### Cost of Track Sixty-five Years Ago.

In an old pamphlet which was discovered recently in the Astor Library, in New York, are some interesting figures with reference to the cost of a piece of track laid by the Baltimore and Ohio in 1830 and 1831. I. L. Sullivan, evidently a civil engineer, in a report to R. L. Colt, estimates that the track laid with wood sleepers, wood bearers, and plate rail, exclusive of ground and graduation, would cost $4,362 per mile; with stone blocks, wood bearers, and plate rail, of which the cost of iron was $1,324, the cost would be $5,115 per mile; with granite sills in line with plate rail, of which the iron was $2,037, the cost would be $6,500 per mile, divided as follows:

| | |
|---|---|
| Sills at $11.50 per 100 | $3,680 |
| Bar iron | 1,300 |
| Broken stone | 640 |
| Various items | 880 |

This engineer speculated on two ton loads and one ton cars, and said in his report that the Baltimore and Ohio would be doing a very rash thing if they went beyond this point. He also says, "The locomotive engine now operating successfully on the Baltimore road, made by Mr. Winans to run on a friction carriage, though of moderate power, has a great useful effect."

### A FOUR SIDED DOVETAIL.

One who examines ornamental woodwork, such as is often seen in old English furniture, finds much to admire in the dexterity with which much of it is done.

Aside from its decorative interest, one may sometimes find in its construction clever little devices, often the invention of the skillful workman, and showing sometimes ingenuity that is very puzzling.

One is frequently surprised to find seemingly impossible things executed in the most simple way, and though these contrivances do not always give strength to the structure, yet are in themselves very interesting bits of decoration.

A most clever device of this sort is the four sided dovetail.

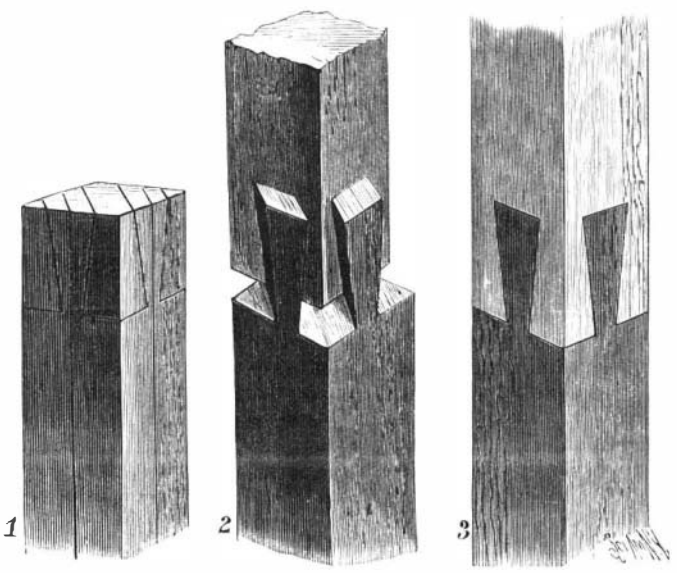
This is apparently two pieces of wood, usually of different colors, and four sided, dovetailed together end to end, thereby showing on each face a dovetail.

To a superficial observer, and probably to many who sought to discover the manner of so joining these pieces, it would prove a puzzle indeed, and almost impossible of accomplishment.

Like many of these peculiar devices in dovetailing, the effect and task is consummated by a very simple wedge problem. In this case the pieces are not pushed together end to end, but slipped into place from the side.

The cuts made in the one are so shaped as to receive exactly the parts of the other, and also so that when joined each side shows a dovetail.

In Fig. 1 we illustrate the method of laying out the work before sawing out the mortise. Fig. 2 shows the method of joining the two sections, and Fig. 3 shows the completed work.




A FOUR SIDED DOVETAIL.

### An Anthropological Expedition.

Mr. Morris K. Jesup, president of the American Museum of Natural History in Central Park, has preparations well advanced for an exploring expedition which he proposes to send out in search of information in the line of anthropology and ethnology. The expedition will be the greatest, it is said, in point of time spent and territory traversed, ever backed by private individuals in this line of research.

America, Asia and Africa will be visited. Such specimens as are collected and such information as is gleaned on the subject of man in his earlier stages will be devoted by Mr. Jesup to the museum of which he is the head. This information, with some details, was given to a correspondent of the New York Times at Albany.

The expedition will be backed by Mr. Jesup from his private resources. Prof. F. W. Putnam, who was in charge of the anthropological division of the World's Fair and for many years a professor at Harvard, will conduct the expedition, and with him will be the anthropologist, Dr. Boas. They will take with them a competent corps of assistants, and will, it is expected, occupy six or seven years in their researches.

They will first visit the northwestern coast of America to the north of British Columbia, and will work up along the entire seaboard of Alaska. Then they will cross the Bering Sea to Asia, and work down the entire coast of Siberia and China, and around through the Indian Ocean to Egypt. Preparations for this long trip, with the incidental incursions to the countries visited, have been under way for some time. Among other things, the consent of the various Asiatic countries to visit them and make investigations of this nature has been secured, in part at least, and that of the others it is expected will be obtained without serious difficulty.

The expenses of the expedition are estimated at about $60,000.

Especial attention is to be given to acquiring information on the subject of man's first appearance on this continent, and all that can be learned on the subject of the earliest visitors from Asia, with their characteristics before they came and after their arrival, as well as the route by which they came, will be carefully collected.

Mr. Jesup, it is said, desires to make as complete a collection of anthropological antiquities as is possible, and proposes that time and money shall be devoted to the work with the same patience that characterized his efforts some years ago in collecting the specimens of American woods, which now form such a valuable exhibit in the museum. In making that collection more than ten years were spent. So confident is he that a collection worth having will be secured that he has consulted with the New York City authorities on the question of space for displaying it.

It is said the expedition will be started out as soon as the necessary arrangements can be made for so long a trip. The New York City authorities, it is said, are heartily in favor of locating such collections as may be made within the museum. Just how many assistants Prof. Putnam will take with him is not determined.

### The Retirement of Prof. Newcomb.

Prof. Simon Newcomb, who retired from the navy and the superintendency of the Nautical Almanac on March 12, leaves a remarkable record of public service, through which he has become one of the foremost savants of the world. In the forty years which have elapsed since he first became connected with the Nautical Almanac office, and especially in the twenty years of his superintendency, he has done more than any other American since Franklin to make American learning respected and accepted in European countries. To-day every astronomer in the world uses Newcomb's determinations of the movements of the planets and the moon; every eclipse is computed according to Newcomb's tables; every nautical almanac is based on the determinations of the Washington office, and the shipping of the civilized world is guided either by the American Nautical Almanac or by ephemerides based on Newcomb's work.

Prof. Newcomb was born in Wallace, Nova Scotia, in 1835. He came to the United States in 1853 and began his career as a teacher in Maryland. He became acquainted with Joseph Henry, of the Smithsonian Institution, and Julius E. Hilgard, superintendent of the United States Geodetic Survey. The latter was so impressed with Mr. Newcomb's aptitude for mathematics that in 1857 he succeeded in getting the young man appointed a computer on the United States Nautical Almanac. Mr. Newcomb entered the Lawrence Scientific School and graduated in 1858, and afterward remained three years as a post-graduate student.

While in Cambridge he found time to plan and execute one of the most ambitious pieces of astronomical work undertaken up to that date. This was the computation of the orbits of the asteroids—that singular group of miniature planets revolving about the sun between Mars and Jupiter. Newcomb's first calculations were made on four of the asteroids in 1859, and attracted much attention when presented at the meeting of the American Association for the Advancement of Science at Springfield, where he exhibited a diagram showing the changes in the orbits during a period of many thousand years. In 1860 he published a general mathematical theory of the subject, applying it to a larger number of these little planets, and this publication at once gave to the young computer an international reputation.

In 1861 he was appointed professor of mathematics in the United States navy, and went to Washington to reside. Here he negotiated for the 26 inch equatorial instrument.

In 1870 he was sent to observe a total eclipse of the sun, visible on the Mediterranean, and established a station at Gibraltar. Unfortunately, the usual observations were prevented by clouds, but the opportunity was utilized in extending certain original studies concerning the minor motions of the moon. Lunar tables showing the recognized motions of the moon were already in existence, notably those constructed by Hansen and published by the British government in 1857; but even before 1870 it was found that the observed positions of the earth's satellite did not correspond with the computed positions, as shown by error in the calculation of the eclipses and in other ways; yet the problem defied the combined skill of the mathematicians and astronomers of the world. With his genius for tasks deemed insurmountable by others, Prof. Newcomb had already set himself to the resolution of the problem, and while abroad he visited the various observatories of Europe, and consulted the earliest records extant. The task was not abandoned until the problem of the motion of the moon was solved and until formulæ were developed for constructing accurate lunar tables. This triumph gained fresh laurels for the young astronomer throughout the world, and brought him official recognition from different nations.

Although the two tasks just noted were everywhere regarded by astronomers as of unprecedented magnitude, they were in reality only steps toward the accomplishment of a much greater task which Newcomb had already set for himself. This herculean labor was the accurate determination of the "elements of the solar system," including the measurement of the dimensions, weights and orbits of the principal planets, the larger asteroids and the more important statellites or planetary moons. This work was carried forward in connection with official duty as opportunity offered.

As early as 1867 he published a final memoir on the secular variations of the orbits of the asteroids; this was followed in 1874 by results of investigations concerning the orbit of the planet Uranus; the final researches into the motions of the moon were published in 1876, and other results of the work were placed before the public at frequent intervals in official reports as well as in unofficial scientific papers. In 1877 he was made superintendent of the Nautical Almanac office, and thus acquired additional facilities for carrying forward the laborious task, which he has now practically completed. The details of the work fill volumes, and are so complex and elaborate as hardly to be summarized.

As might be supposed, Prof. Newcomb's important labors brought him great honor. He is the author of several works on astronomy and other subjects.

### The National Forests.

A law was passed a few years ago empowering the President of the United States to declare portions of the federal territory to be forest reserves. In this way many of our great national reservoirs, the sources of our rivers, were protected.

Over eighteen millions of acres of forests or river sources of land were declared reserved by President Harrison, and on Washington's Birthday, 1897, President Cleveland approved the report of the committee which has been studying the matter. By his action twenty-one millions of acres of forest reserves are preserved. The combined area of these two reserves is as great as the States of Maine, Massachusetts, New Hampshire, Vermont, and Rhode Island.

The location of the boundaries of these forest lands has been carefully studied by a commission appointed by the National Academy of Sciences, who have aimed to include as much as possible of the great bodies of timber and unclaimed land. Wherever it was possible to secure the continued existence of forests on high mountain slopes, they did not fail to do so. The committee was composed of Prof. Charles S. Sargent, who was president of the committee, Prof. Brewer, Prof. Agassiz, Gen. Abbott, Mr. Pinchot, and Dr. Hague.

The new reserves include all the central portion of the Black Hills of South Dakota, the Big Horn Mountain range in Wyoming, the basin of Jackson Lake, and the Teton Mountains south of the Yellowstone National Park in Wyoming, all the Rocky Mountains of northern Montana, an important forest in northern Idaho, the principal part of the Bitter Root Mountain region in Montana and Idaho, the Cascade Mountains of northern and southern Washington, the Olympic Mountain region in western Washington, the Sierra summits in California north of the Yosemite National Park, the San Jacinto Mountains in southern California, and the Uintah Mountains in northern Utah.

A CORPORATION to be known as the Southern California Power Company has been organized with a capital stock of $1,000,000. The purpose of the company is to develop power from the Santa Ana River by taking the water out at the junction of Bear Creek and Santa Ana River, carrying it in a cement ditch and tunnels about four miles, thus securing a fall of 1,000 to 1,100 feet, and then running the water again into the stream. The power will be transmitted by a pole line seventy-five miles to Los Angeles, there to be used to supplant steam power. It is said that it will be the longest line and the highest voltage (30,000 volts) in use in the world.