Scientific American.

ESTABLISHED 1845

MUNN & CO., - - - Editors and Proprietors.

PUBLISHED WEEKLY AT

No. 361 BROADWAY, - - NEW YORK.

TERMS TO SUBSCRIBERS

One copy, one year, for the United States, Canada, or Mexico..... $3.00
One copy, one year, to any foreign country, postage prepaid. £0 16s. 5d. 4.00

THE SCIENTIFIC AMERICAN PUBLICATIONS.

Scientific American (Established 1845).....$3.00 a year
Scientific American Supplement (Established 1876) ..... 5.00 "
Scientific American Building Edition (Established 1885). ..... 2.50 "
Scientific American Export Edition (Established 1878)..... 3.00 "

The combined subscription rates and rates to foreign countries will be furnished upon application.

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MUNN & CO., 361 Broadway, corner Franklin Street, New York.

NEW YORK, SATURDAY, OCTOBER 12, 1901.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are *sharp*, the articles *short*, and the facts *authentic*, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

THE LOSS OF THE "VIPER" AND THE "COBRA."

It is an extraordinary coincidence that, out of nearly two thousand torpedo boats and torpedo-boat destroyers belonging to the navies of the world, the only two that were driven by turbine engines should have been wrecked within a few weeks of each other—the "Viper" running upon the rocks, and the "Cobra" foundering in a heavy gale. On the face of it, the coincidence would seem to point to the turbine motors as being directly or indirectly the cause of the disasters; but as far as the facts have been made public, there is no positive evidence that they were even indirectly contributory to the loss of these valuable and phenomenal boats. The "Viper" was wrecked when running at high speed among the sunken rocks of one of the most dangerous stretches of water in the world. The rise and fall of the tide among the Channel Islands, where she was wrecked, amounts to 40 feet, and the tides sweep across the track of vessels steaming from these islands to the English coast at a velocity which in places reaches as high as 7 knots an hour. The list of casualties in these waters is a long one, and where the experienced captains of the regular Channel Island steamers have so often lost their ships, a naval officer less acquainted with the currents might easily be carried from his course and strike one of the many sunken rocks.

The "Cobra" seems to have been wrecked by breaking in two when she was being driven against a gale, and it is possible that the desire to make a record trip on the trial run led to the frail vessel being driven too fast into the head seas, with the result that her back was broken.

In each case the disaster seems to have been due to poor navigation, and the fact that both vessels carried turbine engines proves nothing against the new system of propulsion.

At the same time, the fact remains that for marine purposes the turbine engine is severely handicapped by its inability to go astern; and in the three turbine vessels that have been built, smaller auxiliary turbines are fitted for this purpose. This offsets, to a certain degree, the high efficiency of the turbine installation; yet, so great is the saving of weight that, even with reversing motors on board, the total weight of the motive power is only about 66.5 per cent, for a given horse power, of that required in reciprocating engines.

THE TANDEM COMPOUND LOCOMOTIVE.

Interest in the compound locomotive has been quickened by the success of a new type of locomotive built by the Schenectady Works, in which the pair of high and low pressure cylinders on each side of the locomotive is arranged in tandem, the high-pressure cylinders being placed in front of the low pressures and on the same axial line, a common piston-rod carrying the two pistons. This arrangement involves the use of four cylinders, in which respect the type corresponds to the well-known Vauclain system, which carries the two high-pressure cylinders above the low pressures, the two piston-rods on each side connecting to a common crosshead.

Although the compound locomotive has not met with the favor or made the advance in this country that it has abroad—and particularly in France, where the fastest trains are hauled by four-cylinder compounds, —the best designs of compounds that our shops have turned out have fully justified the claims of fuel and steam economy which are urged in favor of the compound as compared with the simple high-pressure type.

The disposition of our builders to preserve the simplicity which has been one of the excellent features of American locomotives led them to favor, in the earlier compounds, the two-cylinder type, an arrangement which conformed closely to the ordinary two-cylinder simple locomotive. The recent growth in size of locomotives, however, has necessitated increasing the low-pressure cylinder to a diameter which cannot be accommodated by the width of the tunnels and clearance of station platforms. Hence the use of four cylinders has become a structural necessity, to say nothing of the more advantageous distribution of weights.

Assuming four cylinders to be a necessity, the question is one of their location. In England and France, they have been arranged to work on four cranks, two outside and two inside the frames. In this country, with our traditional dislike to inside cranks, we have preferred to place all four cylinders outside the frames. The Vauclain system has proved its good qualities by ten years of service, and the new experimental tandem locomotive, built by the Schenectady firm for trial on the Northern Pacific Railway, has given such satisfactory service during the past twelve months, that an order for twenty-six more has been given, and forty have also been ordered for the Atchison, Topeka & Santa Fé Railway.

SOME OF THE ENGLISH ROYAL TREASURES.

In the forthcoming coronation of King Edward VII. of England there will be a display of royal treasures that has seldom been brought together at a single function in recent years. It is so long since England has had a coronation that not many of the people remember the exact amount of royal treasury stock in the shape of jewels, crowns, and scepters kept on hand. It will be an interesting inventory time for the English nation, and not a few will find out for the first time the magnificent collection of jewels kept securely in the Tower. A good deal of the value of the English regalia is due to the historic associations connected with the various pieces. The crowns and scepters that have been worn by many successive kings naturally have a value in the eyes of the people far above their actual intrinsic worth.

There is quite a difference in actual worth between the early crowns of England's monarchs and those of later date. Probably Queen Victoria's imperial crown was the most expensive ever made. King Alfred's crown, which long ago disappeared, was mentioned in early works as being worth £248 10 shillings. Compare with this Queen Victoria's magnificent crown, so sparkling with brilliants that the crown itself is scarcely visible. There are by actual count 2,783 diamonds in this crown, some of which are large, handsome stones, and others mere chips, but all cut and set to form a complete picture of wonderful brilliancy. In addition to the diamonds there are 277 pearls, 16 sapphires, 11 emeralds, and 4 rubies, besides one large ruby and sapphire of remarkable value. This large ruby is the great spinel ruby which belonged to the Black Prince in 1367, and it has been said to be worth £100,000. The big sapphire is also an historical gem of almost priceless value. It was the one worn in a ring by Edward the Confessor and buried with him at Westminster. These two stones alone make the crown of both historic and intrinsic value far beyond that of any other crown in existence.

This crown is of more recent construction than the other imperial regalia, and it shows its modern workmanship in the setting of the stones. Most of the royal treasures used for the coronation and state occasions were made in 1662. At the time of the Commonwealth all the crowns and royal regalia were destroyed except the golden pitcher used for holding the anointing oil, the golden spoon, and the ancient coronation stone. After the restoration all the ancient articles were remade by Sir Robert Vyner, the royal goldsmith. His work testifies to his skill as a goldsmith, and no jeweler since has been made as famous because of the fact he received the royal commission to restore the destroyed regalia. His ambition was to imitate as closely as possible the ancient relics. For this purpose he studied the old coins and great seals of former kings to get the idea of the orbs, scepters, and crowns. The ancient style of the jeweler's art was to set many of the jewels with enamels on gold open work. This style of work is particularly manifest on the scepters, where enameled and jeweled scrolls are the chief ornaments. The champlevé enamel on the royal bracelets represents good work done in the days of Sir Robert Vyner, but there is also some sign of recent touching up by modern goldsmiths.

Queen Victoria's imperial crown represents the highest skill of modern stone setting, and from the point of view of the diamond cutter it is said to be the perfection of design. It required a good deal of artistic skill to set so many stones in a crown of that size without ruining the effect as a whole. In fact, the setting of the stones is so light and carefully done that one is scarcely aware of the background. The setting is of silver, and the pearls are held with gold wire. The rim of the crown is not a solid metal ground, but the gems are arranged in clusters in open work. The effect is consequently very striking.

St. Edward's crown is the official crown of England, and this shows very different work from Queen Victoria's. The latter was made in 1838 by Rundell & Bridge, and the former in 1662 by Sir Robert Vyner. The official crown is of great size, and almost clumsy looking compared with its mate. The rim is of solid gold, and edged with rows of pearls of considerable size, with here and there clusters of colored jewels surrounded by diamonds and set on enamels of red and white. The effect of so many colors in the rim gives a rather brilliant aspect to the crown, especially in a light. The four crosses patées and fleurs-de-lis which rise from the rim and form an arch toward the center are likewise studded with diamonds and colored jewels set in red and white enamel. In fact, this whole enamel effect is apparent in every part of the crown, and shows to perfection the old method of setting stones. Even the center orb of gold is filled with stones, with enamel effects. From the center orb the cross patée rises upward and is tipped off with a large pearl and with extended arms containing drop-shaped pearls. On the whole the crown is very striking, though somewhat clumsy, and a good representative of the goldsmith's art of nearly three centuries ago.

The orbs and scepters of the royal regalia which are deposited in the Tower and brought out only for coronations, are fully as interesting as the crowns, for though dating no further back than 1662, they possess sufficient historical association to make them of great value to the English people. They are symbolical of times and personages which will forever live in history. There are two orbs in the collection made for monarchs in the past. The first and larger one was made by Sir Robert Vyner for Charles II. and the smaller one for Queen Mary II. The first has consequently always been accepted as the official one by the English people, and every monarch since has been crowned with it. The orb is held in the hand at the coronation, its distinctive meaning being of rather obscure Christian origin, borrowed evidently from the Roman emperors by the early Saxon kings. In the great seals of the early Saxon kings the monarch is represented as holding a simple sphere or orb in his left hand, and in some a cross and a dove surmount the orb. From the earliest time the orb has thus been representative of the sovereign, and all succeeding orbs have been imitated after these early ones. They have varied somewhat in ornamentation since Edward the Confessor's time, but in the main they retain the cross-and-dove effect.

Sir Robert Vyner, under instructions from King Charles II., made the official orb of 1662, which is in use to-day, six inches in diameter, with a fillet around the center surmounted with an arch and edged with pearls. Clusters of colored jewels and diamonds stud the band and the arch, while the red and white enamels inevitably appear. At the top of the arch is a fine amethyst cut in facets one and a half inches high, and on this stands the cross patée, edged with rose-cut diamonds. In each of the four corners of the cross is a large, handsome pearl, while at the foot there is a collar of diamonds.

The smaller orb of Queen Mary is made somewhat after the same pattern, but it is smaller and more delicate, yet ornamented with fully as many jewels and diamonds. The fillet of gold around the center is outlined with large pearls and handsome amethysts, sapphires, and diamonds. The small cross at the top is simply decorated with precious stones. This orb belongs to the royal regalia, and is kept with jealous care in the Tower. Though it is not the official one, it generally figures in every coronation.

There are also two scepters in the royal collection, either one of which is a superb piece of the goldsmith's art. The royal scepter with the cross is two feet and nine inches in length, while Queen Mary's scepter, made for her by King James II., her husband, is two feet and ten inches in length. The latter is of solid gold, and ornamented only with diamonds. The former is of gold, but very elaborately decorated and ornamented with colored jewels. The upper portion is wreathed and twisted, and very handsomely decorated. There are three white and red enameled bands dividing the scepter. The cross rests on an orb of gold, and a large amethyst stands on it, faceted and held in position by jeweled projections. The whole piece is studded thickly with costly gems, and the effect is brilliant in the extreme. This is one of the finest products of Sir Robert Vyner's art. Some parts of this scepter have been remade since the time of Vyner, but the part which represents his work is easily recognized from the later additions.

There are only three articles of the regalia that date back to a period more remote than the restoration. These three articles were in Westminster Abbey at the time the Commonwealth ordered the destruction of the royal treasures, and they escaped. One of these is the ancient coronation stone. The other two are the only royal treasures produced by the goldsmith's art to recall a very great antiquity of workmanship. They are the golden eagle or ampulla, and the coronation spoon. The eagle stands on a pedestal,