

Research Items

Prehistoric Motives in Modern Chinese Art

MR. CARL SCHUSTER, who is at present engaged in collecting examples of folk design in western China, chiefly in the form of cross-stitch embroidery, points out in *Man* of December that these designs often show a marked divergence from the rest of Chinese art, and are evidence of early foreign influence. The design here under consideration in particular is a wavy line similar to the M or W marks which occur frequently in archaic Greek pottery and in pre-dynastic Egyptian art, where they have been interpreted by Herbert Kuhn as signs for water and, by extension, for fertility. This interpretation has also been applied to the zig-zag which appears in European prehistoric pottery from neolithic to iron age times. The suggestion is supported by their occurrence on vessels which would have been used for storing liquid. A favourite motive in western Chinese embroidery design is a vessel, out of which grows a plant, the Tree of Life. On these pots the zigzag decoration is persistent, but it rarely appears in any other examples of this class of work. The zigzag as a mark on vessels is not confined to embroidery. It also appears on vessels in stone carving, as, for example, on a wayside shrine. It also appears in blue tape on the seat covers of the rickshaws of the city of Ch'ungking in Szech'uan, where it forms an essential part of the design, though this has been much simplified. In the embroidery designs, folk art has sometimes borrowed from the professional. It shows the 'professional' scale pattern on the bottom of the vessel, while the popular zigzag appears on the neck, thus expressing the same idea in two 'languages'. As these embroideries are some eighty years old and are not made by the present generation, no trustworthy account of their meaning can be obtained. Of the alternative origins, independent invention and an unbroken cultural transmission, the latter is thought to be the more probable.

Tumours Transplantable with Viruses

DR. W. E. GYE and Dr. F. Pentimalli each discuss the problem of the transmission of tumours from one animal to another by means of viruses, in papers read at the cancer congress in Brussels last autumn ("Reports of the Second International Congress of Scientific and Social Campaign against Cancer", Brussels, 1936). It is twenty-five years since Peyton Rous discovered fowl tumours which could be transmitted to other fowls with cell-free filtrates. The agent concerned in the transmission of these tumours is particulate and approximately 0.1 micron in diameter. With the growth of the tumour, these particles multiply, but the fact that they never increase outside the cells of the host and that their behaviour in immunological reactions is like that of proteins suggests that they are non-living agents. Peyton Rous has recently experimented with a papilloma of a cotton tail rabbit which can be filtered like other viruses, and this virus injected into an animal bearing a non-malignant papilloma produced by painting with coal tar causes such a papilloma to become rapidly

malignant. Dr. Gye suggests that the carcinogenic tar prepares the tissue so that it gives a malignant reaction to a virus. When the virus of a fowl tumour is injected into mammals, the mammalian serum acquires the power of neutralizing the virus of the tumour, and this anti-tumour serum will inactivate extracts of the original tumour and of other fowl tumours even without complement. If extracts of normal fowl tissue are injected, the mammalian serum will only neutralize the fowl tumour virus in the presence of complement and differs from the anti-tumour serum in that the tumour neutralizing power is absorbed by normal fowl cells. The tumour virus thus seems to have two parts, one probably typical of the fowl and another more specific part possibly derived from nuclear material from the malignant tissue.

Japanese Cœlenterates

IN 1935 (*Mem. College of Science, Kyōto Imperial University*, Series B, 10), Dr. Taku Komai described *Stephanoscyphus*, the scyphostome stage of the primitive peromedusa *Naurithoë* from shallow waters around Seto. He now finds a second form ("On Another Form of *Stephanoscyphus*, found in the Waters of Japan", *ibid.*, 11, No. 3; 1936) of this peculiar cœlenterate, which is probably specifically distinct. This is provided with conical projections on the inner wall at regular intervals, exactly as in the forms previously described by Allman and Schulze from the Mediterranean, and these projections are absent in the specimens from Seto. On this feature and other differences, the author classifies the genus *Stephanoscyphus*, distinguishing four different kinds. In a second paper ("The Nervous System of Some Cœlenterate Types. (1) *Coeloplana*") the same author uses the vital staining method with rongulit white. He finds that in *Coeloplana bocki* the dorsal side contains no nerves except in the marginal zone where nerve cells, probably sensory, are found in abundance. The ventral side shows nervous elements all over, but especially in the marginal region. In the polar plates "nerve-cell-like" bodies occur in the region between the central and marginal areas. Otherwise there is no element resembling nerves in the sense-organ or in the parts surrounding it.

The Sub-Genus *Proto-peridinium*

IN a recent paper (Report of the Biological Survey of Mutsu Bay, 30. Notes on the Protozoan Fauna of Mutsu Bay. III, Sub-genus *Proto-peridinium*: Genus *Peridinium*. *Sci. Rep. Tōhoku Imp. Univ.*, Fourth Series (Biology), Sendai, Japan, 11, No. 1. July 1936), Tohru Hidemiti Abé re-adopts the sub-genus *Proto-peridinium* Gran and Paulson in a somewhat modified form, whilst Dr. Böhm (Bull. 137, Bernice P. Bishop Museum) does not use it at all. Dr. Abé's paper only includes 7 species, 4 of which are new, and none of these is mentioned in Böhm's paper. The subdivision of the genus *Peridinium* is always controversial, and the fact that Dr. Abé has found a close relation between the general features of the ventral area and its plate patterns on one hand, and the type of the

hypotheca other than the ventral area on the other hand, together with some diversities in the type of ventral area and constancy in the structural relations of this area, seems to be a distinct advance in our knowledge of the structure of these forms. Six groups are recognized in the sub-genus, three of which are here considered, the other three being left for a later paper. The details of the ventral area in the species described are beautifully figured, and the paper is an important contribution to the morphology of the genus.

Germinal Layers and the Larva in Amphibia

If a slit be made in the neurula of an Amphibian egg, it is possible by means of glass needles and a hair loop to remove the internal germinal layers, that is entoderm and mesoderm, entirely, or such parts of them as may be selected. O. Mangold (*Naturwiss.*, Nov. 27, 1936) has employed this method to analyse the extent of the co-operation between the germinal layers in the formation of the larva. The removal of the entire entoderm may result in a fairly normal embryo in appearance but lacking gill slits, gill bars, alimentary canal except for the ectodermal proctodæum, most of the blood corpuscles; also the heart is only poorly developed. On cutting the embryo transversely and removing the entoderm from the two halves, the front half develops into a more or less distorted head end often associated with the approximation of the eyes or the establishment of a cyclopic condition. The tail half produces an almost normal tail end including a proctodæum. If the entoderm is extracted whole, the anterior fifth swells to form a vesicle representing the fore gut, but the hinder four fifths remain in a clump not forming liver, pancreas, stomach, etc. Further experiments include the insertion of the entoderm of *Triton taeniatus* into the ecto- and mesoderm of *T. alpestris* in a normal, inverted, or reversed position.

Cordyceps and Isaria Fungi

Cordyceps militaris is one of the spectacular fungi; it forms perithecia upon lepidopterous larvæ. *Isaria farinosa* is also an entomogenous fungus which occurs upon a wide variety of insects, from which it produces small white, floury conidiophores. The mycologist Tulasne considered *I. farinosa* to be the conidial stage of *C. militaris*, and though considerable doubt prevailed, his conclusions were generally accepted. Mr. T. Petch has recently elucidated the problem (*Trans. Brit. Mycol. Soc.*, 20, Parts 3 and 4, Nov. 1936). He has shown that the two fungi are quite distinct. The conidial stage of *C. militaris* is not *Isaria*, but a species of *Cephalosporium*. The perithecial stage of *I. farinosa* is unknown; it has no connexion with *Cordyceps*.

Lilacs

THE term lilac is usually interpreted to mean the European shrub *Syringa vulgaris*. Flowers of this plant are indeed beautiful, but a paper by Mr. H. G. Hillier (*J. Roy. Hort. Soc.*, 61, Part 11; 1936) shows that most of the other twenty-seven species of the genus *Syringa* are no less worthy of attention by gardeners. Lilac species are, with the exceptions of *S. vulgaris* and *S. josikaea*, Asiatic plants, and their advent to horticulture is due to the activities of plant collectors in comparatively recent times.

S. japonica, *S. pekinensis*, *S. reflexa* and *S. pinnatifolia* are specially commended for attention by virtue of the photographs which embellish the paper, but full descriptions of many other species also appear. Practical considerations of propagation and culture, and a comprehensive description of varieties of the common lilac, are also included.

Non-Disjunction and Trisomics in *Oenothera*

AN analysis of the disjunction arrangements in an *Oenothera* having a ring of fourteen chromosomes has been made by Mr. C. E. Ford (*J. Genetics*, 33, No. 2), who found a non-disjunctional arrangement in 46 per cent of the pollen mother cells. In *O. biennis*, with rings of 6 and 8, he found only 17 per cent. In the ring of fourteen, three cytologically distinguishable types of non-disjunction were recognized: (1) double non-disjunction on opposite sides, (2) on the same side, (3) three-in-a-row non-disjunction. Three varieties of type (1) will occur, but all will produce non-viable gametes. Type (3) leads to the formation of type A gametes, having all the chromosomes of one complex plus one from the other complex, and certain classes of them will be viable. In type (2) the disjoining chromosomes may be separated by 1 and 9, 3 and 7 or 5 and 5 chromosomes in the ring, thus forming the B, C and D types of 8-chromosome gametes. There will be 14, 14 and 7 different gametes of these types respectively, thus making a total of 49 possibly viable different 8-chromosome gametes. As non-disjunction occurs in the megaspores while non-disjunctional pollen grains are not functional, and each of the 49 different 8-chromosome megaspores can combine with either complex of the pollen, 98 possibly viable primary trisomic mutants can result. The possible trisomics in species with chromosome rings of different sizes are also determined, as well as the catenations in various interchange trisomics. It is found that the latter should occur in *O. Lamareckiana* about once in 100,000 plants.

Solar Radiation at Calcutta

PROF. P. N. GHOSH, Dr. A. C. Ukil and Mr. M. K. Sen (*J. Ind. Med. Assoc.*, November 1936), in a paper on the extent and intensity of extreme ultra-violet solar radiation at Calcutta, review the literature and describe a photographic photometric method which they devised not only to determine the intensity of the extreme ultra-violet biologically active solar rays but also to ascertain their daily and monthly modifications at Calcutta. The method consists of two operations. The first consists in taking spectrograms of the desired radiation along with that of a standard source, while the second is a measurement of the degree of blackening produced in the different spectral regions by the two sources as well as the estimation of the characteristics of the plate in these regions. The authors' investigations, which are illustrated by tables and charts, show that the ultra-violet intensity of the biologically active region of sunlight at Calcutta is highest during June, though the maximum extension was found in July. It decreased rapidly, however, in May as well as in July. The curves for March, April and May indicated a very weak ultra-violet intensity, while during the period May to September the afternoon intensities were much more pronounced than those of the morning. In the winter months, the reduction in intensity was very marked during the mornings. In conclusion,

the authors emphasize the importance of the estimation of intensity of biologically active rays in the selection of sites for sanatoria in different parts of India and especially in the different hill stations.

Excitation of Phosphors in a Neon Discharge Tube

INTERESTING work on the excitation of zinc sulphide and zinc silicate phosphors by ultra-violet and Schumann radiation is reported by A. Rüttenauer (*Phys. Z.*, **37**, 810; 1936). The phosphors were placed in the neon discharge, the exciting radiation being the ultra-violet region of the discharge (4000–2500 Å.), and the resonance lines of wave-length 736 and 744 Å. By a special arrangement of tubes, it was possible to separate the phosphorescence due to excitation by these two regions. The zinc sulphide phosphors were excited in both regions, but the phosphorescence in the Schumann rays was less intense the higher the current density. Commercial samples of zinc silicate were not excited at all; but it was found possible to prepare specimens which were strongly excited in the Schumann region, but not in the ultra-violet. The phosphorescence radiation converts the usual red colour of the neon discharge into yellow. It seems possible that discharge tubes containing phosphors may find commercial application.

The Micro-Gap Switch

IN a paper read to the Institution of Electrical Engineers on December 17, Prof. W. M. Thornton described the micro-gap switch, which should prove useful in the thermostatic control of the temperature of electrically heated water. The alternating current circuits to be broken are those of the heaters controlling the hot-water or air supply for buildings. To do this, the switch is operated by a bimetallic device which, in the hot-water thermostat, consists of a non-expanding rod contained within an expanding sleeve. The length of the gap is adjusted so that the A.C. current, after passing through its zero value, cannot restrike. On a 250-volt circuit, the opening of the gap is about 0.005 inch. When the contacts separate, the current can have any value from zero to the maximum. Oscillographic records show that at whatever point in the cycle the contacts open, the current stops at the next zero point and does not restrike. If a break greater than the free sparking distance were formed instantly in a non-inductive circuit, there would be no arc, for the contacts would not have time to get hot, no electrons would be emitted, and the arc or break-spark could not form. To keep the contacts cool at break, many devices have been invented. In general these are for large power circuits. For relatively small powers and circuits which are practically non-inductive, the micro-gap switch is available and it is stated to act perfectly.

Physico-Chemical Factors in Cancer

WORKING in Buenos Aires, Dr. A. H. Roffo has obtained tumours in more than seventy per cent of animals exposed to the sun or to the light from mercury vapour lamps. The tumours developed on those parts which are not protected from radiation, such as the ears, eyes, nose and forelegs, but also on other parts of the body if hair were artificially removed. The radiation produced an increase in cholesterol content of the skin, and cholesterol in the presence of ultra-violet light becomes photo-active, possibly

by being changed to a hydrocarbon and emitting photo-electrons. The production of cancer by solar radiation may therefore be due to a physical radiation or to a chemical carcinogenic agent produced by the photochemical action of such radiation. The results of this work are discussed in a paper in the "Reports of the Second International Congress of the Campaign against Cancer" (Brussels 1936). The photoluminescence and fluorescence of cholesterol and the relation of other physical conditions to cancer is discussed in the same volume by Vles and de Coulon.

Mandelic Acid in Urinary Infections

THE treatment of the troublesome *Bacillus coli* infections of the urinary tract has advanced during the last two years by the introduction of mandelic acid. Several preparations of this acid can now be obtained for treatment (see NATURE, **138**, 649; 1936), one of the latest introductions being the "Collosol Brand Phospho-Mandelate" of the Crookes Laboratories, Park Royal, London, N.W.10. An essential condition for successful treatment with this drug is an acid condition of the urine, which at first was obtained by the simultaneous administration of ammonium chloride, the taste of which is, however, objectionable, and this is replaced in the Crookes Laboratories preparation by ammonium phosphate, which is not unpleasant as well as being more efficient for the purpose than ammonium chloride. On the first day of treatment, four doses of ammonium phosphate only (contained in a blue envelope in the package) dissolved in water are given to establish a proper acidity, and on subsequent days four doses of ammonium phosphate and of mandelic acid (contained in a white envelope) are similarly given in water. Test-papers are also supplied, by means of which the proper acidity of the urine may be determined. Six days' treatment will frequently clear up an obstinate and long-standing infection, provided this is caused by the *Bacillus coli*.

Photo-electric Photometry of Stars

MENTION was made in NATURE (**133**, 801; 1934) of a new photo-electric photometer constructed by J. S. Hall for obtaining infra-red magnitudes of stars. Dr. Hall has recently used another photometer of similar type in conjunction with the 24-in. refractor at Swarthmore College (*Astrophys. J.*, **84**, 369). Infra-red magnitudes of 281 K-type stars were obtained from comparisons of the effective stellar energy at 8300 Å. with that of a controlled incandescent lamp, the zero point being determined from similar observations of 40 stars. These infra-red magnitudes were compared with Hertzsprung's photographic magnitudes to form one measure of the colour magnitude for each star, which was then combined with published values of colour from Sproul and Berlin-Babelsberg to give a mean value of colour. A mean of three accurate spectral classifications (Harvard, Mount Wilson and Victoria) was used as the adopted spectral type for determining the colour excess. A discussion of the results shows that the correlation between colour excess and absolute magnitude suggested in the previous paper is confirmed for giant stars of types K1-M0 and possibly for the G4-K0 types, though it is much weaker for the latter stars. As a method of determining absolute magnitudes of giant K-type stars it is simpler than the spectroscopic method, though probably not so accurate.