

without ability. In the case of children selected by competitive examination at the age of 11 plus, only 1.0 per cent have the opportunity for higher education without having the ability to benefit by it.

These figures reveal striking differences between the educational opportunities available for children of equal ability but of parents of different social status; and these differences are inherent in the

present social system. That is to say, they belong to nurture and not to nature. It might be added, in comment, that the validity of these results depends on the extent to which the intelligence test measures the ability of the child to benefit from the higher education of the type provided in secondary schools. This is a matter which some educationists would be prepared to debate.

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## Tell el-Amarna, 1934-5

AN exhibition of finds from Tell el-Amarna, results of the Egypt Exploration Society's expedition during the season 1934-5, opened at the rooms of the Palestine Exploration Fund, 2, Hinde Street, London, W.1, on September 16, and will remain on view until October 12. Further progress has been made in the excavation of the Royal Palace. Its total length has not yet been ascertained, as exploration has not proceeded beyond the modern road, but it is expected that it will fall not far short of a kilometre.

Operations of the season concentrated on the great hall at the south end of the building, the harem quarter, and the state approach, paved with plaster, which runs on the western side of the harem to the 'Broad Hall'. Advantage was also taken of an opportunity to make a record in tracings and photographs of the sculptured reliefs in the Royal Tomb, which lies in a valley about four miles away. This is the burial place of the young Princess Maketaten, one of the daughters of Akhenaten (1387-70 B.C.), religious reformer and builder of Tell el-Amarna. No complete record of these reliefs has been made before, and owing to the fitting of a new doorway, the opportunity will not recur. The drawings from the tracings have not yet been completed; but the series of photographs, which show the representations of intimate scenes of mourning, including a visit of the Royal Family to the temple, forms part of the exhibit of plans and photographs, which illustrate the progress of the excavations and the character and extent of the building.

Although the finds of the season included several of striking interest, the total number of exhibits is not large. This is due to the fact that a large amount of the expedition's time was absorbed by the deep digging necessitated in the area of the approach way to the 'Broad Hall'. Here a large building, called the

'Shining of the Aten', and part of the approach had been demolished early in the reign of Akhenaten. The whole area had then been filled in with sand to a depth of ten feet and levelled to form a parade ground.

In this filling were found many fragments of the sculpture of the original building, which could not be used elsewhere. Hence the sculptures have preserved all their freshness. Among the selection shown are some singularly striking examples of graphic representation, such as, in particular, spirited horses, soldiers and servants bowing, a fine royal head, and two heads with arrogant expression, here labelled 'priests'. The approach way itself has yielded thousands of fragments of the rows of huge granite and quartzite statues with which it was adorned. These were systematically broken up at the time of the destruction of the city after the death of Akhenaten and the overthrow of his reformed religion.

In the harem quarter, with its garden surrounded by a colonnade carved with festoons of birds, one of the most notable finds was the model of a fish in gold plate, which may have formed a part of the decoration of a formal pond, or have been a royal toy. It is shown only by a photograph, the original remaining in Cairo. One of the most interesting portions of the Palace as yet explored is the great hall at the south end of the building. Its vast roof was supported by a forest of brick piers, and it was decorated with faience tiles. Complete examples of these are now shown for the first time. They show naturalistic flower designs with white daisies in faience inlaid. It is hoped that it may be possible to complete the excavation of the Palace in the coming season. This, however, must depend entirely upon the extent to which further financial assistance towards the cost of excavation can be obtained from subscription by the public.

## The Bihar Earthquake of 1934

SOON after the occurrence of this great earthquake on January 15, Dr. J. A. Dunn and three assistants were sent to the areas chiefly affected. A preliminary report on the earthquake by Messrs. J. B. Auden and A. M. N. Ghosh has recently been published (*Rec. India Geol. Surv.*, 68, 177-239; 1935). A brief report has also been written by Mr. N. Nasu (*Bull. Earthq. Res. Inst.*, 13, 417-432; 1935), who

spent seven weeks during the following summer in the central district.

Owing to the occurrence of the earthquake at about 2.13 p.m., the loss of life was much less than might have been expected from the damage to property. Including Nepal, more than 10,000 lives were lost, mainly in the crowded towns of Monghyr, Muzaffarpur and the Nepal valley. The isoseismal of highest



intensity (10, Mercalli scale) covers three tracts. The largest is bounded by an ellipse about 80 miles long from east of Motihari to Madhubani and about 20 miles wide. Two much smaller areas lie near Katmandu and at Monghyr, the total area enclosed within the isoseismal being 1,300 sq. miles. Important destruction to property was confined within an area of 31,000 sq. miles. The shock was felt near Madras, at Dharwar and, according to pilgrims, at Lhasa. At about the same time, a shock was felt in the extreme south-west of India, but this was not directly connected with the Bihar earthquake. The total disturbed area was about 1,900,000 sq. miles.

Surface undulations were seen by a great number of observers. It is difficult at such a time to estimate the dimensions of these waves, but, according to one observer at Muzaffarpur, the distance from crest to crest was about 5 ft. and the height of the waves about 6 in. The maximum acceleration was determined at several places by means of West's formula, the highest figure given being 3,270 mm. per sec. per sec. at Monghyr. The corresponding amount for the Mino-Owari earthquake of 1891 was 4,300 mm. per sec. per sec. The amplitude of the movement was 12 in. at Muzaffarpur and 5·2 in. at Katmandu.

One of the most remarkable features of the earthquake is the wide area over which sand and water were ejected from fissures and vents. Indeed, it is doubtful if the area has been equalled in any other known earthquake, for it amounted to about 18,000 sq. miles within the isoseismal 8. As a rule, the rise of sand and water seems to have taken place after the main shock had subsided, sometimes by as much as several minutes. The greatest height reached by the spurts of water was 6-8 ft. In places, the surface was so completely riddled with sand-vents that small areas might be compared with boiling porridge. The closeness of the vents and the wide area covered by the sand suggest that its origin was at no great depth below the surface. According to Mr. Nasu, the deposit of sand was in most places thin, the depth exceeding one foot within an area of not more than 300 square miles.

The ejection of sand attained its maximum within and near what has been termed the *slump belt*. This is a band within the isoseismal 9, covering about 4,700 sq. miles in Bihar and also including portions of Nepal, in which houses were tilted rather than crumbled and the subsidence of the ground was marked. Two lines were re-levelled by the Survey of India, and it was found that the area of subsidence of one foot or more coincides approximately with the slump belt. It may be a zone in which the alluvium was shaken down by the earthquake to a slightly lower level.

The epicentral area enclosed within the main portion of the isoseismal 10 lies about 50 miles to the south of the main boundary fault. Whatever movement, if any, occurred along this thrust plane below the surface, no signs of displacement were detected at its outcrop. It seems probable, therefore, that the movements responsible for the earthquake originated some distance to the south of the boundary fault and along thrust planes that are now concealed by the Gangetic alluvium. The two detached portions of the isoseismal 10 about Katmandu and Monghyr may be due to displacements relieving subsidiary zones of strains in these two areas.

C. D.

## Science News a Century Ago

J. D. Forbes on the Puy de Dôme

ON September 22, 1835, J. D. Forbes wrote to his sister: "Clermont seems to me the most pleasantly situated of all the large towns of France which I have seen. It is perched upon an eminence rising from an extensive and fertile plain, which forms a sort of bay amongst the hills which surround it for two-thirds of the horizon. These hills are, for the most part, connected with a plateau or table-land of granite, from which the volcanoes rise; and of these, the Puy de Dôme, the highest and most noted, is conspicuous from Clermont, being about the distance of the nearest Pentlands from Edinburgh, and greatly resembling some of them in shape. . . . The Puy de Dôme was the first mountain up which a barometer was carried, at the suggestion of the famous Pascal, and I ascended it fully as much in reverence for his memory as on any other account. He was a most remarkable man; and as he was a native of this place, I hoped to have obtained some new particulars about him, but in this I have failed".

Cost of University Education

IN a letter to *The Times* dated September 22, 1825, "Justus" said: "I am a great admirer of our old Universities and consequently I am anxious that a misrepresentation which is abroad should no longer be unnoticed—I mean an impression relating to the expenses of education there. The charges for what actually constitutes the education are £2 10s. per term or £7 10s. per annum at Cambridge. This charge comprises all the fees, which at the London colleges amount to £21 at the least, to say nothing of the necessarily superior education which may be obtained at the former arising from greater competition, access to the libraries (in which advantage London is very deficient), and those incentives to study which a better situation and greater quiet naturally generate. The expense of board and lodging are very moderate indeed; and I do not hesitate to assert that any young man may secure every advantage which those noble institutions can bestow at an expense of, at the very utmost, £30 per term, or £90 a year".

Naval Architecture in Great Britain

IN 1832 Captain (afterwards Rear-Admiral Sir) William Symonds (1782-1856) was appointed to succeed Sir Robert Seppings (1767-1840) as surveyor of the Navy. He held the post for sixteen years, but often was criticised for his actions. On September 23, 1835, *The Times* said: "We have much satisfaction in announcing to the nation that the present disgraceful state of English naval architecture is likely to become the subject of a formal, and we trust, serious and candid inquiry in the next session of Parliament. Mr. G. F. Young has placed upon the order-book of the House of Commons the following notice of motion:—"That a select committee be appointed to inquire into the system at present adopted in the construction of ships for His Majesty's navy; to report how far that system is calculated to insure for the public service the advantages of scientific and practical knowledge of naval architecture, and of improvements in naval construction; and to suggest the best means for submitting to the test of impartial examination and fair competition