Roach, Essex, and from the oyster-breeding tanks of the Ministry of Agriculture and Fisheries at Conway and Lympstone, Devon. In the sea we have found concentrations varying from 5 to 70 organisms per mm.³; but under tank conditions densities up to 200 mm.³ have been recorded, usually following enrichment of the water. Such high densities are accompanied by high pH and by much increased opacity of the water. The very high concentrations recorded in Loch Sween² must be treated with reserve, if only because of the statement that maximum densities (more than 2,000 per mm.³) were recorded from clear waters of normal pH. Such a combination is in practice impossible. Cultures of a wide variety of flagellates are maintained at this Station, and at densities of 2,000 per mm.³, estimated without concentration, all these cultures are noticeably dense and coloured to the naked eye in small flasks. In the Conway tanks, with a depth of 2 metres, large objects are not visible on the bottom, except as blurs, if the density of nanoplankton organisms exceeds 100 per mm.³.

¹ Cole, H. A., *Min. Agric. and Fish., Fish Invest.*, Ser. II, 15, No. 4, 1 (1937).

² Marshall, S. M., *Proc. Roy. Soc. Edin.*, B (Biology), 63, 21 (1947).

ROYAL PHOTOGRAPHIC SOCIETY ANNUAL EXHIBITION

THE second part of the ninety-fourth annual exhibition of the Royal Photographic Society, which was opened on October 8 and continues until October 26, is devoted to scientific, Nature, record and technical subjects. This part includes about sixty exhibits, from studies of metals by radiography and the electron microscope to photographic illustrations of various medical treatments, together with a number of pathological specimens which probably occupy the greater part of the exhibition.

The electron-microscope examination of certain metal surfaces at magnifications up to 25,000 times provides some very good examples of how many of the difficulties of this technique have been overcome. The classification of two different subjects under the same general title of "Autoradiography" provides the spectator with a moment of doubt as to which is more worthy of the title. The subject-matter of the first deals with the use of radioactive nickel in the preparation of an aluminium-nickel alloy: an autoradiograph was prepared by pressing the surface of the alloy into contact with a photographic plate to give a result showing the nickel-rich regions with much greater clarity than a corresponding radiograph of the same object. The second example consists of a radiograph of a high-voltage rectifier valve using a lead-lined pinhole camera, the film remaining in a light-tight paper sheath. The bombardment of the glass walls of the valve produced enough X-ray radiation to expose the film, which thus revealed the tracks taken by the secondary electrons. The use of X-rays is also shown in the critical examination of stamps, the picture of a used stamp being capable of complete separation from its postmark in certain circumstances. Nuclear fission is represented by a very impressive set of enlargements, one of which shows forty-two separate tracks produced by the collision of a single high-energy calcium nucleus with a silver or bromine nucleus in the emulsion. The greatly reduced distortion claimed for a new design of lens in an air-survey camera is demonstrated by

means of photographs and curves. An example of analysis by Schlieren photography of the air flow and sound waves produced by an aerofoil in a stream of air travelling at about 900 ft. per sec. is also shown.

Under the group of medical exhibits is one of particular interest to microscopists. It illustrates the amount of distortion introduced by the cutting of a section of animal tissue embedded in paraffin wax. The section is compressed by the shearing action of the blade in a direction parallel to its movement, and a pair of sections of the same object cut at right angles to each other together with the original give a comparison of the distortion introduced. Among the remainder of the medical photographs are certain specimens, such as one showing rheumatic endocarditis, which has an almost third-dimensional realism and gives credit to the excellence of the photography, despite the grim nature of the subject. It is almost a relief to the non-medical observer to come across the rather beautiful results that have been achieved by the photography of a group of crystals of sodium biurate. A group of stereo-photomicrographs which comprises a study of the surfaces of paper and lithographic plates reveals a number of features that would be most difficult to visualize if presented as normal photographs.

There are also more than four hundred entries in the section on Nature photography, the majority being of birds and plants. A number were well illustrated by lantern and colour slides in addition to monochrome prints. A Society medal was awarded to Gordon F. Woods in this section for his fine contributions on the life-histories of the *Ailanthus* silk moth, the gipsy moth and the early thorn.

BRITISH WATER-COLOURS AT THE ROYAL ACADEMY

THE exhibition of the J. Leslie Wright collection of British water-colours at the Royal Academy is an event of outstanding importance. Amateurs of this peculiarly English form of art have known for years that Mr. Wright was building up at his home in Warwick a careful selection of paintings and drawings of the best period, and a privileged few have been able to inspect it from time to time. Now Sir Alfred Munnings, president of the Royal Academy, has prevailed upon Mr. Wright to show his collection in London for a month—the exhibition closes on November 6—to the great benefit of all who see it.

Although some are earlier and some are later, the collection, for all practical purposes, illustrates the period between 1750 and 1850. It begins with water-colour drawings, which are primarily drawings tinted with water-colour, and ends with water-colour paintings, in which the colour comes first and the drawing, though no less important, is not emphasized by 'lining in'.

Herein lies the particular interest of the collection; it takes us from the drawings of such masters as Rowlandson to the paintings of Girtin and Turner—to whom, more than any other two men, the change must be credited—but avoids that disastrous later period when it was the fashion so to misuse water-colour that the paintings looked as though they had been executed in oils.

There are fine series of works by Rowlandson, Gainsborough, de Wint, Paul Sandby, Cotman, Girtin and Turner, as well as shorter series by J. R.

Cozens, Bonnington, Francis Wheatley, and many others who, although not so widely known, were none the less masters of their craft.

Some of the pictures have an adventitious interest in addition to their artistic merits. For example, the Sandby gouache described in the catalogue as "Castle with Figures and Horses in the Foreground" is one of a number painted at Windsor, and another version is in the Royal Library there; it represents the Winchester Tower and the Hundred Steps. Incidentally, Sandby used powder colours mixed with isinglass and hastened the drying of his pigments by thinning them with gin, a practice not unknown to later generations.

In much the same sort of way, three of the Gainsborough drawings are interesting because they have been varnished. This was then the common practice when sketches in chalk or charcoal were intended to be used for teaching purposes. It destroyed so much of the texture and charm of the medium that such pictures are rarely seen in public exhibitions.

An artistic point to notice is the astonishing modernity of treatment displayed by many of the paintings. This is particularly well seen in "A View of Cayne Waterfall, near Dolgelly, North Wales" by Girtin. The rendering of the water reminds one so strongly of "A Waterfall" by J. D. Innes that one is tempted to speculate whether the latter could have seen the old master's work at some time. Finally, if anyone should imagine that a full palette is necessary for water-colour painting, let him, or her, ponder long and carefully over two or three of the Turners executed solely with blue, yellow ochre and Venetian red, and, perhaps, a touch of Chinese white. Not all the colours of the rainbow could convey the artist's message more clearly or more vividly.

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CONFERENCE ON FOUNDRY STEEL MELTING

ON September 22 and 23, the Steel Castings Division of the British Iron and Steel Research Association held, at Ashorne Hill, near Leamington Spa, a conference devoted to a consideration of recent scientific developments in melting steel in a manner and of a quality suitable for making into steel castings.

In early historical times, metals were used in the form or shape in which they happen to have been cast; later, metals were cast to the shape desired, so that the founder of metals is bound to look upon the operation of melting metals as subsidiary to the more intricate operation of casting to the desired shape. Although to-day the bulk of steel is made in furnaces of large capacity, and is cast in cast-iron moulds to form ingots of relatively simple geometric shapes which are afterwards mechanically worked into the shape or section required, there remains a very important section of metallurgical industry, the foundry industry, in which the demand for molten metal is determined by the founder and the rate of his supply of suitable moulds in which the metal can be cast. In a few large steel-works in Great Britain, steel is melted and is cast either into ingots or castings in accordance with the needs for either; but this is the exception rather than the rule, and in the majority of steel foundries the demand is for smaller quantities of steel at frequent intervals at a somewhat higher temperature than is required for ingot production.

Thus the general problem of supplying liquid steel for a foundry differs in certain distinct ways from that of supplying bulk steel for ingot manufacture, and it was the object of this conference to discuss these differences with the view of guiding steel founders in the choice of the several types of steel-melting furnaces available to them. In actual fact the conference went much further than this, for not only did it provide a scientific exposition of the essential characteristics of present-day furnaces, but also, having dealt with certain developments being sponsored by the British Iron and Steel Research Association, it went on to indicate likely trends in the future.

The conference was arranged in four sessions held during the two days. The chairman for the first day was Mr. Richard Lamb, well known and highly esteemed in the industry, and chairman also of the Melting Sub-Committee under the guidance of which the conference had been arranged. Mr. Lamb was unable to be present on the second day, so that the chair was then taken over by Mr. H. Everard, a member of the same Sub-Committee and one who has been most active in the promotion of research in the important steel foundry with which he is connected. Fourteen papers were presented, eight of which were from men prominently associated with particular steel foundries and who were thus able to present first-hand practical experience of their own steel-melting furnaces. The other six papers were presented by men who fulfil the role of scientific advisers to the industry, and they included three members of the staff of the Association and three representing auxiliary industries.

The papers were not intended to be complete in themselves, but rather as introductions to the various phases of the subject, and were presented in such a manner as to encourage discussion, and so promote the dissemination of scientific information among those who are in a position to advance the standards of industrial achievement. The Association strongly supports the view that there is a great need for closer liaison between scientific workers and industry, and this is one of the reasons why such conferences as this are sponsored. In harmony with this idea, one of the most stimulating papers presented was by Mr. F. A. Martin, chairman of the British Steel Founders' Association and leader of the first 'productivity team' to visit America, who made a challenging comparison of British and American productivity and the underlying causes for the differences. Naturally there was some criticism of American methods, but it was evident that all present accepted the rebuke that British industry had been slow to apply within itself scientific developments, which in many instances were made by British scientific men. The need for greater industrial enterprise and confidence in its own scientific workers was stressed, as also was the need on the part of men of science to expound their findings in a form of language more easily apprehensible to the community at large.

It was assumed that all existing furnaces of whatever type and throughout the world justify their use in the particular circumstances in which they are employed, or that there is no single type of furnace which has all the merit; and that whether the present distribution of the various types of furnace continues in the future depends upon scientific developments, which it was the object of the conference to study. For this reason the first two sessions commenced with a brief survey of the two principal types of melting