future, and, notwithstanding the terrific cold of winter, it will not be so difficult to build as it was to construct the line of the White Pass and the Yukon Railway.

The prices paid for labor in Russia and Siberia are exceedingly low, varying from 15 cents to $1.50 per day, the laborers feeding themselves out of their earnings. This large range in the price of labor depends greatly upon the locality and whether food is plentiful or not. In central Siberia men can be contracted for by the year at $15 per month; the workmen are of the peasant class. It is not thought that laborers in Siberia will at once alter their methods, but this will probably come in time. The mining laws of Russia allow the taking up of mining claims by Russians or foreigners, but there are many severe restrictions. The claims consist of 200 acres of land, generally surveyed at the locator's option.

Cities of 10,000 to 50,000 inhabitants are now numerous in Siberia. Hotels with comfortable rooms, restaurants which may be said in many cases to be truly palatial, with electric lights and telephone connections, are not difficult to find, says Consul Thomas Smith, of Moscow. Anyone can traverse Siberia in great luxury in superb trains supplied with bath, piano, dining saloon, drawing room, easy chairs, observation cars, etc., the whole being lighted by electricity. The cost of the journey from Moscow to Irkutsk, 3,200 miles, including sleeping car, is only $44. Siberia is practically unknown to most Russians, and they have an idea that furs are always necessary on account of the intense cold. Actual experience in the city of Krasnoyarsk shows that the thermometer reaches 110 degrees for days together in the month of August, and any clothes but those made of silk and linen were absolutely unendurable. To those who wish an unhackneyed trip, Siberia offers an excellent opportunity.

THE HEAVENS IN AUGUST.

BY EDGAR L. LARKIN.

THE SUN.

The sun moves east 1 h. 53 m. in August—not 2 h.—because the earth's velocity is less than the average, moving 54′ 40″ daily instead of 59′ 8″, the mean. Part of this loss of speed is accounted for by its increased distance from the sun, having been at its most distant point on July 3. Therefore, not quite one-twelfth of the sky will be lifted up in the east or sunk in the west. The sun will be 9° 21′ 22″ nearer the equator on August 31 than on the 1st. At this writing (July 7) it is free from spots.

MERCURY.

This planet will reach its maximum elongation, west, on the 2d (19° 22′), and must, therefore, rise before the sun, because, being west, it sets before the sun does. Its right ascension—distance east from the first point of Aries—will be 7h. 31 m., but that of the sun will be 8 h. 48 m. The advancing horizon will overtake Mercury first because it is at a less distance from Aries, 1 h. 17 m. earlier, hence it will be morning star. Since it is 2° 29′ further north than the sun, it ought to be seen without optical aid from the entire Atlantic coast of the United States. Here in the marvelous air of the Sierra Madre Mountains it will glitter with brilliancy unknown in the Eastern States. Mercury will rise up through its node on the 9th; that is, it will come from the south to the north side of the plane of the earth's orbit. Thus: (2) N. ——— (1) S. the line is cut out of the plane, and the circle, 1, is Mercury before passage and 2 after. The planet will be nearest the sun on the 13th, farthest north on the 23d, from which position it rapidly declines and retreats to the opposite side of the sun from the earth on the 27th, so that the centers of the earth, sun and Mercury will be nearly on the same straight line.

VENUS

is evening star and will be unimportant throughout the month, since it is farther away than the sun. Its eastern advance being only 20m.

THE EARTH.

Stand back to the sun at sunset on August 1, and look toward the opposite side of the universe; then the earth will be slightly west of θ Capricorni, and on the 31st a little west of λ Aquarii.

MARS

is so far away that, being in the solar glow, it will not appear of special interest, but a study of its motion is highly instructive. Its R. A. on the 1st is 12 h. 40 m., and on the 31st 13 h. 50 m.—gain 1 h. 10 m., while its declination south increases from 4° 16′ to 11° 44′. But this track carries it through the plane of the ecliptic from north to south, and it passes its descending node on the 5th at the 19th hour, when its R. A. will be 12 h. 51 m. and its declination south 5° 27′ 58″, which point is in the ecliptic plane, when for an instant the latitude of the center of Mars will be zero. This affords a fine opportunity for locating the earth's orbit among the stars. For Mars will slide along near and below the plane for several days, while Venus to the west will be advancing slightly above it, the equator, ecliptic and equinoctial colure, or 12th hour circle, all crossing between the two planets. August 5 will be of great interest, for Jupiter and the earth's orbit coincide, with Saturn only 1° above it. Remember where the sun disappeared on that day—make a note of where the center of the earth is, then in succession pass the eye from the sunset point to Regulus, Venus, Mars, Spica, Jupiter and Saturn, and an arc of the orbit traversed by the earth will be cut out. On the 18th Mars will pass the first magnitude star Spica 2° 7′ to the north, while on the 21st the distance between the star Regulus and the sun's center is only 15′, but since the radius of the sun on that day is 15′ 50″, Regulus will vanish behind the sun, or make an exceedingly close approach.

JUPITER.

The R. A. of Jupiter on the 1st is 18 h. 19 m. 35 s., and on the 31st 18 h. 14 m. 4 s., hence he loses 5 m. 31 s.; that is, retrogrades during the month. But on the 31st he stops, hesitates a moment and then begins a race with Saturn that will be one of the most impressive spectacles of modern times. Thus, at noon on the 29th the seconds, only, of R. A. are 4.35, 30th 4.06, 31st 4.59; thus 4.06 is the least—planet farthest west—and the next day it is east again. The entire world where the splendor of the approaching conjunction (November 27) is visible, cannot fail being lost in admiration.

SATURN.

Saturn also loses 5 m., and is in training for the race when he will strive to outrun Jupiter, but will fail. Both planets are in Sagittarius, and, in the splendid air of California, burn and blaze with a supernal light, unseen where the atmosphere is impure.

URANUS.

This distant world is in Ophiuchus and almost at a standstill, moving only 35 s. in the month.

NEPTUNE

sets before the sun and is invisible in the evening. Therefore in August, 1901, α Cancri and the cluster Præsepe, Regulus and both Lions, with the head of Hydræ, Sextans and the mast of Argo Navis will vanish in the west, and at this observatory, if not consumed in solar flames, will be cast into the ocean. In the east Cygnus, the Fox and Dolphin, with Capricornus, Aquarius, Equleus and the head of the steed Pegasus, will be new.

Mount Lowe Observatory, California, July, 1901.

TWO EMINENT CALIFORNIA SCIENTISTS.

By the death of Prof. Joseph Le Conte and Dr. Harvey Wilson Harkness, California has been deprived of two of its most eminent scientists. Both were men approaching four score years, and had been residents of the State from early manhood. Though as investigators each pursued a different branch of science, yet each rendered great service to the community and well deserved the high estimation with which they were universally regarded.

Probably no man has studied more industriously or arrived at conclusions that are more entitled to respect as to the complex geological system of California than Prof. Le Conte. From 1869, the year he became one of the faculty of the University of California, as teacher of natural sciences, all of his unoccupied moments were spent as a student. He was one of the first to scientifically explore the Yosemite Valley and the very first to describe and define the geological conditions and attractiveness of that wonder of nature. It was an appropriate spot for the old professor to give up his last breath. Prof. Le Conte was among the first who explored the region east of the Sierras in Inyo County, finding traces of the great lake that once covered that country to great depths, defining boundaries, and luminously detailing the remarkable geological problems there presented. Prof. Le Conte was the author of many scientific textbooks and a strong advocate of evolutionary doctrines.

The branch of science in which Dr. Harkness gained his great eminence was the obscure one relating to fungi, particularly as concerned the abundant plant and fruit life of California. The service he rendered to an important and expanding industry of the State in the definition and cure of this class of disease entitles him to grateful remembrance. For many years Dr. Harkness was president of the California Academy of Sciences and devoted his leisure to the development of that great institution. At the beginning of his administration the academy was ill housed and dependent upon contributions for an existence. Later James Lick left it over $1,000,000, and the building which it now occupies, filled with a priceless collection of natural objects, is worth three-quarters of a million and is of splendid usefulness.

Both of these eminent men lived lives simple and unostentatious. Their friendships were wide, and in the world of science they will be greatly missed.

SCIENCE NOTES

The Guttenberg Museum at Mayence was opened on June 23.

Wherever the Romans penetrated they were sure to erect great baths. Recent excavations on an estate in Scotland have revealed the foundations of an immense bath with concrete floors and walls, lead-pipe connection, hypocaust and stoke-hole with a flue extending from it, says The Architect. The foundations of the piers in the hypocaust are now displayed. The walls of the rooms are formed of stone and lime covered with strong concrete, with a polished surface and painted a brick-red color. The floors are all of concrete.

An attempt is to be made by the British authorities in Uganda to utilize the zebra for transport purposes in that country. It is contended that the characteristics of the animal render it specially suited to this district, since it is naturally immune against the ravages of the tsetse fly and horse sickness. The plan suggested is the domestication of the adult animal. The young zebra cannot be reared apart from its mother, and it is considered that if the animal were accustomed to the presence of man from its birth, in the course of a few years a large supply of zebras will be available for work.

The study of languages by those who are not able to obtain actual instruction from the professor has always been hampered by the fact that notwithstanding the grammar might be mastered there was always trouble with pronunciation. This phonetic difficulty has been overcome by the International Correspondence Schools of Scranton, Pa. The system employed is highly interesting, for each student in the language courses is furnished with a phonograph. The instruction proper is given by mail. The lessons are dictated by the professors at Scranton, and the phonograph cylinders are sent to the students. The cylinders are not copies, but are "master records," so that they are so clear that the students are easily taught the correct pronunciation. The courses in the foreign languages are under the direction of Prof. David Petri-Palmedo, who will give instruction in German; Prof. Edouard Lamaze, who will teach French, and by Prof. Antonio Llano, who will teach Spanish.

NEW WEAVING DEVICE.

A new contrivance, which it is anticipated will modify the process of weaving, has been invented by a young weaver named Bernard Crossley, of Burnley, Lancashire, England. By means of this little device, which can be attached to existing looms, one weaver can attend to eight looms, and as stoppages are avoided, each loom will produce 12½ per cent more cloth in the same time. The invention is a small device capable of attachment at a comparatively small cost to the present single box looms. There are at present some 850,000 power looms in England, and of this aggregate 600,000 can be fitted with the Crossley invention. Its mechanism is simple; it works at a tremendous speed, and effects the shuttle changes with remarkable rapidity. For example, if a loom is working at the good average rate of 250 picks per minute, this device, without any pause in its action, changes the shuttle in one four hundredth part of a minute—half a revolution of the first shaft. This change is accomplished without any of the faults in the general type of loom. The cloth is woven very evenly; that is to say, there are no thick and thin places in the cloth caused by the insertion of too much or insufficient weft. After the change of shuttle the loom resumes work without leaving any trace of the change having taken place, with the exception, perhaps, of a broken pick. It consequently produces a far superior cloth to that woven upon the present loom. In view of the remarkable merits and advantages of this loom the invention has been acquired by a wealthy syndicate, and it is stated that it will be attached to the looms in several of the leading cotton mills of Lancashire without delay.

THE FASTEST TRIP OF THE "DEUTSCHLAND."

The Hamburg-American steamer "Deutschland," which sailed from the port of New York July 11, arrived at Plymouth July 17, making the trip in 5 days, 11 hours and 5 minutes. It is true that this was not the quickest trip which the "Deutschland" has made between Sandy Hook and Plymouth, but on this trip she ran on the long course. Her best time on a short course of 2,080 knots was 5 days, 7 hours and 31 minutes; but on the trip just completed she made an average run of 23.51 knots an hour, which beats her best previous record of 23.36 knots an hour. Her hourly average of 23.51 knots, if maintained over the short course, would enable her to cross in 5 days and 3 hours. Her greatest day's run on the recent trip was 557 knots, and on this day her average speed was about 24 knots per hour, allowing 23 hours and 10 minutes as the length of a nautical day going east.