sumed in the factories where made. The estimated production indicates an increase of 6½ per cent. in the three common grades, but more than 100 per cent. in the strongest grades.

The estimate of Portland cement output in 1915 indicates shipments from the mills of 86,524,500 barrels, an increase of one tenth of one per cent. over 1914. There was a slight decrease in production and this, with the appreciable decrease in stock, indicates a more conservative trend in the industry, which in the preceding few years showed a tendency to overproduction. Prices generally averaged a few cents lower per barrel in 1915 than in 1914, although toward the end of the year prices were substantially increased, and the outlook for 1916 is brighter than for several seasons.

Perhaps the most notable item in the year's record is the stimulation of metal mining in the western states. Almost without exception the increases in production were large and in several states 1915 was the best year on record. In Arizona, which leads in copper, the output of that metal exceeded the previous record production of 1913. California continues to lead in gold and had the largest yield in thirty-two years, and with one exception in half a century. In Montana and Arizona record outputs of silver are reported and in Alaska the increased production of gold and especially copper made 1915 a much more prosperous year than even 1906 when Fairbanks and Nome were yielding their greatest returns of gold from bonanza placers.

MEDALISTS OF THE ROYAL SOCIETY

AT the anniversary meeting of the Royal Society on November 30, the president, Sir William Crookes, characterized the work of those on whom the medals of the society had been conferred as follows:

The Copley medal has been conferred upon Professor Ivan Petrovitch Pavlov, one of our most distinguished foreign members, whose researches in physiology have led to the acquisition of valuable knowledge. By a most ingeniously worked-out and original method of making fistulæ or openings to the exterior, Professor Pavlov has successfully studied the interrelation of the functions of the alimentary canal. His experiments have shown how the presence of food in one cavity controls the secretion of digestive juices into the next, and he has made many discoveries concerning the conditions which influence the secretory process, while his method has facilitated the study of the chemical changes which occur in the food as it passes through the canal. Moreover, by the method which he calls that of conditioned reflexes, Professor Pavlov has studied, from a physiological point of view, the influence of the higher brain centers upon the secretion of saliva. He has also investigated the mechanism of the muscle by which bivalves open and close their shells, and the nervous control of the heart, especially through the sympathetic nerves. His resourcefulness and skill have enabled him to make important contributions to physiological science, and his work, the true worth of which has, perhaps, not yet been rightly prized, deserves the fullest recognition.

The Royal medal given annually for physical investigations has been awarded to Sir Joseph Larmor, whose work in mathematics and physics includes a very wide range of subjects—geometry, dynamics, optics, electricity, the kinetic theory of gases, the theory of radiation and dynamical astronomy—upon all of which he has published illuminating memoirs. Possibly his chief claim to distinction is the establishment of the theory that radiant energy and intramolecular forces are due to the movements of minute electric charges. This theory is fully worked out in his treatise, "Æther and Matter." For a long time Sir Joseph Larmor acted as secretary to the Royal Society, performing the duties of the office with great success, at the same time continuing with unabated vigor original research. The offer of the Royal medal is a mark of the society's appreciation and admiration of his invaluable services to science.

The other Royal medal, for work in the biological sciences, is this year conferred upon Dr. William Halse Rivers Rivers, whose work in ethnology has contributed largely to the establishment of the subject upon a scientific basis. He was the first to use the genealogical method in ethnological investigations. His remarkable originality, combined with sound judgment, have enabled him to produce work which will rank with the best that has been done in ethnology.

All chemists will agree that the award of the Davy medal to Professor Paul Sabatier is fully justified. His lengthy researches on the use of finely divided metals as catalysts are universally known. The hydrogenation of unsaturated or-

ganic compounds, especially by means of nickel, has been thoroughly elucidated by Professor Sabatier and his coworker, the Abbé Senderens. The industrial application of the process to the unsaturated acids of the oleic series has already acquired considerable industrial importance. It gives me great pleasure to announce the award, so well earned by Professor Sabatier.

The Hughes medal is awarded to Professor Paul Lanvegin, who has made valuable contributions to electrical science, both on the theoretical and experimental sides. He has found by experiment the rate of recombination and the mobility of ions produced by different processes in gases at various pressures, and he has made an exhaustive study of the theoretical aspects of the interdiffusion of gases and the mobility of ions.

MEMORIAL TO JOHN WESLEY POWELL

The Department of the Interior has completed, on the rim of the Grand Canyon, in Arizona, a memorial to Major John Wesley Powell, the pioneer and distinguished man of science who first explored the Grand Canyon. The memorial is an altar decorated in Indian imagery and supporting a bronze tablet, resting upon a pyramidal base of rough-hewn stone. Fifteen steps lead from the west up to the altar floor, from which one may gaze into the very heart of the glowing mile-deep canyon. It is a structure worthy alike of the rugged, forceful personality of the man and of the titanic chasm which it overlooks.

The spot chosen for the memorial is Sentinel Point, a promontory south of the railway station, which commands a particularly fine view of the Granite Gorge and of the river, whose unknown terrors of whirlpool and cataract the Powell party braved in small open boats. The structure, which is built of weathered limestone from the neighborhood, has a rectangular base 21 by 28 feet. The altar carries on its east side a medallion portrait of Major Powell in bronze bas-relief by Leila Usher and the following inscription:

> Erected by the congress of the United States to Maj. John Wesley Powell, first explorer of the Grand Canyon, who descended the river with his party in rowboats, traversing the gorge beneath this point August 17, 1869, and again September 1, 1872.

The general effect is unobtrusive, natural and appropriate. A few small, gnarled trees grow close by, but do not obstruct the view. The structure stands back from the edge sufficiently to permit visitors in considerable numbers to group themselves in front.

The memorial was planned at the International Geological Congress of 1904 in recognition of Major Powell's distinguished services as director of the United States Geological Survey. In March, 1909, Congress appropriated $5,000 for the purpose, "in recognition of his distinguished public service as a soldier, explorer and administrator of government scientific work." Dr. H. W. Holmes chose the site.

The original plan was to make the memorial a Roman chair facing the canyon. Last spring Secretary Lane substituted an altar for the chair, and Mark Daniels, then general superintendent and landscape engineer of National Parks, designed the structure as it stands to-day.

It was then late in July, and Mr. Walter Ward, engineer of the Reclamation Service, had a difficult task before him to find and hew the rock and build the structure within the slender appropriation.

This memorial, so expressive of the spirit and character of the man whose life work it celebrates, and so admirably located, will be formally dedicated early next summer. If, as is expected, Congress meantime makes the Grand Canyon a national park (it is a national monument now), the two dedications will take place together, making a celebration altogether notable in the history of national parks.

SCIENTIFIC NOTES AND NEWS

Dr. Charles R. Van Hise, president of the University of Wisconsin and previously professor of geology, has been elected president of the American Association for the Advancement of Science, in succession to Dr. W. W. Campbell. The other officers elected at the Columbus meeting of the association and an account of the proceedings will be found elsewhere in the present issue of Science.