picture. By demonstrating the practical utility of modern methods of rapid conveyance of news and equally by recording scientific developments wherever they occur, *The Times* has played a noteworthy part in the rapid progress of the past century.

Rural Conditions in Roman Britain

A NOTABLE addition to our knowledge of the conditions of farm life in Roman Britain is made by the account of an excavation of farm buildings in Carnarvonshire carried out by Mr. B. H. St. J. O'Neil on behalf of the Office of Works, which is described in the *Times* of December 29. The site is on Caerau farm, north of Pant Glas station, in an area which has already afforded evidence of similar cultivation sites, evidently parts of a rural group or community centring on the Roman fort of Segontium, at Carnarvon, and in which the ancient field system of terrace cultivation can still be readily discerned. Of a succession of four ancient farms along the hillside, facing the west, one is practically intact. Within what is described as an excellent system of ancient fields, rising one above another, are two separate courtyard houses, of which the first is an oval about 100 ft. long, bounded by a stone-faced wall of earth or turf. It was approached by a cobbled road 8 ft. wide, which passed through an opening in the wall into the courtyard. On this yard two rooms now open, but originally there were four. These rooms are circular, the larger having a diameter of 25 ft. Their structure is interesting. The walls are now 4 ft. high and may never have been higher. The roof was supported by six posts, for which the holes remain, mid-way between the wall and the centre of the building, where there may also have been a post. The room was provided with a stone bench on the west side, drains and a trench which may have been a slot to receive a wooden partition, dividing the room into two. The smaller hut, which also had a system of drains and gulleys, apparently was used for industrial purposes; the find of a crucible and two hearths suggests the reduction of metals. The second house on the edge of the field system has a polygonal boundary wall with a well-defined entrance and at least five rooms around the courtyard. One room appears to have had a ridge roof. The numerous pottery fragments are typical Romano-British of the second and third centuries A.D.

The Vertebrate Evolutionary Tree

FOR long we have accepted as well-established and equivalent the five classes of vertebrate animals, but recent zoological research, particularly on the palæontological side, has modified many old conceptions of relationship and suggests that there may be need for readjustment in the major groups. An attempt at a new classification which will give due weight to recent discoveries has been made by G. Säve-Söderbergh (*Arkiv. zoologi*, **26**, No. 17; 1934). Its main suggestions are that the present class Pisces is a medley of two of the three main stocks of Gnathostomes and parts of a third one. This third stock (Choanata) gave rise to the higher vertebrates, but probably by two routes, the ancestors of the Dipnoi leading to the Urodela, of the Crossopterygii to the Anura by a devious route. The Amphibia also must be looked upon as a mixed assemblage, which includes the two stocks just mentioned, but also an offshoot of the reptilian Reptiliomorpha, the Anthracosauria. Finally, birds and mammals belong to a richly branching part of the vertebrate phylogenetic tree, most of the branches being grouped as reptiles, while two equivalent branches are given unequal status as the independent classes Aves and Mammalia. The author regards it as absurd that equal systematic value should be given to these classes as to the fundamental group Pisces composed of two entire stocks of Gnathostome vertebrates, and half of the third stock. The writer's first reaction to this interesting and revolutionary view of vertebrate phylogeny, in which birds and mammals are grouped with reptiles and Anthracosauria as equal divisions of the Reptiliomorpha, is the thought that systematic classification is not entirely a matter of equivalents, and that even when phylogeny is known, weight must be given to outstanding novelties in evolution which have originated decisive lines of development. Thus the 'invention' of warm-bloodedness, which by adding to the adaptability of vertebrates has enabled them to conquer land surfaces far beyond the reptilian range, seems worthy, in association with the structures which made it possible, of a distinctive classificatory label.

Starlings in London

FOR some years, enormous numbers of starlings have taken to roosting on the ledges of buildings in central London, where they spend the winter nights in safety on such buildings as the National Gallery, Somerset House, St. Paul's and Covent Garden. In Edinburgh, similar hordes frequent the roof-ledges of the General Post Office and other buildings in the neighbourhood. The winter population of starlings in large towns must be unbelievably large, yet it appears still to be increasing. In the report for 1933 of the Committee on Bird Sanctuaries in Royal Parks (England), C. S. Bayne states that in 1933 (for the first time) starlings roosted on Duck Island in St. James's Park without an interval. In the first week of May, when winter roosts are usually deserted, he counted there eight thousand of them; but the numbers were greatest in autumn before the usual contingents moved in November to take up their winter quarters in Trafalgar Square. It is a matter of some interest to know whence come the starlings that flock to London at night, and R. W. Hale has discovered one of the sources. He has watched the birds feeding on and near Hendon Sewage Farm, and has seen them leave there in flocks about two hours before sunset. The flight of the flocks he has tapped at Cricklewood Lane, Finchley Road Station, Lord's and Baker Street Station. A line drawn through these points and extended passes through Trafalgar Square, so the slightest deviation from this would bring them over St. James's Park, and some of the largest flocks which settle in St. James's Park come from that quarter.

(*Continued on p.* 27.)

Forestry in British Honduras

THE chief note of the annual report of the Forest Trust of British Honduras for the biennial period ending March 31, 1933 (Govt. Printer; 1934) is one of marking time. The Department has now had ten years experience, but the increasing depression in the trade of the Colony necessitated economy during the period under review and the personnel was reduced to a skeleton service. The Forest Trust had early decided that further sylvicultural work, with its long lock-up of capital, was to be discontinued, and all reserves were placed on a 'care-and-maintenance' basis, an expression which will convey little to the forester possessing an acquaintance with the tropical forest. The energies of the Department are to be applied, therefore, to the furtherance of research work into the exploitation and marketing of the secondary timbers, with the view of taking prompt advantage of the recovery of world trade, when the present depression lifts. So far as it goes, this may be regarded as satisfactory; but the Department will have a long row to hoe before the position of half a decade or so ago is re-attained. The following extract from the report in connexion with *taungya* is of importance and should interest West African forest officers: "The practice of seeding-up the annual corn-plantation with mahogany continues to give excellent results. Mahogany seed is dibbled in lines with the maize at 10 by 10 feet intervals, and the area is abandoned after the first crop has been harvested. The mahogany is then sufficiently established to compete with the weed growth, which very quickly closes the canopy. Over-topping of the mahogany by weed-growth is found to be beneficial in preventing shoot-borer (*Hypsiphylla grandella*) attack. Tending consists of removing vines. It is becoming very apparent that huamil (secondary growth) conditions are very favourable to the growth of mahogany, which grows well whilst its head is just under huamil canopy, and that heavy cleaning is not only undesirable but often disadvantageous in rendering the mahogany susceptible to the shoot-borer attack."

Preservation of Newspaper Records

NEWSPAPERS are an important class of historical records as they give a clear view of contemporary life and events. The newspaper files preserved in libraries give valuable reference records for historical purposes. Unfortunately, the paper on which they are printed is often made of crude ground wood fibre, which rapidly perishes, and the space they take up in libraries is excessive. In publication No. 145 of the U.S. Bureau of Standards (Washington: 5 cents), B. W. Scribner describes researches that have been made on methods of preserving newspapers. For retarding decay, the use of Japanese tissue paper has been found effective. Transparent cellulose acetate sheeting is also useful. Pending the development of more satisfactory materials and methods, an effort should be made to copy the most valuable of the older newspaper records on permanent paper by photostatic printing or photolithography. Reproduction in miniature is the ideal method of reducing the space required. The technique of making miniature prints of newspaper records on transparent slides and projecting them in enlarged form for reading is making satisfactory progress. The life of the types of flexible film so far used is only about thirty to forty years. It is recommended that a joint effort be made at once by scientific and library organisations to find the most practical means for preserving newspaper records. Special stress should be laid on perfecting materials and methods of reproduction in miniature. The advisability of founding a central agency for supplying reproductions of newspapers and other records to libraries should also be considered.

Rubber and Agriculture

THE rapid development of the rubber industry has been one of the most notable industrial events of the present century. Between 1910 and 1933, the net amount of crude rubber exported from the principal producing countries increased from 94,000 tons to 851,000 tons per annum, while the world absorption of the manufactured product rose from 85,000 tons to 814,000 tons during the same period. Although the demand for motor tyres has been primarily responsible for this expansion, rubber has now found its place in practically every branch of industry. To illustrate the various ways in which it may be used on the farm, the Rubber Growers' Association (2–4 Idol Lane, Eastcheap, E.C.3) has issued a booklet entitled "Rubber and Agriculture". In outdoor equipment, not only can tyres of every description be supplied to suit everything from a tractor to a wheelbarrow, but also jointed tracks are successfully made. The inconvenience of the ordinary tipping device for unloading lorries is now avoidable by using a vehicle fitted with a rubber movable floor, which discharges on either side as desired. In the cow-shed and dairy, rubber stalls and flooring, rubber parts to the milking machines and rubber rims to the churns to reduce noise, are some of the uses to which this product can be put. In the farm-house itself rubber is becoming increasingly popular; rubber floor coverings, brushes and even rubber upholstery now being practical propositions, while for the farmer and his family, rubber clothing of various types is a recognised part of their outfit.

Small Sparks due to Static Electricity

THE small sparks due to static electricity, similar to those sometimes observed when combing the hair or walking over a thick carpet, have caused fires which cost industry an appreciable amount, both in life and property. According to Science Service, of Washington, D.C., a study made by the Fire Protection Association shows that during the last six years 147 fires in the United States have been attributed to this cause. A frequent cause of sparking is the friction of an endless belt running over pulleys. In an atmosphere containing a certain amount of inflammable gases, this would be sufficient to cause an explosion which might result in a serious fire.