Pueblos. Silhouetted in red against the clear blue sky, with a background formed of the turquoise-tinted mountains, and in the nearer distance, across the precipitous valley of Ta-ai-ia-lo-ne, the sacred thunder mountains of the Pueblos, this city of the past is a picture that takes more than ordinary pen or brush adequately to describe. The terraced buildings are the color of the Sierras and are built of it—red sandstone slabs mortared together with red adobe clay—and their square, fortress-like appearance gives to the town a truly commanding aspect. There is nothing else in the world like Zuni, for without, and from within, it presents a scene difficult to describe. There are narrow, winding ways, irregular-shaped plazas, all of which have characteristic names; while oddly-costumed figures are seen winding noiselessly through the streets, the women carrying on their heads great earthen jars of



DISTANT VIEW OF THE TOWN OF ZUNI



THE TERRACED HOUSES OF ZUNI—A VIEW INSIDE THE CITY.

water, the last a feature suggestive of the Orient. There are ladders everywhere; for though the houses beneath have doors, those that form the superstructure are not entered through those below. Above all the roofs are seen numerous clay chimneys, built in sections, and looking for all the world like the graded array of pots in a china store; while, oddly enough, they form the flues for what are practically the counterpart of the great, old-fashioned New England fireplace. A single slab of stone placed above the fire serves as a stove. Tables and chairs there are none, but Pueblo and Navajo rugs and blankets curtain the walls and carpet the floors.

In intelligence the Zunis rank with the Toltecs, Aztecs and Incas. Like them they have always dwelt in fixed abodes. One commendable feature of this people is the high pinnacle upon which they place their women. With them the woman is no drudge, as she is with the other American aborigines. She is never allowed to do the degrading work of the field. She carries the water and attends to the home, which, by the way, is her own, and from which, is she is so minded, she has the right to turn away her husband. The Zunis are the strictest monogamists, and while it is true that there is no modesty, as civilization understands it, in Zuni, yet there is no immorality. The Zunis are sentimental in the extreme and marry at a youthful age. When a youth is wooing a maiden, he will go and sit before her with his back turned to her, and untwine his head cloth. She rejects him by softly stealing away, or accepts him by running her hands caressingly through his loosened locks.

While they possess no written language like their South and Central American contemporaries, they have an unwritten literature that has come all the way down from their mythical beginning, verbatim. The Zunis never forget. It may be that reliance on the written words is the cause of the inferior powers of memory of the lettered peoples. The Zuni bible has four different divisions or books and each book is divided into four chapters, as it were. Half a dozen of the brightest youths of each generation are selected to serve the less fortunate as their books. On the minds of these are written, beginning at the age of twelve, the words of the sacred book. With the common folk all this is Greek, for it is transmitted in original Zuni, old English as it were, in order that every single syllable may be preserved intact.

Once the Zunis were strong in numbers and fortresses, but disease has thinned them down, and they have also been reduced by privation, resulting in some measure from their own confinement in a barren reservation, to the present number of scarce a thousand souls. Of late years they have broken down the barriers of seclusion and exclusion, that were a marked characteristic of the race. Until 1878 only one white man had ever dwelt in the place, and his stay was made not of his own volition. He was a cross-country mail carrier who was taken in by the Zunis and nursed during a sickness. On his recovery he was not allowed to leave the city. After months of search the unfortunate postman was traced to Zuni, and only on demand from a battalion was he delivered up. The stories told of the Zunis by this man found their way to the East and led to a scientist who became interested in them giving his life to the fascinating study of these people. This was F. H. Cushing, of the Smithsonian Institution; whose voluminous report was not published until after his death. He left Washington for Fort Wingate in the latter part of the seventies, and in the fall ventured, usually unaccompanied, from time to time, to Zuni, and gaining their admiration and respect he was finally allowed to enter the tribe. He was adopted by one of the governors and was required to dress, grow his hair, and live as they did, the people even urging him to marry into their tribe in order that he might inherit his foster-father's high position. This he refused to do, but later, when he took six of the great Chiefs to Washington, he selected a white bride for himself, who also became a member of the tribe. The Indians were so much impressed with what they saw on their journey that they offered Cushing the highest position in the tribe. "The white men are gods," said one of them. "It is a pity they have to live by eating of the earth as we do."

Cushing returned to Washington after a stay of over five years with this remarkable people; but he had become completely invalidated by the coarseness of the food and the various hardships he had undergone for the sake of science, and his death, which took place a year and a half ago, is attributed to these privations.

The Zunis are cruel in some respects, but in their intercourse among themselves they are courteous and would make admirable models for some of our civilized white communities. They never lose their tempers, nor do they discuss matters in violent tones. They consider it beneath their dignity to strike a fellow tribesman. The children are remarkably obedient, a fact which may be accounted for somewhat by their custom of killing the worst child in the village at a certain anniversary feast. They refuse to be taught to

read and write, and the two school teachers that now dwell with them can do no more than train them to sew and perform various domestic duties. Nor will they take up our religion. Their religious dances of supplication to the various gods and their dances of thank offering are numerous, but the great dance of the year is one that is held under the full moon of the month of May.

In the morning the Mudheads appear. These are naked performers with great clay masks over their heads, who rush through the streets shooting arrows into the hides and furs and feathers that are thrown in front of them. Subsequently these serve as clowns to the dancers. As a substitute for the sacrifice of the child, which was, of course, prohibited by the United States government, a band of fantastically garbed priests rush through the streets, carrying long switches which they lay unmercifully on anyone they happen to catch. At noon a number of dances, in which every god is impersonated, take place in the colosseum-like dance place, in which the natives who are not participants sit and applaud. The woman from the moon, the echo god, and the sun god are the most interesting. The echo god follows every utterance of the others a brief space of time thereafter, and he does it wonderfully well.

A feature which speaks strongly in favor of this curious people is, that unlike the nomadic Indians, with which the people of the United States are more familiar, they are very cleanly in their habits, an extremely important point when we remember that the Zunis always live in fixed habitations. Their food consists of curious paper bread, which is made by pulverizing grain, making it into dough and spreading it with wonderful evenness over slabs of stone. The bread bakes very quickly and is rolled into shavings, in which form it is eaten. Locusts are gathered every morning at sunrise, enough being laid by for each day's needs. They are roasted to a rich brown color and eaten. At the foot of the mountain on which the city stands, is a small salt lake, and in the neighboring valley a peach orchard which produces very fine fruit. Indian corn and maize grow fairly well under the hands of the Zunis, and the government can confer no greater boon upon them than by doing some work of irrigation, or at least by the construction of reservoirs; for it is a fact that the "water god," who is their chief divinity, showers his blessing upon them barely once a year.

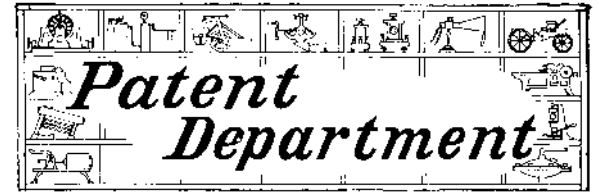
Weather Bureau Wireless Telegraphy.

The Weather Bureau has long been experimenting with suitable instruments for the transmission of wireless telegraphic messages. Recent experiments made by Prof. Willis B. Moore, the Superintendent of the Weather Bureau, have demonstrated the feasibility of the new apparatus which the Department of Agriculture will probably adopt. Prof. Moore stated that over water of wide expanse wireless messages could be sent accurately and quickly, and more rapidly than if wires were used; but that it was a matter of some doubt whether aerial communication would prove very successful on land. The Department used a new wireless receiver, in which a telephone is employed. The recent experiments showed that this apparatus operates faultlessly and rapidly. Prof. Moore states that he sent a message which, to be transmitted over a wire by electric telegraph, would require two or three minutes, and which was sent without wires at about the fastest rate of wire telegraphy over a land wire. What the particular construction of the Department's wireless telegraphic apparatus may be, has not as yet been disclosed.

Lord Kelvin on the Metric System.

The House Committee on Coinage, Weights and Measures, which is now considering the advisability of adopting the metric system in the various departments of the United States government, had two distinguished witnesses before it recently in the persons of Lord Kelvin and George P. Westinghouse. Lord Kelvin advocated the passage of the bill warmly. He remarked that he had long hoped that England would take the lead in this matter. If the United States were the first to adopt the system he had no doubt that England would soon follow suit. He was glad to see that the committee intended to allow a suitable time for the adoption of the standard before making it effective in order that the public at large might familiarize itself with metric terminology. Mr. Westinghouse also advocated this system.

Camden, N. J., will have a new shipbuilding plant soon, which will be quite as extensive as that of the New York Shipbuilding Company. The latter is situated at the lower end of the city, while the new one will be at Cooper's Point, which is at the other end of the city's water front. The plant of the Tway Machine and Blacksmithing Company has been secured, and the work of rearing the new shipbuilding plant will be begun at an early date. A marine railway, improved drydocks and the most modern appliances will be used.



PROPOSED AMENDMENT OF THE BRITISH PATENT LAWS.

The British press is at present quite a good deal exercised over the proposed amendments to the British patent laws. The object of the proposed changes is to so modify the existing laws of Great Britain as to place them upon a basis greatly resembling our present patent practice. It is designed by the proposed changes to establish a system of examination closely resembling the examination conducted by our Patent Office after an application has been filed. When any change in existing conditions is proposed in Great Britain, it almost invariably leads to a controversy, which is often conducted with more or less acrimony according to the degree of importance of the subject. The present instance is no exception, and it is with much of surprise that we note on this side of the water some of the objections offered to the proposed amendments. Some of the opponents claim that it is impossible to make a search which will be at all complete, and if such a search is not complete, it is of little or no value. It is contended by those who favor the bill that no search, however exhaustive it may be, can be absolutely complete, and that a search for fifty years through the patent records without doubt in many cases is not half complete, however carefully it may be made, but that such a search may be supplemented by an independent search on the part of the inventor if he wishes, and although the search may not be absolutely complete, that such completeness is only a matter of degree, but that it is desirable, although the result may not be absolutely determinate or infallible.

The great success which has attended our own practice with reference to the Patent Office search is, we believe, sufficient ground for the belief that the proposed legislation will be carried to a successful termination. The method of conducting an examination in the United States Patent Office is, in the main, very satisfactory. It is difficult to understand, however, how the British Patent Office will be able to carry out a sufficiently thorough examination for the small extra fee of \$5 which it is proposed to charge for the additional work of making the examination. It seems doubtful whether the British Patent Office could be made self-supporting for the fee charged, if the examinations are conducted on a basis as thorough as that in the United States Patent Office.

Not long ago a deputation called upon Mr. Gerald Balfour with the object of having a clause inserted in the bill, which would necessitate the technical working of a patent within a certain definite period. The object of this feature of the bill would be to establish promptly a new manufacture, or to have the patent become void or voidable, owing to the failure to work the patent in the time prescribed. A recent issue of Engineering, in a comment upon these statements, says that "the legislation of practically every important industrial nation, save that of our own country, has a provision to secure this (working) either directly or indirectly." It then naively remarks that "in the United States the high tariff serves toward this end; while in many other countries there are provisions in the patent law for voiding a patent if it is not worked in that country." It will probably strike our readers as a matter of news that the high tariff serves to operate in the same manner as a working clause in other patent laws. We have been accustomed during the past forty years to hear all sorts of benefits or evils saddled upon the poor tariff statute, but this is the first instance in which we have heard a claim of this character put forward. It is certainly a most interesting and ingenious contention. The same article also puts forward the statement that "while giving our German friends every credit for the enterprise they have shown in establishing industrial research laboratories, there can be little doubt that they have also benefited greatly by their patent legislation, which helps their traders enormously by making patents voidable if not worked within the empire." We can hardly believe that the success of the German chemical industries is due to the fact that their patents become voidable after a failure to work them within the empire, and that the English chemical industry has languished owing to the fact that they have failed to establish a similar practice. We surely believe that such a condition of affairs has arisen from very different causes, from the same economic causes, in fact, which have enabled so many American industrial products to gain a firm foothold in Great Britain. One of the delegates, Mr. Joseph Lawrence, stated that "when the Linotype machine was invented, fifteen years ago, he endeavored to obtain a license