three feet long. The largest portion of the Star of Africa, cut from the Cullinan diamond, was inset in the head in 1911. Above is an orb of amethyst surmounted by a diamond and enamelled cross. Sceptres as emblems of kingly power are, of course, of great antiquity.

Rod with the Dove

The Rod with the Dove is the symbol of equity and mercy, the Dove being the emblem of the Holy Ghost. It is part of the 1661 Regalia. The gold staff is decorated with jewelled bands. The Dove, which in medieval times was of gold, is now of white enamel.

St. Edward's Crown

St. Edward's Crown in its original form was his own Crown taken from his grave in 1269. This was ordered by Cromwell to be destroyed with the other Regalia in 1649. The new Crown, much in its present form, was made by Sir Robert Vyner for King Charles II. It has been suggested, however, by Mr. Martin Holmes, that the original crown of St. Edward's was not in fact destroyed, and that it formed the basis of that made by Vyner.

The circlet, or rim, of the Crown, which is of gold, bears alternate crosses and fleurs-de-lis, and from the crosses rise the intersecting arches with, at the top, a globe surmounted by another cross, the whole being richly encrusted with precious stones.

The Crown, after the anointing, and the successive stages of the Investiture, is set upon the Queen's head by the Archbishop of Canterbury.

The Imperial State Crown

The Imperial State Crown was made for Queen Victoria, and has been slightly altered for subsequent coronations. In the front is the famous gem known as the Black Prince's Ruby. On the rim beneath it is another portion of the Cullinan Diamond. The sapphire in the cross surmounting the Orb at the top is traditionally believed to have come from the Confessor's ring; but it has been recut in modern times.

The Imperial State Crown replaces that of St. Edward shortly after the crowning has taken place.

SCIENCE AND THE SOVEREIGN

By Sir ARTHUR MacNALTY, K.C.B.

AT this time of Her Majesty's Coronation, it is appropriate to remember the encouragement which the sovereigns of this realm have given to the progress of science and its teaching.

The Middle Ages were intolerant to science. Roger Bacon, who made discoveries in optics and chemistry, had his books banned and was imprisoned for "suspected novelties"; Bolingbroke, mathematician and astronomer, "the greatest clerk of his age", was hanged and quartered as a wizard.

Then came the great invention of printing which gave to letters and to science the precision and durability of the printed page. Edward IV bestowed his patronage on Caxton, and Richard III during his brief reign encouraged the new invention.

In the reign of Henry VII the light and wisdom of the Italian Renaissance was brought to England by the Oxford "Humanists", Grocyn, Colet and Linacre. Henry VIII, whom Erasmus termed the "scholar king", was a highly accomplished monarch. He wrote excellent Latin, spoke French, Italian and Spanish, was musician, poet, naval architect, a master of ordnance, an amateur of medicine and a good mathematician. He delighted to converse with his learned subjects, appointed astronomers royal, and elevated medicine and surgery in status by founding the College of Physicians on Linacre's advice in 1518, and uniting the barbers and the surgeons as the Barber-Surgeons' Company in 1540, probably at the request of his serjeant-surgeon, Thomas Vicary. He also founded regius professorships of physic at Oxford and Cambridge. He first bestowed the honour of knighthood on two physicians, Sir Thomas Elyot and Sir William Butts. Edward VI knighted his surgeon, Sir John Ayleff. With royal approbation, Edward Wotton (1492–1555), of Padua and Oxford, and physician to Henry VIII, published the first systematic treatise on natural history, and William Turner, Dean of Wells, was the first Englishman to study plants scientifically. His "Herbal" of 1548 marks him as the father of English botany.

Queen Elizabeth I encouraged science. William Gilbert, president of the Royal College of Physicians, who founded the sciences of magnetism and electricity, was her physician and was awarded a pension by the Queen to enable him to conduct his researches, which Francis Bacon quoted in the "Novum Organum" as examples of the method of experiment. John Caius (1510–73), also a president of the Royal College of Physicians, the friend and pupil of Vesalius, was physician successively to Edward VI, Mary and Elizabeth. He wrote a treatise on the sweating sickness, and was a good classical scholar, anatomist and zoologist. Gesner, in a letter to Queen Elizabeth, termed him "the most learned physician of the age". She was a judge of scientific merit, and on her visits to Oxford and Cambridge was accustomed to preside over the disputes in the Physic Act for medical degrees. To James I, Francis Bacon dedicated his philosophy of inductive science which improved instructed thought and commended to the King the regeneration and restoration of the sciences.

The ill-fated Charles I was an enlightened patron of science as well as art and letters. William Harvey was his physician and the King showed the liveliest interest in his researches, being personally present, as Harvey records with pride, at a demonstration of the circulation of the blood and giving him facilities to use the deer in the royal parks for his pioneer work in embryology. King Charles also nominated Harvey as warden of Merton College, Oxford.

One of the greatest royal patrons of science was King Charles II. He founded the Royal Society in 1662, presented it with a silver-gilt mace, and presided at its inaugural banquet and at several meetings of the Society. He studied anatomy and chemistry, and his cousin, Prince Rupert, made several discoveries in chemistry. The King was always interested in new discoveries in the realm of science, as Pepys and John Evelyn tell us. King Charles "had yet skill to discover excellence and virtue to reward it", as is shown by the knighthoods he bestowed on Sir William Petty, the founder of the science of political economy, and the erudite Sir Thomas Browne.

The outstanding discoveries of Isaac Newton were recognized by William III, who appointed him master of the Mint in 1699, and by Queen Anne, who knighted him in 1702. All the four Georges encouraged science. George I is said to have boasted

of his two subjects, pre-eminent in science, Newton in England and Leibniz in Hanover. Sir Hans Sloane, president of the Royal Society and of the Royal College of Physicians, the founder of the British Museum, collector and naturalist, was created a baronet by George I, and George II made him his first physician. George III solved the difficulties of the Corporation of Surgeons by establishing the Royal College of Surgeons by royal charter, discussed the *Philosophical Transactions of the Royal Society* with Dr. Johnson, and bestowed a baronetcy on Sir Humphry Davy. The King incorporated the Royal Society of Edinburgh by royal charter in 1784. Sir Joseph Banks, president of the Royal Society for forty-one years, acted as the King's scientific adviser ; it was he who directed the dispatch of collectors abroad for enrichment of the gardens at Kew. In the establishment of the Royal Botanic Gardens there the Crown has promoted the studies of botany and horticultural science. On Banks's advice, the Linnean Society was given a royal charter in 1802. George IV was liberal to science. In 1825, he founded two gold medals to be awarded annually by the President and Council of the Royal Society for important contributions to science. These medals have been continued by his successors. The King also granted a supplementary charter to the Royal College of Surgeons in 1822, and gave the site at a nominal rent for the new College of Physicians in Pall Mall, opened in 1825. In 1826, largely through the influence of Dean Buckland, the Geological Society was incorporated by royal charter.

It is, however, in the Victorian Age that science reached a position of fame and authority. This progress was achieved through the great discoveries made by Owen, Darwin, Wallace, Huxley, Lister and others ; but the opposition and hostility the claims of science might have aroused were overcome or silenced by the support they received from Queen Victoria and the Prince Consort. Elected chancellor of the University of Cambridge in 1847, Prince Albert established the Natural Sciences Tripos in 1848, which gave a notable impetus to study and research. Aided by Prof. Owen, he urged a similar departure on Oxford which was soon afterwards followed. He initiated the Great Exhibition of 1851, which displayed the wonders of applied science to the public, and the invested profits of which supply grants to students of science to this day. The Prince's influence was available in every movement for promoting the interests of art and science, for developing the education and improving the material welfare of the nation. After his death, Queen Victoria continued his work.

This royal encouragement of science was promoted by the Queen's successors. King Edward VII was especially interested in social welfare, in the prevention of tuberculosis, and in medical research. King George V followed in his footsteps, although his modesty prevented him from accepting the presidency of the British Association, which King Edward VIII, when Prince of Wales, accepted, giving an admirable presidential address at Oxford in 1926. King George VI throughout his heroic reign encouraged science, and one of his last public acts was to open the new laboratories of the Medical Research Council at Mill Hill. Queen Elizabeth II has already shown her interest in science by accepting the fellowship of the Royal Society ; and the Duke of Edinburgh, alike as president of the British Association at Edinburgh in 1951 and by his acceptance of the membership of other learned societies, shows an equal appreciation of the value of scientific work in this atomic age when so many new fields of endeavour open out before it.

That for centuries the natural sciences have received unfailing support from successive rulers of the United Kingdom has helped to smooth the onward path of those "who search out and study the secrets of Nature by way of experiment".

THE ADELIE PENGUIN

By Dr. W. J. L. SLADEN

Falkland Islands Dependencies Scientific Bureau, London, and Edward Grey Institute of Field Ornithology, University of Oxford

THIS summary of the breeding routine of the Adelie penguin (*Pucheramphus adeliæ*) differs in many respects from what has been written before. A full account of the work is in preparation (to appear in the forthcoming series, F.I.D.S. Scientific Reports). The study was made during two breeding seasons at Hope Bay, Graham Land, 1948–49, and Signy Island, South Orkneys, 1950–51, while serving with the Falkland Islands Dependencies Survey. The rookeries at Hope Bay and Signy exceeded 50,000 and 10,000 nests, respectively.

Evidence for the conclusions in this paper have been provided chiefly from marked and dissected birds. Approximately 1,300 Adelies were temporarily marked with paint, 338 banded with aluminium rings, many of which were also painted, and more than 800 dissected. The methods of marking penguins, including a new method using flipper rings, have already been described[1]. The large number of dissections was possible only because our 20–60 sledge-dogs, when at base, had to be fed on seal or penguin meat. Particular care was taken to cause no unnecessary waste of life.

Suggested Age-Groups

Adelies live among the pack-ice during the winter, returning to rookeries on land to breed during October–February. At Signy, in 1950, adults started to return during the first week in October ; but the largest population was not counted until the first week in November (Fig. 1). Eggs were first seen on October 29, and fresh eggs were still being found on November 19, this variation and other differences in breeding efficiency being due, not only to variation among individuals, but also to age and breeding experience. I therefore propose to divide the population at the rookery into the following four provisional groups, hoping that it will be possible to confirm the first three later by studying birds of known age.

'Experienced' or 'Established' Breeders

These are probably four or five years old and more and have had at least one, and probably two, years breeding experience.

Successful breeders. Ten pairs of breeding Adelies were ringed at marked nests at Hope Bay in November 1946 [2]. In 1948–49 twelve returned to the nest-sites where they had been originally ringed, and five of the original pairs were still intact. Two more were found at adjacent nests in November 1947 and again in November 1948. The remaining six were not found. These results suggest that established