States with respect to the adequacy of supplies of different mineral elements through correlated studies of the composition of soils, crops and animals.

(6) To determine methods of adjusting the mineral composition of plants used for animal or human food in various areas of the United States, by the addition of fertilizers carrying the desired elements or by spraying or dusting the plants, or by other means.

(7) To study the efficacy of supplementing

mineral-deficient diets of man or animals by the direct addition of minerals and growth substances to the ration.

As the work of this laboratory has a nation-wide significance and application, co-operation will be arranged with those State experiment stations, bureaux of the Department of Agriculture, and other research agencies which already have special facilities and staff members especially interested in one or other of the many aspects of this research.

SCIENCE AND ART AT THE ROYAL ACADEMY

By DR. A. T. HOPWOOD

BRITISH MUSEUM (NATURAL HISTORY)

THE canons of art differ greatly in detail from those of science, but since intellectual honesty is the basis of both, there is no fundamental distinction between them. To make an orderly statement of accurately observed facts and from those facts to draw logical conclusions is the very essence of science; but the best art is also logical and orderly, as well as being an accurate interpretation of the impression made by the outside world upon the mind of the artist. Observe the words "interpretation" and "impression"; they are important because they lie at the very root of the matter; whereas science is, or should be, strictly objective, art is intensely subjective. For the rest, the differences are mainly those of design, technique, and of the medium of expression. Is it always recognized that there is as much skill in design shown by the well-written and well-balanced scientific paper as there is in a first-class painting, and that when J. M. W. Turner removed a castle bodily from one bank of the river to the other, because in this way he improved the design on his canvas, he was doing no more and no less than the man of science who puts one section of his paper in front of another so as to improve the balance of the whole? In so far as the man of science recognizes these differences and leaves his prejudices, which are many, outside, so his bewilderment will decrease and his interest and enjoyment increase. In this year's Exhibition at the Royal Academy much is provided to enjoy, and very little to bewilder.

The botanist is always well catered for; this time he is more fortunate than usual. Apart from the landscapes there is a very large number of flower pieces, which range from W. Rankin's big pictures in the Dutch style, highly finished and accurately drawn, to sketchy impressions incapable of recognition without recourse to the catalogue. "The Change", by Heda Armour, is presumably

allegorical and so should be immune from the scientific Philistine, who contents himself with wondering when winter aconite, snowdrops, flag irises and the cuckoo all came together in the same place at the same time. The botanist, too, is this year favoured by the only obvious jest, "The Champion", by J. W. Tucker. This is a monstrous cauliflower to the grower of which homage is being paid by the mayor and corporation with the press and news-reel men in attendance. Mr. Tucker has chosen tempera as his medium and achieved his end, but painting in tempera as practised at the present day does not seem to be suitable for the successful interpretation of flowers, fruit and vegetables. Be the subject what it may, vegetable marrows, carrots, apples, or even the trunks of beech trees, the impression is always of carefully finished plaster models. Incidentally, there is no well-painted fruit this year because of the shortage; memories have played their owners false and the result is lacking in juice and texture.

Pictures for the zoologist are not many. Two of them, "The Jungle", by Shearer Armstrong, and "The Pine Marten", by Billie Waters, are purely zoological, although the monkeys in the first-named have been somewhat stylized so that one is left uncertain as to what species are intended. For the rest, there are a few shells, particularly good in Mr. Dinkel's "Flower Piece with Shells", some scrawny cats incidental to other subjects, at least one impossible fish, and various kinds of domestic animals of greater or less merit. Among the water-colours, "Flowing Tide" and "Lapwings in Spring", both by C. F. Tunnicliffe, attract attention, but it is in the Sculpture Rooms that zoological subjects are mainly to be found. The best of these are more or less conventional, as, for example, "Yearling", by Raoh Schorr—a bronze statuette of a fawn somewhat after the style of

Sleeping—and "Lamb" by H. Wilson Parker. The horses are not good; one, at least, has the shoulder muscles at fault, and another drags its off hind leg in a painful manner. Neither of the tortoises is particularly successful. The other pieces are competent rather than inspired.

Geologists and mineralogists have very little to claim as their own particular interest, but they share the magnificent painting of the jewellery in Gerald Kelly's charming portrait of Her Majesty the Queen. Precious stones are notoriously difficult to paint; Mr. Kelly has triumphed with a marked economy of pigment and a brilliant sureness of touch.

The mathematician will interest himself mainly in the laws of perspective and their application, and even though there is no solution in paint of a complicated mathematical problem to compare with Mantegna's famous "Dead Christ" or the pulsating rhythm of Uccello's "Rout of San Romano" for him to admire, he would be well advised to examine carefully "Sir Charles Grant Robertson, C.V.O.", by Meredith Frampton, A.R.A., and "Coupons Required", by Leonora K. Green.

As regards physics and chemistry, what is there which concerns them? In a sense the whole exhibition is their oyster. The chemist has a father's interest in the pigments, in their behaviour in mixture, as well as in their use or misuse, while problems of light and shade are for the physicist, who may perhaps one day see a "Portrait of a Sound", even as there has already been a "Photograph of a Smell" (Royal Photographic Society Exhibition, 1938).

Taken as a whole, the exhibits in the South Rooms are not so good as in former years, but there is a very interesting sheet of pencil studies of old agricultural implements—"Details from a Devon Farm", by Russell Flint, R.A. Not only are the drawings pleasing but they are also of historical interest, for they represent a dying phase of agriculture.

At least one man of science always takes a deep breath before venturing into the Architectural

Room, for he finds the angularity of "Modern" designs uncomfortable and their curves repellent or even obscene. This year he sighed with relief to find that our English genius has once more triumphed over the upstart invader and that the native tradition still flourishes.

Many words and very little sense have been spent in discussions on modern architecture. Some of its features are admirable; such, for example, are the elimination of waste space and the planning of the fire-places so that the flues run up inside the building instead of dissipating their heat through outside walls. White houses in England there always have been, and coloured roofs as well; the change is in the substitution of more permanent materials for whitewash and in the addition of deep blue and green glazed tiles to the traditional unglazed red.

One's quarrel is with none of these things, but with the perverse body which insists on being revolutionary. The fact that steel and concrete can be made to assume certain forms does not mean that it is desirable that it should be made to assume those forms. That light and fresh air are essential to health is no excuse for designing windows so large that the illuminated rooms are impossible to keep warm during cold weather. As for severity of line and beauty of well-proportioned masses, a boot-box can be severe and well proportioned, but what is suitable for a boot-box is not necessarily suitable for a dwelling-house. There are three parties interested in houses: the housewife, who requires ease of working, the householder, who requires comfort as well as value for money paid, and the community, which has the right to demand that a building shall consort amicably with its surroundings. Unless the architect can satisfy all three he has failed. It is much to their credit that the architectural exhibits in the Academy this year make an honest attempt to fulfil these conditions; and even if there are still such curiosities as windows in which the length of the pane is horizontal instead of upright, the vulgarity of the extreme modern school—vulgar just because it is extreme—is nowhere to be seen.

OBITUARIES

Dr. G. W. C. Kaye, O.B.E., F.R.S.

DR. GEORGE WILLIAM CLARKSON KAYE, superintendent of the Physics Department, National Physical Laboratory, passed away on April 16 after a long illness. His name became familiar to students of science thirty years ago as the co-author of "Tables of Physical and Chemical Constants", which have now reached their eighth edition. He was born in 1880 and studied physics at the Imperial

College of Science, then the Royal College of Science, and later at Trinity College, Cambridge. For Cambridge he retained a warm affection throughout his life, and he was at his best when showing a friend round the colleges and the Cavendish Laboratory. For a time he assisted Sir J. J. Thomson in his research work.

Kaye joined the staff of the National Physical Laboratory in 1910, and at first worked in the Metro-