# Research Items

## Archæological Excavations at Eastburn, Yorkshire

IN the making of a new aerodrome at Eastburn on the Yorkshire Wolds, near Driffield, skeletons were found which on examination proved to be of iron age type; but no pottery or metal was found with them to determine their age. Later, in the course of constructing a hangar, some fifty iron age graves were exposed. The site and the relics recovered have been described by Mr. Thomas Sheppard (*Hull Museum Publications*, 197; 1938). Each tumulus was very clearly indicated in the white chalk gravel by a circle representing a slight trench on the outside of the mound, and a dark, usually squarish, place in the centre of the circle, three to four feet across, which contained a skeleton or occasionally two skeletons. The bones were so decomposed that in three instances only was it possible to remove sufficient of the skull for examination. No pottery or iron was associated with the burials, excepting a single iron brooch or fibula of the involuted type. This type is considered by Sir Arthur Evans to date from 300 B.C. A fragment of a similar brooch was brought to the excavator. It had a knob of red glass still attached by a metal stem, of which the head is apparently copper. A typical iron age pot larger than those from the Danes graves was also found. A year later further discoveries were made, including a female skeleton in remarkably good condition. Three earthenware vessels were also found, of which one, a small vessel with a slightly curved depression between lip and shoulder, is the only one of its kind found in that condition in East Yorkshire. The largest of the three is an example of coiled technique. This vessel and another each contained the humerus of a pig. Among the iron objects found were a leaf-shaped spearhead and a remarkable iron sword 28 inches in length. Its handle had been mounted with horn and there were traces of a wooden scabbard. On the arm of a female skeleton was a bronze bracelet of great beauty with two decorated bands of cable-like design. Roman and Anglo-Saxon relics also occurred on the site.

## Recent Research on Cancer

THE thirty-sixth annual report of the Imperial Cancer Research Fund, which has just been published, is the first to appear since the Fund moved into new laboratories at Mill Hill. It summarizes the work carried out during the last year on carcinogenesis, the nature of tumour viruses, the action of radiations and of hormones and the properties of tissue cultures. Dr. F. R. Selbie and Dr. C. Foulds have extended knowledge on the carcinogenic action of radioactive substances. They obtained tumours at the site of injection with thorotrast (a colloidal preparation of thorium oxide) in rats, mice and guinea pigs. There would seem to be little doubt that thorotrast should not be used clinically on account of its possible carcinogenic action on man. Dr. W. Cramer and Dr. E. S. Horning investigated the antagonism between œstrone and the hormones of the pituitary acidophil cells. In a preliminary experiment they have been able to inhibit the spontaneous incidence of mammary cancer in mice by treatment with preparations of the pituitary thyrotropic hormone. If fibroblasts and sarcoma cells are grown as tissue cultures in plasma, the sarcoma cells liquefy the clot more rapidly than do the non-malignant cells. Dr. R. J. Ludford has found that some trypanocidal agents such as Trypan Blue and Bayer 205 promote this liquefaction of the clot by cells, but this action is not specifically associated with tumour cells. Mr. H. G. Crabtree, in conjunction with Dr. L. H. Gray of the Mount Vernon Hospital, found that the ability of isolated tumour tissue and isolated retina to produce lactic acid are both equally inhibited by equivalent doses of γ-radiation, β-radiation or X-radiation when applied *in vitro* at low temperature.

## Tubercular Allergy without Infection

F. R. Sabin and A. L. Joyner (*J. Exp. Med.*, 68, 659; 1938) found that guinea pigs could be rendered hypersensitive to tuberculo-protein by small, repeated, intradermal injections of active tuberculo-protein. The process of sensitization could be accelerated by the addition of tuberculo-phosphatide to the protein, so that the reactions became indurated and necrotic and closely simulated tuberculous disease. Injection of active tuberculo-protein induced a new formation of monocytes and some epithelioid cells, and the addition of phosphatide to the protein brought about a massive formation of epithelioid cells. The writers regard the intradermal route as the best for these sensitizations probably because it provided the largest dose per cell of the sensitizing agent. They compare the degree of sensitization artificially obtainable by the synergic action of tuberculo-phosphatide and tuberculo-protein to the degree of sensitization naturally occurring in tuberculous animals.

## Reactions of House-flies to Light of Different Wave-lengths

J. W. MACBAIN CAMERON, of Macdonald College, Montreal, has recently described experiments which were conducted with the object of testing the reactions of house-flies to different wave-lengths of light (*Canadian J. Res.*, 16, 307; 1938). The insects were reared on an artificial medium and tested by means of different wave-lengths of spectral light obtained from a quartz-mercury vapour lamp. The range of the spectrum tested was from 3022 A. to 5780 A. and the lines were made of approximately equal intensity throughout. In addition, 5461 A. and 4078 A. were tested at several other intensities. The comparison standard, which was used in all cases, was white light obtained from a tungsten filament frosted bulb. Flies to be tested were removed from breeding cages ten hours before the tests began and were kept in darkness until used. It was found that the house-fly is much more strongly stimulated by ultra-violet light of wave-length 3656 A. than by any other part of the spectrum tested. The influence decreases as the longer wave-lengths are reached and also on the short wave-length side of the peak. The available spectrum extended as far as 3022 A. into the ultra-violet, and at this point there is still an attractiveness greater than that exercised either by yellow or green.

### Original Home of the Coco-nut

UNDER this title P. V. Mayuranathan, curator of the Botany Department, Government Museum, Madras, has published an interesting discussion of this subject (*J. Bombay Nat. Hist. Soc.*, **11**, (2); September 1938). His paper examines particularly the question of the antiquity of the coco-nut in India, and whilst discussing previous suggestions as to the original home and the subsequent course of distribution of this palm, it pays particular attention to the geological history of the regions under discussion and supplements botanical evidence with that drawn from philological and ethnological sources. So old is the coco-nut in India that the Arabs from early times called it the Indian nut. On the other hand, *Cocos* is an American genus with no other living representative of that genus anywhere except in the continent of America. The author's solution is that it originated in that ancient Papuan land which included the island continent of New Guinea as we know it to-day; from there the strong eastward current during the north-east monsoon carried it through the Straits of Malacca into the Bay of Bengal, and primitive man brought it over to the shores of India. The discovery of fossil *Cocos* in the Pliocene deposits of New Zealand would be in accord with this view.

### Northern Californian Earthquakes during 1937

As is well known, California forms part of that well-established ring of instability, the circum-Pacific circle, and it was in the Californian region that on April 18, 1906, occurred the great earthquake which wrought havoc in San Francisco and caused such remarkable displacements along the San Andreas rift. During 1937 there was no shock so great as this one, but there were approximately 277 earth quakes and earth tremors of varying intensity. Their intensities and distribution have been examined by Perry Byerly and John N. Adkins (*Bull. Seis. Soc. Amer.*, **28**, No. 4, 263–268; Oct. 1938). One hundred and forty earthquakes were sufficiently well recorded at the various stations for their seventy-five epicentres and initial times to be determined, and for these a map has been drawn by the authors. The epicentres form a broad band parallel with the coast-line with, as in 1936, a region comparatively free from epicentres between Humboldt County and San Francisco Bay, a very active region east of Monterey Bay, and very few epicentres along the San Andreas Fault between Monterey Bay and San Francisco. Compared with 1936 there was increased activity in the region east of San Francisco Bay. There appears to have been also a line of epicentres roughly at right angles to the coast, approximately through the towns of Greenfield and Merced. Seventeen earthquakes occurred in known regions the epicentres of which could not be located accurately owing to poverty of data, and the following observatories recorded shocks not felt by persons or recorded at other observatories: Berkeley, 26; Mount Hamilton, 28; Palo Alto, 38; San Francisco, 2; Ferndale, 8; Fresno, 3. Finally, fifteen shocks were recorded at more than one station, not felt by people and insufficiently well recorded for their epicentres to be located.

### Analysis of Mine Dusts

PAPER No. 101, on the analysis of mine dusts, by A. L. Godbert, Safety in Mines Research Board (H.M. Stationery Office, London, S.W.1, 1938. 1*s*. 6*d*.) gives an alternative method of determining the carbon dioxide contents of mine dusts containing carbonates and a method of determining separately the free and combined water in mine dusts containing gypsum. These data are important in relation to the suppressing action on inflammation of coal dusts known to result from carbonates and combined water.

### Density Condensation of Cepheid Variables

ZDENĚK KOPAL has recently published the results of his research on 88 δ Cephei stars and 30 variables of the RR Lyræ type (*Mon. Not. Roy. Astro. Soc.*, **99**, 1; Nov. 1938). He makes use of the well-known period-luminosity and mass-luminosity relations and also assumes that the cepheids radiate like black bodies, from which two tables are compiled showing the following results: $P$, the period of pulsation; $Sp$, the spectral type; $\log T_*/T_\odot$, $T_\odot$ and $T_*$, referring to the temperatures of the sun and star respectively; absolute visual and also absolute bolometric magnitudes; $\log \sqrt{\rho m}$; $\log P\sqrt{\rho m}$, $\rho$ being the density. Although it has been assumed for a considerable time that $P$ has nearly the same value for all cepheids, it is shown in the tables that there is practically no foundation for this assumption. There is a well-defined relation between $P\sqrt{\rho m}$ and the spectrum, and it seems that there is a close connexion between the density condensations of cepheids and their spectral class. This, of course, depends on the hypotheses involved in the present state of the pulsating theory being correct. There is a gap in the values $P\sqrt{\rho m}$ between the long- and short-period cepheids at spectral type $F$ 5, and it is suggested that the sudden change of $P\sqrt{\rho}$ takes place when a certain temperature has been reached so that there is an alteration in the ratio of specific heats. This explanation, however, is ruled out, and a real change of density condensation is believed to take place. This affords good reasons for the assumption that the long- and short-period cepheids are of essentially different structure.

### A Comparison Sequence for Nova Lacertæ

S. A. Mitchell and C. A. Wirtanen have published a paper with this title which will prove useful to variable star observers (*Mon. Not. Roy. Astro. Soc.*, **99**, 1; Nov. 1938). The paper is the outcome of an informal meeting of the leaders of the American, British and French variable star associations during the sessions of the I.A.U. held at Stockholm last year. A request was made that the Leander McCormick Observatory should publish the magnitudes and co-ordinates of sequence stars for long-period variables that have been determined since *McCormick Publications*, **6**, appeared in 1935, and a special request was made for Nova Lacertæ, No. 2. A table gives visual and photo-visual magnitudes for thirty stars with their co-ordinates, and, assuming equal accuracy for each method, the probable error of one magnitude is 0·02 magnitude. Three of the faintest stars of the sequence, magnitudes 14·6, 15·0, 15·3, have no photovisual magnitudes and these have been observed independently by W. H. Steavenson. Mitchell, using the 26-in. refractor, made visual sequences of grade estimates, and it will be shown in the forthcoming variable-star publication that the scale of his visual magnitudes agrees very closely with the international photovisual system to which the values of Nova Lacertæ are reduced.