tracking radar to track 'angels', on occasion of a widespread display, small flocks of birds have been detected in the field of a telescope fixed to the moving aerial. It was clear that the radar was following their flight, often through considerable changes in azimuth and elevation, and that each individual 'angel' was in this case the composite echo from one flock of 5–30 small birds.

It is hoped to publish more details of this work elsewhere, and to show that other aspects of the occurrence of 'angels', such as their seasonal distribution, and spread in altitude, also point to the conclusion that all widespread displays of 'angels' on centimetric radars in southern England are caused by birds. We can see no reason to invoke any other mechanism to explain them.

The permission of the Director-General of the Meteorological Office to publish this communication is gratefully acknowledged.

[1] Lack, D., and Varley, G. C., *Nature*, **156**, 446 (1945).
[2] Plank, V. G., Geophys. Res. Pap. No. 52, Air Force Cambridge Research Center, Bedford, Mass. (1956).
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[5] Lack, D., *Brit. Birds*, **50**, 10 (1957).
[6] Lack, D., and Lack, E., *Brit. Birds*, **42**, 320 (1949).
[7] Meinertzhagen, R., *Ibis*, **97**, 81 (1955).

MOVING VISUAL IMAGES PRODUCED BY REGULAR STATIONARY PATTERNS

By Dr. D. M. MacKAY
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REGULAR patterns have a peculiar status from the point of view of information theory as being rich in 'redundant' information. Redundancy, despite the pejorative flavour of the word, is not always an undesirable property. In particular, it enables an information system in principle to transmit a message in the face of disturbances or 'noise' which would destroy a less-redundant transmission. To profit from redundancy in this respect, one must in effect reduce the number of degrees of freedom of the signalling system, thus increasing the informational efficiency, by 'recoding'.

These considerations suggest that in investigations of the visual information-system it might be specially interesting to observe the effects of highly redundant information patterns, since the nervous system might conceivably have its own ways of profiting from such redundancy.

As a first step in this direction, some simple stimulus figures have been constructed which fill an appreciable area of the visual field with highly redundant information. Some of these (for example, patterns of parallel lines) are already well known for their disturbing visual effects[1,2], particularly those due to eye-movements.

The main purpose of this communication, however, is to give a preliminary account of some particularly striking after-effects of such regular patterned stimulation, which seem to offer a promising new line of research into visual organization. One of the most interesting patterns so far constructed consists of 120 black radial stripes of width $1\frac{1}{2}$ degrees (Fig. 1), on sheets of matt white photographic paper, 30 cm. × 40 cm., viewed at 1 metre in daylight or normal room lighting. (Neither distance nor illumination is critical.) After an exposure of, say, 10 sec. this 'ray' pattern produces for a few seconds an immediate after-impression of wavy lines moving in circular orbits at right angles to the stimulus lines. It is proposed to call this the 'complementary pattern'. For most observers its initial direction of rotation appears to be constant. Out of a series of 110 subjects, 83 reported it as clockwise, 27 anti-clockwise. A few in each group saw the direction reverse spontaneously. 7 out of 83 of the 'clockwise' group and 5 out of 27 of the 'anti-clockwise' group were left-handed. There is thus no simple correlation with handedness, though the evidence suggests that left–right dominance may be one relevant factor. The direction may be induced to reverse by fixating a point to left or right of the centre of the stimulus pattern.

If part of the stimulus pattern is covered (for example, by a sheet of paper obscuring one half) during inspection, the corresponding portion of the complementary pattern is missing, but the portion which is visible is unchanged.

A second pattern made up of concentric black circles on a white background (Fig. 2) was designed as a dual of the 'ray' pattern. As might be expected, this 'target' pattern gives a complementary pattern dual to the first, rather like the petals of a chrysanthemum. Wavy lines stream radially from or to the centre, but the image does not normally appear to rotate. Here again it has been found unnecessary that the stimulus pattern should be complete, a

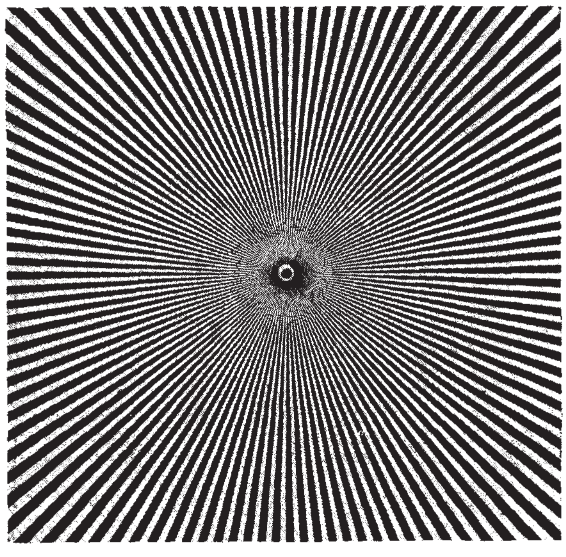

Fig. 1

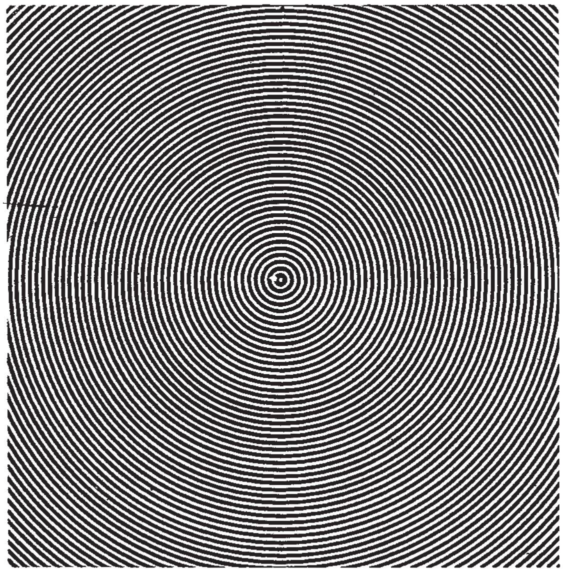

Fig. 2

portion of the stimulus figure giving rise to a corresponding portion of the 'chrysanthemum' image.

These effects are more striking after binocular than after monocular stimulation. During prolonged monocular stimulation the complementary image may often be seen in apparent rivalry with the stimulus pattern, subjectively rather as if it were being presented to the occluded eye on a black background. This suggests that the activity it represents is not an 'off-response' but some kind of co-operative oscillation induced in the visual network by the regularity of the stimulus. This view is strengthened by four further facts : (*a*) Small blank areas introduced into such stimulus patterns appear under suitable conditions to be traversed continually by rapidly moving shadows. The phenomenon is well seen in patterns of parallel black bars arranged in columns side by side (Fig. 3), where the vertical channels between the columns of bars appear to show what most observers call a 'trickling' motion, as if water were running rapidly up or down each channel. (It was a chance observation of this on slotted B.B.C. studio wall-board in 1955 which first led me to experiment with patterns of parallel lines, and I am indebted to Mr. C. L. S. Gilford, of the Corporation, for assistance in making measurements on the original material.) The effect is more marked if the bars have square-cut ends than if they are rounded off. The complementary after-image of a parallel-bar pattern of this kind consists of wavy lines moving perpendicular to the bars, that is, in the direction of the channels between the columns of bars. It seems most likely, therefore, that the same activity is responsible for the 'trickling' seen during exposure of the pattern. (*b*) A randomly printed pattern of dots, viewed through a transparency of Figs. 1 or 2, takes on a static structure similar to that of the complementary image. Relative motion of the two patterns causes an interesting 'shearing' of this structure which is being investigated. (*c*) A spatio-temporally random pattern of visual 'noise' on a cathode-ray tube screen, viewed through such transparencies, evokes a vivid and continuous impression of the complementary image in motion. This discovery offers a simple technique for the future study of these images. (*d*) In stroboscopic light at rates of a few flashes per second, somewhat simplified complementary patterns of the same family may be observed superimposed on the stimulus pattern, usually outlined in a blue or green colour of remarkably high saturation.

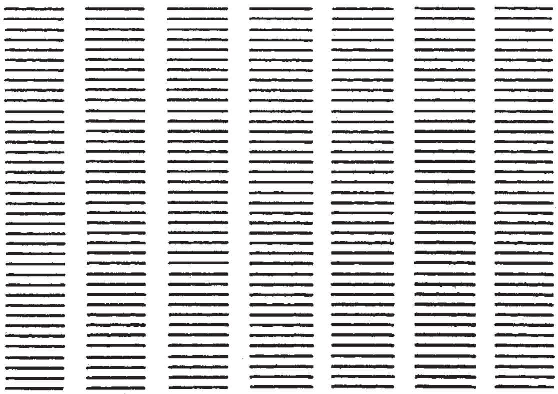

Fig. 3

The theoretical implications of these results are as yet far from clear, but it is suggested that there may be a significant connexion between the new phenomena and the well-known static figural distortions produced by similar patterns. In both cases, the universal rule is that the system tends to favour the direction at right angles to the regular contours, suggesting a theoretical model of form-perception in which directions at right angles are treated by the system as competitive. These phenomena could then be considered as evidence of what might be called 'directional satiation' in the appropriate network, together with co-operative oscillation (a kind of generalized standing-wave pattern) in response to the informational redundancy.

It will obviously be of great interest to localize these complementary responses. The evidence from monocular stimulation mentioned above suggests (though far from conclusively) that they are less likely to be of retinal than of central origin. On the other hand, it has been found that if Fig. 2 is presented to a subject satiated for rotation by viewing a turntable, the well-known rotational after-effect is superimposed on the 'chrysanthemum' after-image, which now appears to rotate in the opposite direction to the turntable. In preliminary experiments with a subject suffering from damage to the brain (to be reported elsewhere) a lesion due to a cerebral embolism, resulting in a wedge-defect in one quadrant, was found to suppress the complementary after-image of Fig. 1 over the whole of the damaged half-field, whereas that of Fig. 2 (the 'chrysanthemum') was suppressed only in the area of the scotoma, which became observable to the subject as a blank patch on the complementary image. After rotation satiation, the 'chrysanthemum' was reported to rotate past the blank patch. It seems, then, that the source of the oscillatory after-images lies on the retinal side of whatever system is modified by viewing the turntable. It is hoped that further experiments with subjects with brain damage may help with the problem of localization.

The assistance of Mr. W. R. Pritchard in constructing Figs. 1 and 2 is gratefully acknowledged.

[1] Luckiesh and Moss, *Amer. J. Psychol.*, **45**, 137 (1933).
[2] Erb and Dallenbach, *Amer. J. Psychol.*, **52**, 227 (1939).

first yellow–blue test except a small deviation to yellow, although she was more than fifty years of age; but on her second test she had an enlarged matching range and a very slight blue deviation.

The two men passed the Ishihara test, the younger making only one error. The elder made only four errors. He claimed to smoke seventy cigarettes a day. The woman, although she was less defective than the men, failed on the Ishihara test, with fifteen errors in twenty-four plates.

R. W. PICKFORD

Psychology Dept.,
The University,
Glasgow. Nov. 7.

[1] *Nature*, **168**, 954 (1951).
[2] *Brit. J. Physiol. Optics*, **14**, 2 (1957).

Moving Visual Images produced by Regular Stationary Patterns

IT would seem that some of the intriguing visual phenomena discussed by Dr. MacKay[1] may be due, not to cerebral or retinal factors only, but at least in part to preretinal factors, namely, fluctuations of accommodation combined with lack of axial symmetry in the optical system of the eye. Helmholtz[2] described how, when looking at a pattern consisting of black and white concentric circles, and thus similar to one of Dr. MacKay's, a complicated system of darker and brighter radial zones is seen. If accommodation, or the distance from the pattern to the eye, is slightly altered, the positions of the brighter zones vary and the observer sees them rotate rapidly to and fro. According to the above explanation the phenomenon is due to actual changes occurring in the image of the pattern formed on the retina. Unless such changes can be ruled out as a factor in Dr. MacKay's more complicated experiments, it does not seem possible to conclude that subjective impressions of movement received while the pattern is looked at, or in after-images, are necessarily caused by the nervous system responding to a truly stationary light distribution in the optical image formed by the eye.

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[1] MacKay, D. M., *Nature*, **180**, 849 (1957).
[2] Helmholtz, H. von, "Physiologische Optik", 1st ed., Part 1 (1856).

WHILE viewing the pattern of concentric circles reproduced in *Nature* of October 26 [1], many readers will have noted rapidly fluctuating sectors and they may have speculated about their cause.

This effect was first described by Helmholtz[2], but although he attributed it to accommodation, he did not give a definitive explanation of why the sectors appear to rotate.

When the young emmetrope focuses on a near test object the amount of accommodation exerted is not constant. The lens is constantly undergoing small ($\pm$ 0·1 dioptre), rapid (2–3 c./s.) fluctuations of power. This has been demonstrated objectively with an infra-red high-speed recording optometer[3] (see Fig. 1). Arnulf *et al.*[4] have shown that these fluctuations are mainly astigmatic, that is, different segments of the circular ciliary muscle probably contract asynchronously. There are, therefore, even in the emmetropic eye, small, variable astigmatic errors that occur in constantly changing meridians. Inspection of Dr. MacKay's Fig. 2 [1] clearly shows rotating sectors. The frequency of occurrence of the effect agrees with the objective measurements shown in Fig. 1 herewith. The reader can readily confirm that the cause of these rapidly rotating sectors is irregular fluctuations of accommodation. The rotation ceases if the eye is focused at infinity. This experiment may easily be done by viewing the pattern at 25 cm. or so through a +4 dioptre lens. Similarly, the rotation stops if the ciliary muscle is paralysed with homatropine eye drops. Naturally, the effect will not be reported by a presbyopic observer who is over the age of fifty-five years. The effect will also cease if the pattern is viewed through a 1-mm. artificial pupil, for the increased depth-of-focus of the eye eliminates the perception of the small variable astigmatic errors[5].

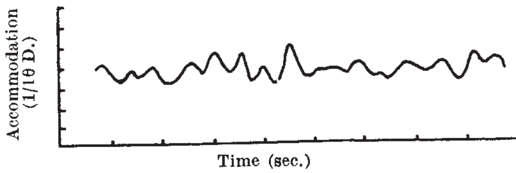

Fig. 1. Variation of power of accommodation measured in the vertical meridian of the eye during steady fixation of a small object (scale in 1/10 dioptre)

F. W. CAMPBELL
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[1] MacKay, D. M., *Nature*, **180**, 849 (1957).
[2] Helmholtz, H. von, "Handbook of Physiological Optics", 1, 192 (Optical Society of America translation) (1924).
[3] Campbell, F. W., *J. Physiol.*, **133**, 31*P* (1956).
[4] Arnulf, A., Dupuy, O., and Flamant, F., *C.R. Acad. Sci., Paris*, **232**, 349, 439 (1951).
[5] Campbell, F. W., *Optica Acta* (in the press).

THE phenomenon mentioned by Dr. Pirenne is one of several side-effects of our patterns which are being separately investigated because they seem to be distinct from the complementary response. Helmholtz's "rotating sectors" are, of course, well known and may be considered as moiré fringes due to the superposition of displaced replicas of the pattern either in the optical image or at a neural level or both. In the 'ray' figure described in my previous communication[1] similarly fleeting 'figure of 8' moiré patterns can be seen as accommodation varies. The simplest way of demonstrating their origin is to cover the stimulus figure with a transparency of itself, when similar fringes appear (Fig. 1), and one can in fact measure the amplitude and direction of the effective retinal image-displacement by observing the displacement required in the transparency to produce the same moiré pattern.

The marked differences observed between these moiré patterns and the complementary images provided the first reason for believing that the latter had a different origin. The evidence[1,2] of interocular transfer, especially in random visual noise, and of the limited relevance of eye movement demonstrated by the persistence of the response with a stabilized retinal image and in stroboscopic light, combine to confirm that the complementary image presents a different and separable problem. Furthermore, following Campbell and Robson's helpful suggestion, I have verified that the complementary image is still seen when the ciliary muscle has been paralysed by homatropine. It can be seen also (by seven out of

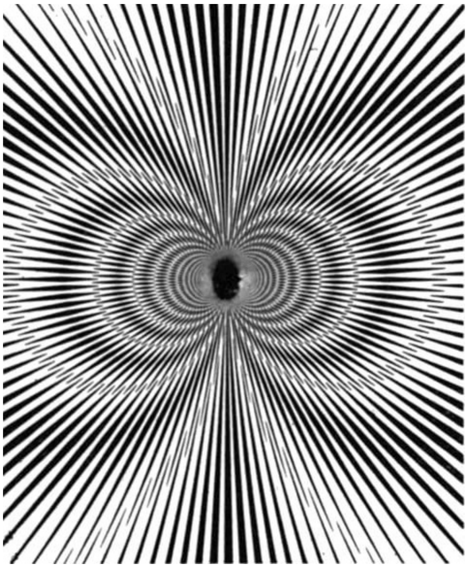

Fig. 1

ten observers to date) in the first few seconds after exposure of the ray-pattern in a single 120-Joule flash lasting less than 1½ msec.

Finally, when the retinal image is deliberately moved in such a way that no moiré figures are generated (for example, by slightly rocking the ray figure about its centre several times per second), the complementary after-image is strengthened (presumably because 'on' and 'off' receptors are stimulated), whereas with other types of artificial motion it is not.

The foregoing evidence would appear to dispose also of a confusion in some early literature[3] between these complementary after-effects and the after-effects of seen movement, caused by the use of striped curtains and the like as moving stimuli. This work, to which my attention has been directed since my earlier communications were published, includes unmistakable reports of complementary images; but writers usually assimilate them to the 'streaming' after-image of movement which they were studying. If one uses a random dot pattern (for example, a photograph of sandpaper) as the moving stimulus, the two effects can be clearly separated.

One interesting side-effect which we are studying is an apparent disturbance of the accommodation reflex by the circular pattern. A hair laid obliquely across its central region may sometimes defy all efforts to bring it into sharp focus, although against a plain background at the same distance it becomes perfectly sharp. It is hoped that experiments in this connexion may yield some clues to the organization of the detector-system which normally enables an out-of-focus image to be corrected.

A fuller account of investigations using these regular stimulus-patterns will be published elsewhere.

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Dec. 11.

[1] MacKay, D. M., *Nature*, **180**, 849 (1957).
[2] MacKay, D. M., *Nature*, **180**, 1145 (1957).
[3] See, for example, Hunter, W. S., *Psych. Rev.*, **22**, 479 (1915).

Coffinite in Cornwall

Coffinite, $U(SiO_4)_{1-x}(OH)_{4x}$, a rare mineral previously reported only from the Colorado Plateau, United States[1], and the Buller Gorge area of South Island, New Zealand[2], has been identified in ore samples from Roskrow United Mine, Ponsanooth, Cornwall.

Here coffinite occurs as a replacement of colloform pitchblende. All stages of replacement occur from incipient alteration along radial fractures and concentric growth bands to complete colloform pseudomorphs measuring up to 5 mm. across.

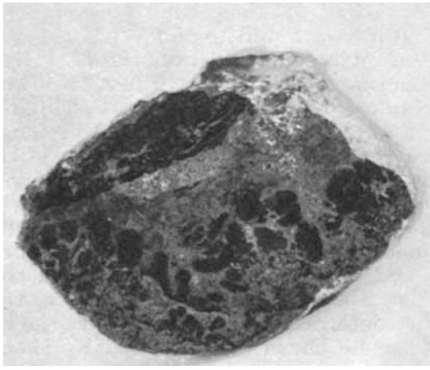

Fig. 1. Colloform aggregates of coffinite (black, lower part of specimen) pseudomorphous after pitchblende. × 0·85

The identification was based on X-ray powder photographs with the strongest lines at 3·49 (v.s.), 4·66 (s.), 2·64 (m.s.) and 1·80 (m.s.) A. A spectrographic analysis showed major uranium and silicon with vanadium and lanthanum among the minor elements.

A full description of the physical properties with a complete chemical analysis will be published elsewhere. The present communication is published by permission of the Director of the Geological Survey.

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R. K. Harrison

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Geological Survey of Great Britain,
Young Street, London, W.8.
Nov. 5.

[1] Stieff, L. R., Stern, T. W., and Sherwood, A. M., *Amer. Min.*, **41**, 675 (1956).
[2] Reed, J. J., and Claridge, G. G., *Nature*, **179**, 546 (1957).

Subjective Probability, Gambling and Intelligence

It is well known that subjective ideas of probability differ from predictions made using statistical laws. This has been shown in temporal predictions by Jarvik[1], Cohen and Hansel[2] and others. It has also been shown by me[3] to be the case for predictions about spatial ordering.

It is also well known that persons in general like to gamble. If they have the choice of a number of different courses of action which, on the average, will yield the same benefit, they will prefer to risk some loss in order to chance some gain, rather than to choose a course which has a certain outcome. This preference has been shown in laboratory studies by Edwards[4].

of the 'compensatory hyperregeneration' of Hemipteran antennæ, are in progress.

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[1] Esaki, T., *Zeitschr. Wiss. Insektenbiol.*, **20**, 1 (1925). Müller, G., *ibid.*, **21**, 51 (1926).
[2] Wolsky, A., *Arbeiten d. Ungar. Biol. Forschgsinst.*, **10**, 139 (1938).
[3] Blakeslee, A. F., *American Naturalist*, **75**, 117 (1941). Blakeslee, A. F., and Avery, A. G., *J. Hered.*, **28**, 393 (1937).
[4] Berger, C. A., *Anat. Rec.*, **67** (Supp. 1), 63 (1936); *Carnegie Inst. Wash. Contr. Embryol.*, **167**, 210 (1938).
[5] Geitler, L., *Naturwiss.*, **26**, 722 (1939); *Chromosoma*, **1**, 1 (1939).

Lamprey Distribution in Streams and Rivers

It has long been known that there is a close relation between gradients of rivers and their living population[1-5]. Many accounts have stressed the way in which these populations (especially fish) tend to move up or down a river, depending on its water-level and rate of flow. I have noticed that lampreys and their larvæ do not seem to do this. Apart from those instances where, during severe drought or drought followed by flooding, ammocoete beds dry out or are washed away, such beds and the ammocoetes in them usually remain where they are whatever the state of the river.

My own observations[6] point to two conclusions. (1) The building up of an ammocoete bed is a function of the gradient of a river and, once made, the bed will withstand severe changes in water-level and flow providing it does not dry out. (2) The ammocoetes themselves, by living in the ammocoete bed, are in fact not in the ecological environment of the main stream but in a micro-environment of their own.

Lampreys, like fish, are very sensitive to increases in the temperature and carbon dioxide content of water. Changes of this sort are less likely to occur in reaches of a river where the gradient exceeds 10 ft. per mile[5,7] and distribution records of the occurrence of lampreys, particularly the brook lamprey (*Lampetra planeri* Bloch), which I have collected over a number of years indicate a broad correlation between distribution of lampreys and gradients of stream of between 10 ft. per mile and 30 ft. per mile. In addition, however, I have found certain regular variations within these limits which require further investigation.

It is the purpose of this communication to seek the help of all those who know of stream or river localities in which lampreys occur, so as to increase the amount of information to a level where it can be analysed statistically.

The information sought is as follows: (1) Any evidence of the existence, or former existence, of lampreys or ammocoetes of any species in a particular stream or river. (2) Identification of the species, if possible. (3) An accurate description, preferably by map reference, of the locality. In Britain, 1-in. Ordnance Survey (and edition) is sufficient. (4) Date on which specimen was observed. (5) Any weather observation made at the time.

I shall be grateful to receive even single records. Such information from any part of the world will be of value as I have access to large-scale maps here in London which will enable me to determine the general geographical features of any locality.

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June 3.

[1] Kofoid, H. C., *Bull. Ill. Lab. Nat. Hist.*, **6**, 95 (1903).
[2] Percival, E., and Whitehead, H., *J. Ecol.*, **17**, 282 (1929).
[3] Nikolski, G. V., *J. Anim. Ecol.*, **2**, 266 (1933).
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[5] Huet, M., *Schweiz. Z. Hydrol. Basel*, **11**, 332 (1949).
[6] Baxter, E. W., Ph.D. thesis, University of London, 1954.
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Occurrence of *Elminius modestus* Darwin in Ireland

The appearance, and subsequent spread, of the Australasian barnacle *Elminius modestus* Darwin in British and north European waters is well known[1]; but, hitherto, it has not been recorded in Ireland.

On September 12, six small specimens of *E. modestus* were found at Tralispean and on September 15, four more were discovered on the east side of the Coosh, near Lough Ine in south-west County Cork[2]. Both are sheltered localities. The specimens were found near low water, and the carino-rostral diameter of the largest specimen was 5 mm.

An immediate study of the general distribution of *E. modestus* in Ireland should establish its point of entry.

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University of Bristol.
Oct. 15.

[1] Bishop, M. W. H., *Nature*, **159**, 501 (1947). Stubbings, H. G., *Nature*, **166**, 277 (1950). Bishop, M. W. H., *Nature*, **173**, 1145 (1954). Crisp, D. J., and Chipperfield, P. N. J., *Nature*, **161**, 64 (1948). Connell, J. H., *Nature*, **175**, 954 (1955). Boschma, H., *Nature*, **161**, 403 (1948). Bishop, M. W. H., *Nature*, **167**, 531 (1951).
[2] Renouf, L. P. W., *J. Ecol.*, **19**, 410 (1931).

Some Further Visual Phenomena associated with Regular Patterned Stimulation

In a recent article[1] I described some striking effects of visual stimulation by regular patterns. The principal feature of these is the appearance of what may be called a 'complementary pattern' the main outlines of which run roughly at right-angles to those of the stimulus-pattern. A 'ray' pattern of radial lines, for example, produces an after-impression of wavy lines moving in concentric circles; a pattern of concentric circles produces an after-image of wavy radial streamers. These complementary patterns may also be evoked continuously in stroboscopic light, or in a background of visual 'noise' (on a television screen) viewed through a transparency of the stimulus pattern.

Since the article was written a number of related effects have been discovered, two of which appear to be of special interest. The first is observed when a source of visual 'noise' is presented after a ten-second viewing of the stimulus pattern in normal light. The spots of light on the screen, which normally suggest an incoherent 'Brownian motion', are for a a few seconds organized into a vigorous scurry of apparent movement roughly along the lines of the complementary pattern. This after-effect shows little transfer (when the stimulus is presented to one eye and the screen is viewed afterwards by the other). It has been found, however, that if one eye views the stimulus pattern and the other simultaneously views the screen, some similar but less-violent motion of the spots on the screen can be seen continuously.

It has been found that this phenomenon, as well as those described earlier, is unaffected when the stimulus presented is stabilized against eye-movement. This has been done by mounting a photographic reduction of the pattern on a stalk 1·5 cm. long attached to a contact lens of + 60 dioptres power. (A similar method of stabilization has been used independently by Prof. R. W. Ditchburn of Reading in another connexion (personal communication).) The stimulus-pattern 'fades' irregularly, as expected, but even when it has faded the other eye can detect the complementary motion in the spots of 'noise' on the screen.

This evidence of limited transfer complicates an already puzzling picture, and suggests that in these phenomena we may be dealing not with a single localized activity but with an activity to be expected in the highly interconnected visual network at several, if not all, levels from retina to cortex.

The second effect to be reported is seen with a stimulus pattern consisting of concentric rings of increasing thickness (Fig. 1). Viewed monocularly in bright light, this evokes a radial complementary image which is seen in apparent rivalry with it. If now the stimulus pattern is moved slightly towards or away from the subject, the complementary image is observed to contract or expand rapidly, providing a strikingly sensitive indication of motion in depth. The apparent inference is that the elements the activity of which generates the complementary image are highly sensitive to the spacing of the stimulus-contours. The exaggerated sensitivity of the complementary image could then have somewhat the same explanation as the great sensitivity of moiré patterns to relative movement. An important observation, however, is that the phenomenon does not require central fixation. The pattern may be freely explored with eye-movements without disruption of the complementary image. Any explanation based only on the central symmetry of the retinal receptor-pattern would thus seem to be ruled out.

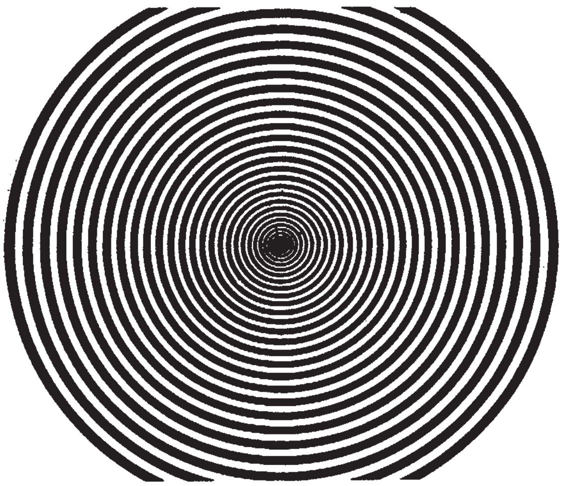

Fig. 1

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Oct. 12.

[1] MacKay, D. M., *Nature*, 180, 849 (1957).

Lord Cherwell

There is little that need be added to the excellent obituary notice of Lord Cherwell in *Nature* of September 21, p. 579, but I should like to comment on the reference to the work in the Clarendon Laboratories in the 'twenties. It is true that the work was diverse, but any one of the problems being studied might have flared up into a whole school of research, which is indeed what many of them have since done.

Griffith was calculating the electrical conductivity due to electrons and ionized molecules in the upper atmosphere, which might very well have led to the work now associated with Appleton's name; Collie was trying to fix Wilson cloud-chamber tracks in gelatine, anticipating Powell's work at Bristol; I was working on the coherence of radiation at different parts of the wave-front, which is now being investigated by Hanbury-Brown and others. One day Lindemann asked me to apply thermodynamical theorems to chemical reactions at extremely high temperatures, beyond anything then known on Earth. The application to stellar constitution and nuclear explosions would have followed.

Lindemann's uncanny foresight revealed to him the importance of the solution of these problems; but, being himself outstandingly adept with his hands, he was apt to suggest experiments which demanded a technique difficult of attainment. In consequence many of the workers became involved in attempts to construct new types of delicate apparatus, and the solution of the main problem was indefinitely delayed.

H. R. Calvert

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Church Hill,
Merstham, Surrey.
Oct. 3.

Museums in Britain

The article in *Nature* of October 19, p. 769, on this subject reported that several museums must close unless financial assistance is rapidly forthcoming. The Government at present considers that financial aid is a local matter. The Royal Institution of South Wales (founded 1835) in Swansea is in a similar position to some of the museums mentioned, but fortunately local industry has come to its support. An industrial section is being formed within this Museum, members of the local University College are co-operating, and funds have been provided by industry to prevent closure.

R. B. Southall
(Chairman)
Hugh O'Neill
(Secretary)

Industrial Museum of South Wales, Ltd.,
The Royal Institution,
Swansea.