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CONTENTS

Meetings and Excursions 1970-71

Mr. C. J. Leeke delivered his Presidential Address entitled "What Makes a Man" at the Annual General Meeting (attendance 37). Two evenings were devoted to members' exhibits, talks and slides (42 and 46), attention at one of them being directed especially to books. Films were shown at two meetings (44 and 41), and there was an afternoon meeting for the study of specimens under the microscope (6). The lectures delivered at the remaining indoor meetings were "European Conservation Year", by Mrs. U. Bowen (20); "A Visit to the Galapagos", by Miss D. Mason (46); "All Galloway is a Garden", by Mr. R. Schardt (40); "Nigerian Episode - Vegetation and Birdlife", by Dr. F. V. Watson (35); "Lichens", by Dr. K. L. Alvin (29) and "Meteorites", by Dr. M. Hey (25).

Winter walks were held on 5th December, Woodley for birds (attendance 8); 9th January, Eversley Wild Fowl Garden (12); 6th February, Reading for lichens (13); 13th March, Cleeve for mosses (14).

The summer field meetings were: 17th April, Beenham Woods (14); 1st May, Moor Copse, Tidmarsh (c. 40), 12th May, Pangbourne College Woodland (c. 18); 15th May, Clayfield Copse, Emmer Green (15); 26th May, Englefield Park and Lake for bats (10); 29th May, Cothill Fen (14); 9th June, Woods near Marlow for birds including the nightjar (15); 12th June, Upper Wargrave, Bowsey Hill ( ); 26th June, coach excursion to the Cotswolds and Bristol Channel (31); 3rd July, College Wood, near Goring, and Bix Bottom for the study of grasses ( ); 24th July, Kennet at Sulhampstead for waterlife (21); 28th July, Central Reading for town plants and aliens (16); 7th August, Thurle Down (8); 21st August, Swyncombe Downs (18); 4th September, Turville Hill (31); 18th September, Bucklebury Lower Common (18); and 9th October, Fungus Foray at Kingwood (c. 40).

WHAT MAKES A MAN?

The Presidential Address to the Reading and District Natural History Society October, 1970

The study of fossil man has made great strides in the last twenty-five years and has become increasingly exciting with both the discovery of several new species and new interpretations of old ones as more specimens become available. In the last 100 years or so since Darwin destroyed the idea of the separate creation of each species and fired men to look for their own ancestors, and in particular the "missing link", interpretations of fossils have ranged from the erudite to the ludicrous. An example of the latter was the description of an early amphibian fossil as "the remains of some poor sinner drowned in the flood" (British Museum - Nat. Hist.). I hasten to add that the museum had fully savoured the humour of this century-old error.

This underlines the necessity in all biological studies to be able to recognise unerringly the organism under observation. In the search for the origins of man one is delving back in time, with an increasing paucity of specimens because, during the critical period, the Miocene, apes flourished but the conditions were not conducive to fossil making, particularly in Africa, where it is now believed human origins occurred. The nearer one approaches the origins of a group, the smaller are the differences between it and related groups. The scarcity of specimens makes the range of form due to age, sex and other causes uncertain, and it becomes extremely difficult to judge whether a fossil is of one group or another.

In order to understand something of this problem the first task must be to show the relationship of the various Primates.

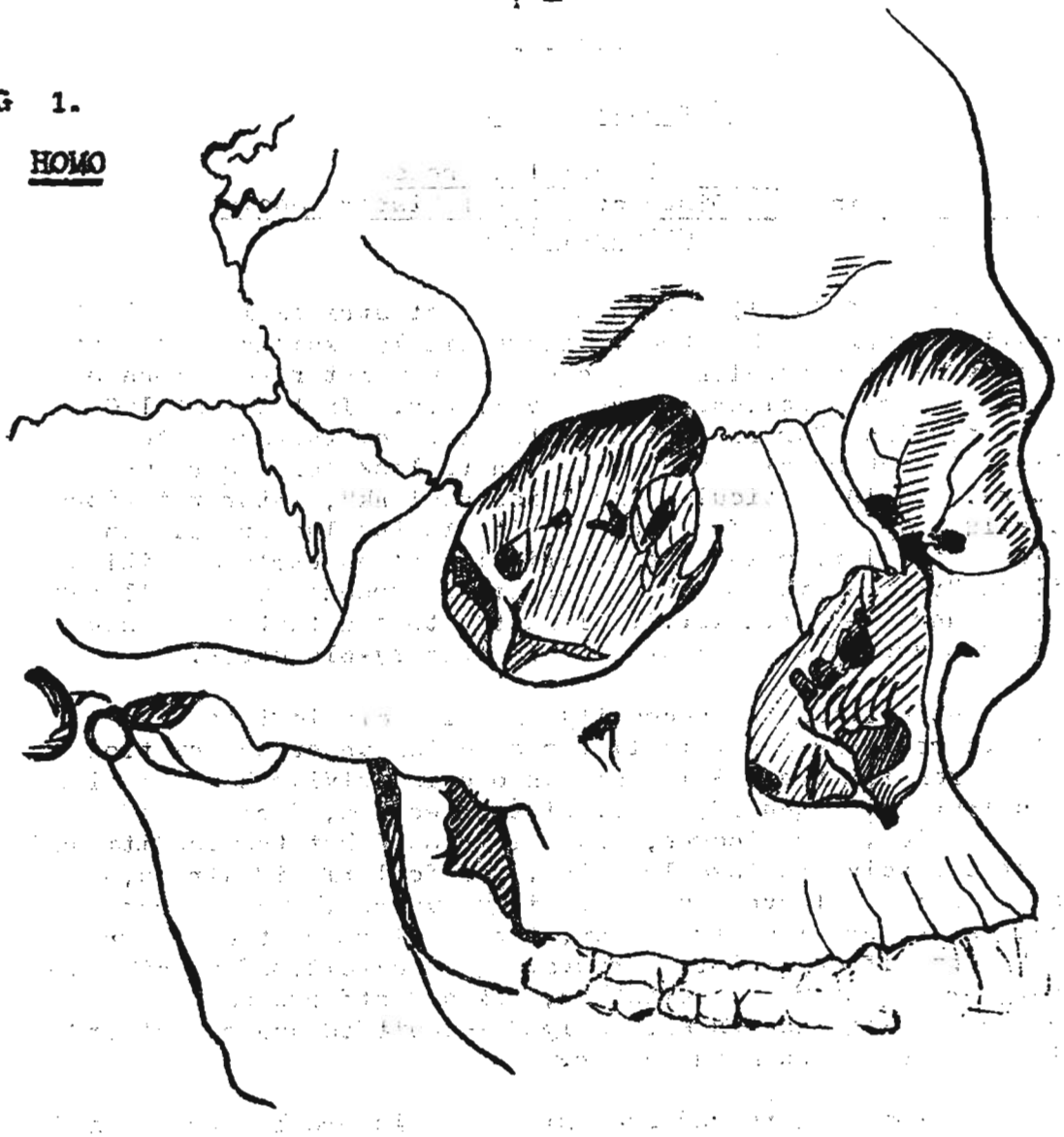
CHART I

ORDER PRIMATES

- (SUB (ORDER (SIMIAE
  - (HOMINOIDEA
    - (HOMINIDAE
    - (PONGIDAE
    - (HYLOBATIDAE
  - (CERCOPITHECOIDEA
  - (CEBOIDEA
- (SUB (ORDER (PROSIMII
  - (TARSIOIDEA
  - (LEMUROIDEA
  - (TUPAIOIDEA

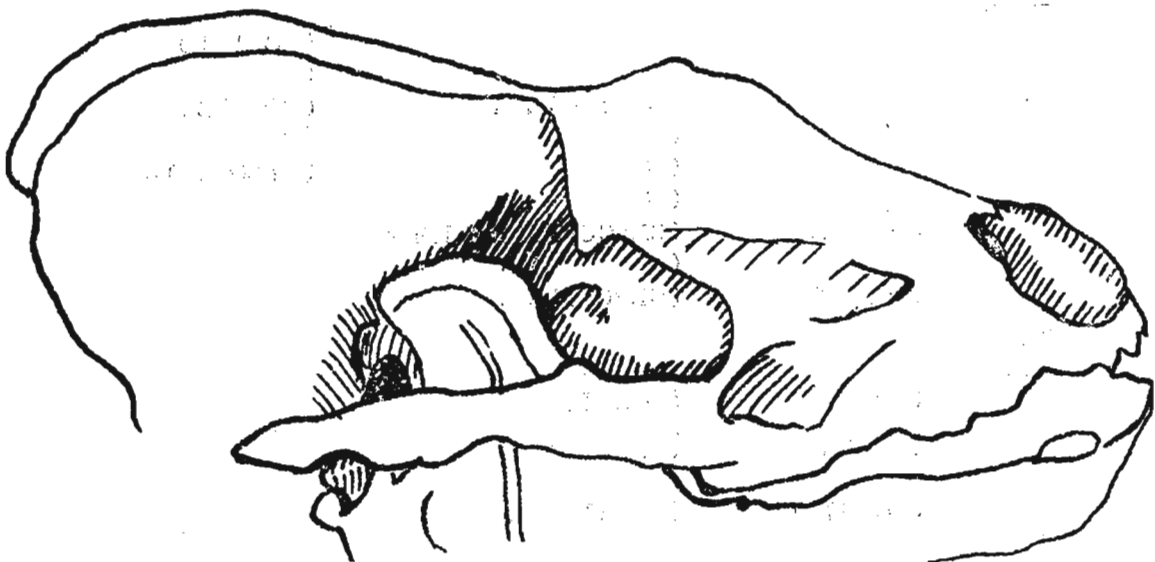
FIG 1.

A. HOMO



B. MELES

A. Closed orbit. B. Open orbit.



The Tupaioidea are tree shrews, close to the basal insectivore stock. The five genera are widely distributed throughout the Far East.

The Lemuroids are small to medium-sized, mostly nocturnal, primates comprising three Malagasy families and one which occurs in the Far East and Africa, with altogether fifteen genera.

The Tarsioidea is a group containing one family and one genus; there are three species and twelve subspecies. They occur on many islands of the Malay Archipelago.

The Cercopithecoidea are Old World monkeys with six Asian genera, seven African genera and one genus, Macaca, common to both regions.

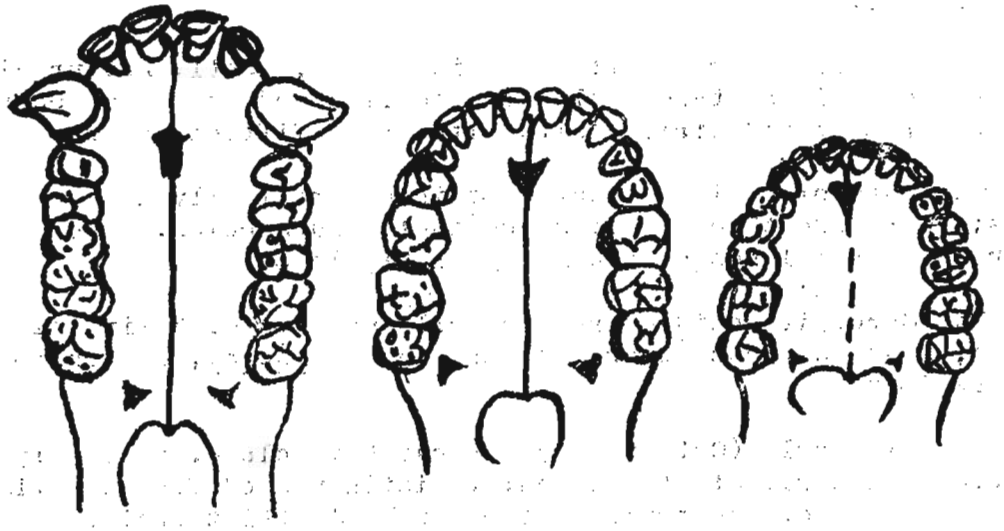
The Old World (Catarrhine) monkeys have close, obliquely positioned nostrils that are easily distinguished from the flat and broadly spaced nostrils of the New World (Platyrrhine) monkeys who also may have prehensile tails.

The Hominoidea are man, and the man-like apes. The group contains three families; Hylobatidae, Gibbons, with two genera comprising seven species and seventeen subspecies; Pongidae, Gorilla, with three subspecies, Chimpanzees (Pan), with two species and three subspecies, and Orang Utan (Pongo)with two subspecies, and Hominidae, Man (Homo) with one species. Of course many fossil genera and species are also included in the Hominoidea.

As LeGros Clark pointed out it is important to distinguish clearly between Hominoidea the larger group and Hominidae, the family of man. Hominid fossils have the maddening habit of being not only scarce but also fragmentary, with a few welcome exceptions. It is therefore of prime importance to be able to recognise primate fragments from other mammals and to distinguish hominid from pongid material.

The most frequent finds are skulls, usually broken, jaws and teeth. In primate skulls, the orbits are enclosed at the back whereas they are open in other mammals (fig. 1). In hominids the dental arcade is arched, whereas in pongids it is square (fig. 2). Obviously smaller fragments might require other diagnostic criteria to identify them, such as the number and form of cusps on teeth (fig. 3). Tooth patterns change slowly and regularly and are so characteristic that Dr. Davidson Black was able to name Sinanthropus pekinensis from a single tooth, before the marvellous finds in the cave at Choukoutien were made. The presence or absence of a maxillary fossa or a diastema, the position of the foramen magnum, the form of nuchal crests (fig. 4) are also examples of these criteria.

FIG 2 Pongid and Hominid dental arcades and palates.



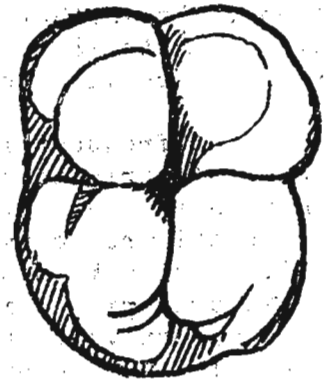
Gorilla. Australopithecus. Homo.

FIG 3. The occlusal surfaces of the left , lower second permanent molar of A. Dryopithecus , a Miocene ape and B. Modern man.

A.

The typical Y5 pattern of Dryopithecus.

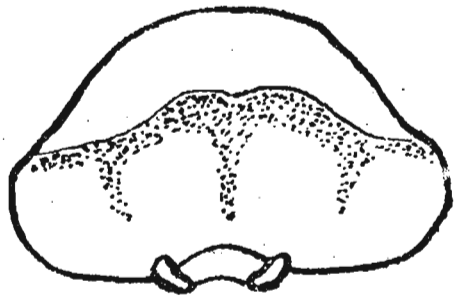
B.

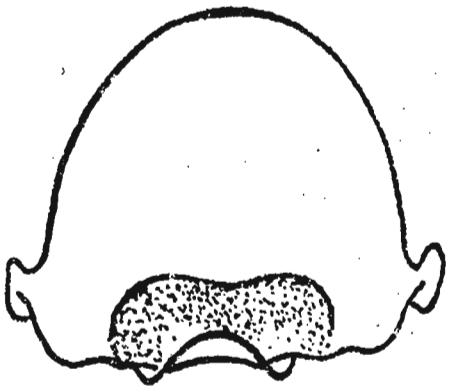


The typical + 4 pattern of Modern man.

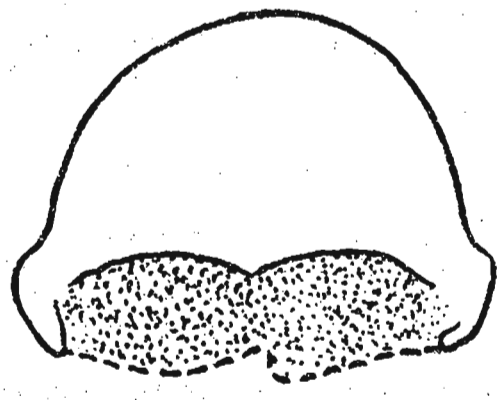
FIG 4. Diagram to show the position of nuchal crests (dotted areas) in several hominoid skulls (seen from behind).

A. Pan.

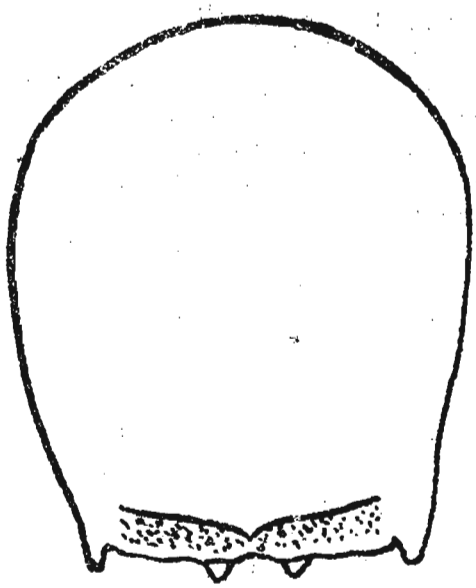




B. Australopithecus.



C. Pithecanthropus.



D. Homo.

Lacking series of fossils to show the range of form and variations due to age, sex and other causes, workers had great difficulty when faced with describing and naming one fragmentary fossil, and the older the fossil the greater the difficulty. If it was primate and associated with stone tools, a euphemism for weapons, it was generally accepted as hominid. If not, then it was open to considerable variation in interpretation by different workers, and heated arguments were not unknown. As more fossils become available it is possible to revise earlier namings with some degree of confidence and so Pekin man is now considered to be the same as Java man and both are considered to be of pre-Neanderthal stock.

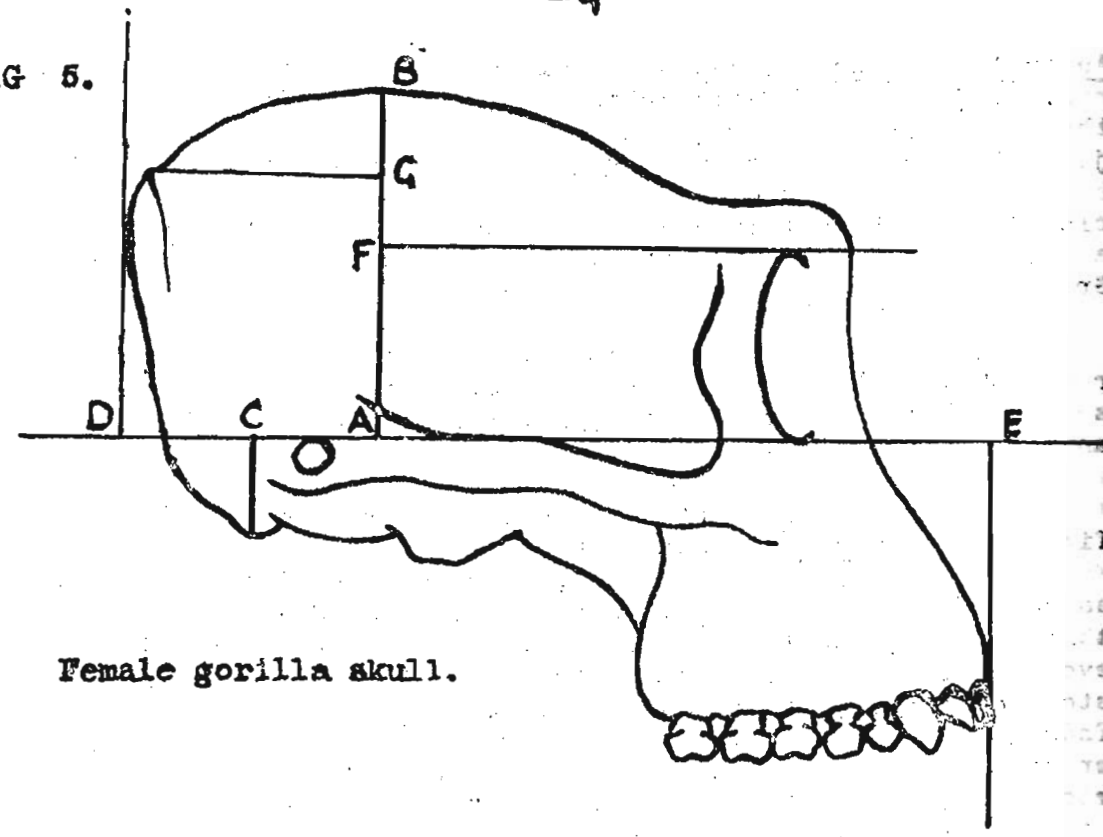
To aid in comparing animals of different sizes, in order to determine whether they come within the range of form of a particular group or not, it is useful to express some measurements in terms of others. Good examples of this are cranial indices in which a skull of any shape or form can be orientated in a standard way so that measurements can be made and proportions calculated which would have relevance to all specimens. The skull is orientated so that a straight line from the orbit to the auditory meatus is horizontal, the Frankfurt plane, and measurements are made perpendicular or parallel to that base (fig. 5).

Palaeontologists have suffered from several traumatic experiences. Not the least was "Piltdown man", which was brilliantly exposed by LeGros Clark and Oakley, and of which Howells and others were so critical even before the last great war. In "Mankind So Far" Howells wrote that "Piltdown Man" was the main impediment to producing a family tree for humans.

Earlier, at the end of the 19th century, Dubois gave up his teaching post in Holland to take a medical post in Java in order to search for the "missing link" where he believed mankind had its origins, and most surprisingly, within two years, discovered in the sands of the Solo river a cranium and a femur, which he named Pithecanthropus erectus. It was the bold statement of a young self-confident man which burst on the staid world of palaeontology long before it was ready to accept that man walked upright before he became sapient man. There were such arguments as to whether the femur belonged to the skull, whether Pithecanthropus had achieved speech, whether, indeed, it was human or not, that Dubois retired with his fossil from the fray for twenty years.

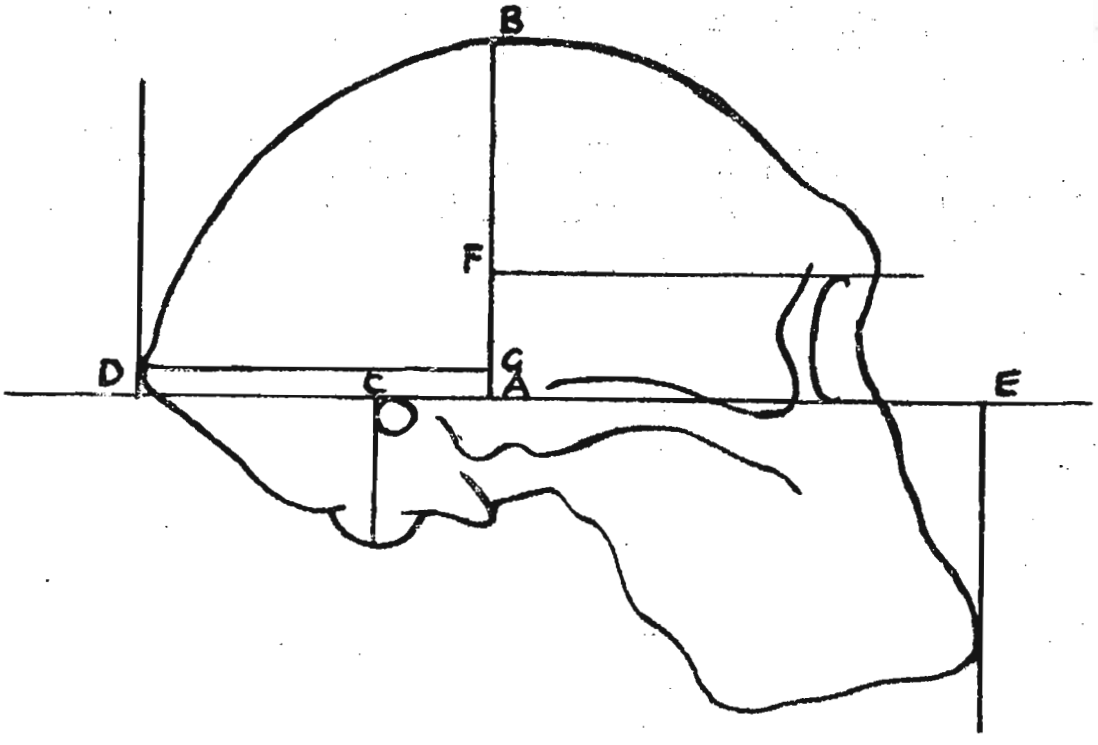
By 1916 the general uproar had subsided and Dubois' thesis that Pithecanthropus was an upright hominid was accepted. Then, in 1922, another young man, Raymond Dart, an Australian who studied in London and took a teaching post in South Africa, discovered the famous Taungs child's skull, which he named

FIG 5.



A. Female gorilla skull.

Cranial indices shown in respect of gorilla skull and australopithecine skull orientated on the Frankfurt plane.



B. Australopithecine skull.

Australopithecus africanus and claimed as an ancestor of modern man. It too was heavily criticised, so that Dart withdrew from the scene for a number of years. The arguments were that a juvenile could develop more simian features as it matured, it had small canines because of youth, it had not been fully developed from the matrix and so the form of the teeth was not fully apparent, one skull was not enough evidence, and the mixture of Greek and Latin in the name was very bad form.

Dr. Broom, a South African, found further australopithecine remains at several other sites and in discussion with Dart, persuaded him to work up the fossiliferous breccia from contemporaneous limestone cave floors.

Both Dubois and Dart were attacked for presuming that their finds were hominid and not hominoid in the absence of stone tools. Man was considered a tool maker, therefore any fossils not associated with stone tools were highly suspect. Notwithstanding that the stone tools themselves also showed an interesting evolution, it was never considered that there might be a pre-stone culture, or that man had experimented with other materials. Thus it was that the analysis of fossils from the associated breccia showed some surprising results. Many baboon skulls were recovered, each with a double, indented fracture to the left parietal region. When shown to a police pathologist, he commented that "it looked like mayhem committed with an early blunt instrument". Later it was found that the distal end of an antelope femur nicely fitted the injury. The conclusions to be drawn here are that Australopithecus was a carnivore, that he hunted and ate, among others, baboons, that he was right-handed and used the bones of his prey as weapons.

The bulk of the bones found were of herbivores and when analysed (Chart II) it can be seen that they were highly selected.

Chart II. Simplified list of non-hominid bones from Makapansgat

Fossil Bones	Bovid	Non-Bovid
Vertebra	229	17
Scapula	126	3
Humerus	518	11
Radius	380	5
Ulna	102	2
Innominate	187	4
Femur	101	2
Tibia	183	2
Tarsal/Carpal	209	4
Metacarpal	330	7
Metatarsal	278	17
Phalanges	43	11
Skull/parts	108	80
Horn core	210	--
Maxilla	172	80
Mandible	369	114

Few vertebrae and no ribs were present, yet these are the most numerous bones in a skeleton. Such bones as were found were numerically in direct proportion to their probable usefulness; femora, humeri, dentaries with teeth (herbivores - scraping, carnivores - slitting) and so on. Some were broken with use, but many showed consistent breakage such as would happen if they had been fashioned for a purpose. Indeed, these bone pieces were shown to be extraordinarily like some well-authenticated bone implements made only 15,000 years ago at Kalkbank in the Central Transvaal.

Yet in spite of this similarity and the weight of the statistical evidence, there was considerable antagonism to Dart's "Osteodontokeratic" culture of the southern ape. It was considered, and this was a view which had been applied to other cave finds of this sort, that these non-primate bones represented the remains of meals of hyaenas which had inhabited the caves at about the same time as the fossil primates. A considerable weight of opinion was behind this view from many eminent palaeontologists including D. M. S. Watson. Dart checked back the references to the hyaena theory to a German monk of the mid-nineteenth century who had suggested it to explain the bones often associated with pre-human remains in caves. He further enquired of game wardens, who know animal habits well, whether modern hyaenas carry bones into their earths and was assured that they did not. One earth was extensively dug out and only the undamaged bones of a tortoise were found. Now Dart made a cardinal error. He stated that no hyaenas carry or carried bones into their caves or earths. Such a dogmatic statement was indeed impossible to prove. He might have been able to convince people that his fossil bones were untouched by hyaenas, but not that no such incidents ever occurred.

It was very unfortunate that, just as Australopithecus had been welcomed into the hominid fold, following a study of the teeth by Gregory, its pre-stone culture was being discredited. In 1955 there was an Anthropological Convention in Livingstone at which Dart read his paper on the Osteodontokeratic Culture of Australopithecus africanus. It received scant attention from those present, who included L. S. B. Leakey, and no-one bothered to step into the next room to see the collection of bones laid out for inspection. A cursory glance would have shown that these fossils were untouched by the massive jaws of hyaenas, probably the most powerful bone crunchers among quarternary mammals. There were no teeth marks whatever on them, the only damage was of a percussive nature. There would seem to be little doubt that the hundreds of fossil bones carefully removed from several tons of breccia represented the armoury of an ancient man-ape who had not yet learnt to knap flints, but who knew how to use those parts of an animal that bit or kicked him, and to select and store them against future use.

It would seem that there has been a lot of emotional conflict as well as scientific argument and that the establishment would not budge from old views, nor assimilate new ones without a considerable amount of evidence. This is not altogether a bad thing, but it does sometimes mean that progress towards the truth may be slower. The demolition of "Piltdown Man" was a steam-roller cracking a nut; drillings taken from the jaw and skull were physically very different, two or three similar simple tests early on would have saved a mass of verbiage. Even today Dart's "bone, tooth and horn" culture is not generally accepted for his southern ape, although such implements are readily accepted for much later men who already had a stone culture.

Surely the useful lengthening of the reach by wielding a femur or humerus would commend itself to a primitive mind more than using a large pebble which would bring the hunter into dangerously close proximity with the prey?

What makes a man? In the words of Joad it depends what you mean by a man.

C. J. Leeke.

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Pink Frogs from Black Spawn (Rana temporaria L.)

by Arthur Price

On 14 March 1971 a pigmented female frog, Marfer, daughter of Mickie, a pink (i.e. albino) double recessive (cc) male, and herself single recessive (Cc) for pigmentation (Price, 1971)was placed in the north pond in the Froghouse with the 1967 cc male. The expected result of this mating was:

cc male x Cc female ------- Cc Cc cc cc

The frogs went into amplexus on 23rd March 1971 and on 28th March 350 ml of black spawn was laid, 23% of which was fertile. A total of 400 tadpoles hatched out of an expected 1,750. All of these tadpoles were pigmented but it was hoped that some of them would lose their melanin and become pink frogs. This did not happen, and about thirty pigmented frogs were placed in the Froghouse to provide Cc breeding material for future years. The absence of pink frogs could be explained by the fact that the expected 50% cc frogs was in the 77% of the spawn that did not hatch. It may be possible to repeat this mating in 1972.

The mating of the 1968/4 pigmented female with Mickie, cc male, resulted in the laying of 350 ml of fertile black spawn. On 25th March 1971 most of the tadpoles which hatched developed normally, but on 16th May, thirty-one legless tadpoles, in which the melanin was breaking up into patches, were isolated. Three similar tadpoles were found on 30th May. By 27th June, the melanin had entirely disappeared and on 11th July six pink frogs were feeding on aphids. We thus have pink frogs seen to develop from black spawn. Smallcombe (1949) had suggested a similar occurrence. All of these frogs died within two months of metamorphosis. The small number of pink frogs suggests cross-over as the cause of their lack of pigment.

After fertilising Marfer's black spawn on 23rd March 1971, the 1967 cc male was offered to one of the 1968 cc female frogs. The result was immediate amplexus. On 24th March, 100 ml of white spawn was laid, 50% of which proved to be fertile. It developed normally and by 17th July seven pink frogs were thriving on aphids and small insects. Four pink frogs were still alive on 24th November, the largest being 40 mm long and weighing 6.76 g.

Twenty-one of the pink frogs bred from the 1967 cc male and the 1968 cc female in 1970 are still alive, but their progress in development is slow due to their poor sight and the fact that more than the optimum number were retained in order to provide breeding stock for the future. Four of these frogs exceed 48 mm in length. So far only one male has been identified but as fifteen of the frogs are less than 47 mm in length more males could be found later.

In addition to the thirty hybrid pigmented frogs (Cc) from Marfer's spawn of 1971, there are in the Froghouse approximately twenty-four second year, pigmented frogs from the mating:

1968/10 male x 1968 cc female

and these should certainly be Cc. Four of the males, some over 50 mm long, have been seen, two of which could breed in 1972. If these males are crossed with some of the 1968 cc females the results could be of great interest. The three older, pigmented frogs in the Froghouse, namely The Matriarch (90 mm, 85 g), 1968/4 female (80 mm, 49 g) and Marfer (75 mm, 53 g), are hibernating in the water, under a stone slab in the north pond. Some of the smaller frogs are hibernating under wood out of the water.

During a visit to the Highmoor Road Pond on 21st February 1971, seventeen dead and decaying frogs were found. Many were females, some of which contained white spawn. Mrs. Jeffery stated that some dead frogs were seen in the pond in January. A few had been opened up ventrally; the pond does contain goldfish, newts and several pairs of the water-beetle Dytiscus marginalis L. Dead frogs have also been reported from two other ponds during the same period and under similar circumstances. This phenomenon could be explained by a deficiency of oxygen aggravated by the continuing decay of detritus in the pond throughout the mild winter of 1970/71. Only five clumps of white spawn were found in this pond in the spring of 1971 all of which were removed to 6, Mansfield Road for study. Three clumps produced 100% recessive tadpoles which pigmented as they developed, whilst one small clump yielded a small number of pink tadpoles, none of which metamorphosed. A percentage of the samples were returned to the pond.

The fifth clump of white spawn yielded a significant percentage of pink tadpoles. This clump contained 275 ml of spawn and the resulting tadpoles were 75% recessive, which pigmented, and 25% pink. The pink tadpoles included a higher proportion of kinked tadpoles (Price 1967) than is normal but those which were not kinked averaged 40 mm in length. During metamorphosis these frogs experienced great difficulty in forcing the front legs out of the operculum. Some did not succeed whilst those which did had clenched legs which were not functional. This condition was confirmed by two other naturalists who undertook to rear some of this spawn. A great many frogs metamorphosed; none survived. The proportion of the different types of tadpoles in the 25% clump seems to confirm the earlier suggestion that the albino strain is maintained in this pond by Cc x Cc matings.

It became essential during 1971 that the Highmoor Road Pond should be cleaned out as it was becoming progressively more polluted by decaying detritus. On 28th October the pond was completely emptied, cleaned out and refilled with water. During

this operation fourteen adult, pigmented frogs were found, all of which bore the characteristic black patches of this strain. They were found in the mud around the lily roots and under the mats of marginal vegetation. All fourteen frogs were males. Van Gelder (1971) states that he also found males and no females in a pond during the winter. We must balance against this fact the discovery of dead females in the Highmoor Road Pond during January/February 1971.

Summary

1. No pink frogs resulted from the mating of Marfer, a Cc female, with the 1967 cc male in 1971.
2. Pink frogs were reared from black spawn.
3. A clump of white spawn from the Highmoor Road Pond yielded 25% cc tadpoles i.e. a Cc x Cc mating.
4. Four pink frogs were bred from the white spawn laid by 1968 cc female mated with 1967 cc male.

Again my thanks are due to a great number of people who have helped. They also serve who only stand and listen.

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Some Notes on the Life-history of the MULLEIN MOTH (Cucullia verbasci)

by A. M. Sandels

At the end of June, 1969, some thirteen strikingly patterned caterpillars were observed feeding on a cultivar of Verbascum blattaria (Moth Mullein) in the garden of "Stonecroft", Chipping Norton. As similar larvae had been seen previously feeding on nigrum (Black Mullein) and Scrophularia aquatica (Water Figwort) they were identified as Cucullia verbasci L.

Early in July, two of the largest larvae were brought indoors in order that the pupating stage might be observed. Some of the food plant and a container with soil was provided, and within two days both caterpillars had constructed cocoons of earth and small stones "cemented" together with strands of fine silk. They were oval, about 1½" x 1", and attached to each other. By the middle of July all the remaining caterpillars except one had disappeared - presumably they had gone to earth.

The two cocoons were kept in an open container on the kitchen windowsill during the ensuing nine months. At the end of April, 1970, a newly emerged moth, light fawn and brown in colour with very ragged wing margins was seen flying around the kitchen light in the late evening. A second one emerged a day or two later. About a week later the two moths were placed in the early evening on the woody stems of Potentilla fruticosa (Shrubby Potentilla) in the near vicinity of the food-plant. The moths blended well into the background of fibrous bark; both had disappeared by the following morning.

A careful watch was kept on the Mullein plant, and just over a week later a number of pale green, domed and ribbed eggs, laid singly, were observed, mainly on the underside of the leaves. By the end of the first week in June some small larvae, about ¼" long, pale coloured and with apparently dark horizontal stripes were seen, and the eggs had vanished. These larvae quickly increased in size, and soon the characteristic yellow patches and black marking were visible. The larvae began by eating the leaves of their food-plant, but as they increased in size they moved upwards to feed on the buds and flowers, for which at this stage they exhibit a preference, though if these are not obtainable they will resort again to the foliage.

By the end of June all the caterpillars had disappeared, gone to earth, and thus had completed their life-cycle under the observation of a botanist.

1969.	July 7th.	2 larvae brought indoors (nearly full-fed)
	July 9th.	both pupated.
1970.	April 30th.	one moth emerged.
	May 3rd.	second moth had emerged.
	May 10th.	moths placed outside.
	May 19th.	eggs seen on Mullein.
	June 7th.	small larvae appeared.
	June 10th.	yellow and black marks visible under lens.
	June 26th.	all larvae gone to earth.

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WILD PLANTS OF CENTRAL READING

by M. V. Fletcher

The weeds, aliens and other wild plants of Reading constitute one of the most colourful and distinctive groups in the local flora. Though often only represented by small numbers of plants, the number of species is surprisingly large.

In the 10 km. grid square containing Reading, about 700 species were recorded in Dr. Bowen's Flora of Berkshire. This total is only equalled in one other square, the one containing part of Oxford. The total is not fully relevant since it includes many plants found in the country near Reading, but absent from the centre of the town. The present account is of a small area of waste ground, old houses and gardens in the inner suburbs, bounded to the West by London Street, to the South by London Road, to the North by the River Kennet, and including the roads as far east as the Technical College and Cemetery Junction. This area, of less than ½ sq. km. has been built over for more than a century, and contains very few original "native" plants. Several interesting species which occur just outside the area are excluded. Even so, over 150 species have been seen, several are rare or even new to the county, and some distinct communities have formed. While rarities will receive a mention, the bulk of the account concerns the behaviour of the commoner plants in an entirely urban setting.

Any list of species is bound to be arbitrary in such an area, for at least three reasons. First, much of the ground consists of private gardens, which are inaccessible and invisible to the public. Several plants known to occur but not visible from any public right of way have been omitted. Second, the distinction between native, established, casual and

cultivated plants is meaningless in towns. Third, species appear or become extinct far more often than is usual in the open country.

As might be expected, there are many annual or biennial species. Of the 132 mentioned, over fifty are annual or biennial. About thirty have seeds which could be expected to travel long distances by air, including many of the most successful species, especially the Compositae and Epilobium spp, with a feathery pappus. The large number of foreign introductions, about thirty-five, is noteworthy, also the fact that some of the commonest of these, especially the ubiquitous Senecio squalidus L. (Oxford ragwort) and Buddleja davidii Franch. (Buddleia) were unknown, or very much rarer a century ago.

The plants will be mentioned in connection with their most characteristic habitat. "Habitat" is perhaps too grand a term for the unpromising niches to which these plants are so well adapted. All the communities are fairly open ones in which chance arrivals can gain a foothold, and many species are likely to be found almost anywhere.

The nomenclature (including most English names) is, with few exceptions, as in The Flora of the British Isles, 2nd edition, by Clapham, Tutin and Warburg.

RIVERSIDE

The banks of the Kennet are cemented, except for the strip of ground by Queen's Road car park, on which is found the only semi-natural vegetation in the area. Alnus glutinosa (L.) Gaertn. (alder) is only found here. There are several trees and seedlings, together with Acer pseudoplatanus L. (sycamore) which appears with monotonous abundance on all waste ground. There is also an ash Fraxinus excelsior L., and a common sallow, Salix cinerea ssp. atrocinerea (Brot.) Silva & Sobr. Both are occasionally self-sown elsewhere. There are some characteristic waterside herbs, including Epilobium hirsutum L. (great hairy willow herb), Scrophularia aquatica L. (water betony) and a large sterile sedge, Carex riparia Curt. (great pond sedge). Nuphar lutes (L.) Sm. (yellow water lily) grows submerged in the swift current nearby. The rough turf here contains a few common grassland plants little seen elsewhere. These include Achillea millefolium L. (yarrow), which has spread widely by the car park, Hypericum perforatum L. (common St. John's wort), Hypochoeris radicata L. (cat's ear), and Arrhenatherum elatius (L.) J. & C. Presl. (false oat grass). Eupatorium cannabinum L. (hemp agrimony) may have originated by the water but is abundant on waste ground nearby, and is a colonist of damp cracks in the area though less often reaching seeding size in such situations.

WALLS

The only flowering plant characteristic of brick walls is Cymbalaria muralis Gaertn., Mey. & Scherb. (ivy-leaved toadflax). Being a perennial with a long seeding season and with seed pods which discharge their seed into the crevices of the wall, it has an unique advantage over all other plants, which normally become established on walls by chance. However, the old limestone walls and crumbling oolitic limestone around the houses in Eldon Road support a few characteristic plants. These are Corydalis lutea (L.) DC. (yellow fumitory), Antirrhinum majus L. (snapdragon) and Centranthus ruber (L.) DC. (red valerian). By these walls have also been seen Chelidonium majus L. (greater celandine) and, rarely, Parietaria diffusa Mert. & Koch (wall pellitory). Chrysanthemum parthenium (L.) Bernh. (feverfew) is also common-est in the gardens of the limestone houses.

Fern spores do not become established on the loose dry soil, except in damp cracks among cement or bricks. Five species have been noted, all on walls. Pteridium aquilinum (L.) Kuhn (bracken) does grow in two gardens, possibly planted, but it is more frequent in a stunted form around broken gutters on walls. Perhaps impurities washed down in the polluted town rainwater enable it to survive in a normally calcareous habitat. The commonest fern seen on most damp walls is Dryopteris filix-mas (L.) Schott (male fern). It is never well developed, but sometimes fertile. Other closely related species may possibly occur. Phyllitis scolopendrium (L.) Newm. (hart's tongue) is less frequent. A single plant of Asplenium trichomanes L. (maidenhair spleenwort) on a damp limestone wall died when the gutter above was repaired. Scattered plants occur in other parts of central Reading. A small colony of Polypodium vulgare L. (polypody) grows on a sloping cement rockery wall in Eldon Gardens.

PAVEMENT CRACKS

These are the most obvious niche in all towns. Only small plants can develop fully, and they are subject to weeding and occasional extermination by weedkiller, especially at the height of the growing season. Though plants which gain a hold have little competition and enjoy constantly moist soil under the tarmac, few species can maintain a permanent population in pavement cracks alone. Outstandingly successful is Poa annua L. (annual Poa), which can be found in Central London, far from any other possible habitat. In Reading it is by far the commonest pavement-crack plant. It has relatively few seeds, which are not adapted for wind dispersal. On the other hand, it grows and seeds throughout the year, and can run to at least three generations in this time. The importance of this long season was demonstrated by a fine colony of Senecio squalidus on a sloping brick wall in Sidmouth Street, which was destroyed by weedkiller in June 1967. This plant seeds throughout the year, and has

recovered its former abundance. Sagina procumbens L. (procumbent pearlwort) has also reappeared there, but Conyza canadensis (L.) Cronq. (Canadian fleabane), which produces a far larger number of seeds, though only between August and October, was exterminated.

Nevertheless, pavement cracks are constantly recolonised from elsewhere. Airborne seeds are the most likely arrivals, and those brushing against walls and falling to their base have an advantage. So perhaps do small or pointed seeds, which can lodge in tufts of moss. Common annuals are Senecio squalidus, Conyza canadensis, Senecio vulgaris L. (groundsel), Sonchus oleraceus L. (sow thistle) and Stellaria media (L.) Vill. (chickweed). Small willowherbs are common, Epilobium hirsutum, E. montanum (broad-leaved willowherb), E. roseum Schreb. (small-flowered willowherb), and E. tetragonum L. ssp. lamyi (F. Schultz) Léveillé (square-stemmed willowherb) have been noted. Others probably occur. Chamaenerion angustifolium (L.) Scop. (rosebay willowherb), though not common in any habitat nearby, has been seen several times in pavement cracks. The chance nature of most arrivals is shown by the frequency with which unexpected plants (and there are quite a lot of them) can be traced to a nearby garden. Such escapes include Anemone hybrida Paxton (Japanese anemone), Chrysanthemum maximum Ramond (marguerite or Shasta daisy), Digitalis purpurea L. (foxglove), Tradescantia virginiana L. and Verbascum thapsus L. (mullein).

Perennial plants are less well represented. Taraxacum officinale Weber (dandelion) is the commonest. It might be expected that the perennials mentioned later, with rhizomes able to creep along cracks and survive weeding would be more common. Perhaps colonies of such plants receive individual attention if they become too successful. However, two remarkable plants with this habit are known only in pavement cracks. Both are grasses. Poa subcoerulea Sm. is frequent in several roads near Sidmouth Street. This species is recorded in 'Flora of the British Isles' as P. pratensis L. ssp. irrigata (Lindm.) Lindb. f., a name regarded by Dr. C. E. Hubbard as invalid. The plant is not considered by some botanists as a species distinct from P. pratensis. The Reading plants are very similar to those identified as P. subcoerulea at Sonning by Dr. Hubbard (See Grasses. Reading Naturalist no. 23 (1971) p. 28). The leaves are strongly hooded, and when young are, in the local plants, stiffly erect and concave with a pronounced dark blue tinge on the upper surface. Setaria geniculata (Lam.) Beauv., a tropical American grass, formed a good colony by a south-facing wall in South Street. It was probably introduced in birdseed, persisted for two years, until 1970, and set good seed. The dark red anthers are conspicuous on young flower heads from July to September. The only other perennial grasses noted in pavement cracks are Lolium perenne L. (perennial rye grass) and Festuca rubra L. (red fescue).

GARDENS

These are the richest and most obvious habitats. The age of the houses, the variety of their occupants, and the light soil ensure a diverse flora, especially of annuals. Gardens range from neat rectangles of sterile soil to incipient sycamore forest. Many common weeds of disturbed or arable land can be listed without comment. Aethusa cynapium L. (fool's parsley), Capsella bursa-pastoris (L.) Medic. (shepherd's purse), Chenopodium album L. (fat hen), Euphorbia peplus L. (petty spurge), E. helioscopia L. (sun spurge, rare), Galium aparine L. (cooseegrass), Lamium purpureum L. (red dead nettle), Mercurialis annua L. (annual mercury), Mycelis muralis (L.) Dum. (wall lettuce), Polygonum persicaria L. (spotted persicaria), Urtica urens L.(annual nettle), Veronica persica Poir., and V. hederifolia L. (Buxbaum's and ivy speedwells; the latter is the commoner,). On harder ground Arabidopsis thaliana (L.) Heynh. (Thale cress) and Plantago major L. (great plantain) are common. The annual grasses Anisantha sterilis (L.) Nevski (barren brome), and Hordeum murinum L. (wall barley) are also common, and may dominate dry soils two or three years after they have been disturbed.

A number of more interesting and striking annuals and biennials, often introduced as garden plants, appear in garden beds, and some of them achieve sporadic abundance on disturbed waste ground. Papaver rhoeas L. (field poppy) is the only native in this group, though not common. P. somniferum L. (opium poppy) is rarer still. Oenothera erythrosepala Borbas (evening primrose) is frequent, and owes its success to large numbers of windblown seeds, which in my garden have germinated over a period of at least four years. Calendula officinalis L. (marigold) is common, and persists in the face of weeding, aided by its long seeding season. Long naturalised populations have single, more uniformly coloured flowers than those recently planted. Calendula arvensis L. appeared in one garden. Delphinium orientale J. Gay (garden larkspur) is sometimes planted, but is well established in gardens near Queens Road, and is often encouraged. Most puzzling is Euphorbia lathyrus L. (caper spurge), noted in three places. The seed of the last two species cannot be very effectively dispersed, and many of their sporadic appearances may be from long dormant seed. Galinsoga parviflora Cav. (Kew-weed) has existed for at least four years by Queens Road, but has not spread or become plentiful. Impatiens glandulifera Royle (Policeman's helmet) is spreading rapidly in several gardens, aided by its explosive seedpods, and Impatiens parviflora DC. (Small balsam), established for some years on the old University site, appeared in a Sidmouth Street garden in 1971. I have seen both species abundantly on waste ground in other towns, but not yet in Reading.

WASTE GROUND

The intermittent enthusiasm of many local gardeners provides ideal conditions for annuals and biennials. Where neglect is prolonged, and especially on the waste ground in Newtown, a quite different selection appears. Perennials, especially those with creeping roots and stolons become important. The commonest are Aegopodium podagraria L. (ground elder), Agrostis stolonifera L. (creeping bent), Aster novi-belgii L. (Michaelmas daisy; cultivated forms persist, but only the "wild" form with pale mauve flowers about 1 cm. in diameter seems to appear from seed), Cirsium arvense (L.) Scop. (creeping thistle), Convolvulus arvensis L. (bindweed), Lamium album L. (white dead nettle), Rumex crispus L. (curled dock), Solidago canadensis L. (golden rod), Trifolium repens L. (white clover), and Urtica dioica L. (stinging nettle). Festuca rubra is common, and Holcus lanatus L. (Yorkshire fog) is abundant. Other species mentioned later are also common, especially where there is some trampling, or a lot of rubbish or rubble. Less common are Dactylis glomerata L. (cock's-foot grass), Cirsium vulgare (Savi) Ten. (spear thistle), Rubus spp. (blackberries, three records, two of cultivated forms, the third of R. ulmifolius Schott.), Silene dioica (L.) Clairv. (red campion), S. vulgaris (Moench) Garke. (bladder campion), Solanum dulcamara L. (woody nightshade), Tussilago farfara L. (coltsfoot) and isolated sterile or damaged Cruciferae, including apparently Diplotaxis and Sinapis spp. Equally conspicuous though much more rare, are Polygonum cuspidatum Sieb. & Zucc., Clematis vitalba L. (traveller's joy), Parthenocissus tricuspidata (Sieb. & Zucc.) Planch. (Virginia creeper) and Humulus Lupulus L. (hop).

A succession takes place as the common annuals are crowded out of all but the most barren patches of rubble or paving. The perennial herbs are in turn shaded out by bushes and trees. Sycamore is overwhelmingly abundant, Sarbucus nigra L. (elder) is common. Some plum and apple, and occasional ash, appear. Buddleia seedlings are common. They reach seeding size in three or four years, and on heaps of mortar or rubble become the dominant plant.

In a large garden between Ort's Road and Kings Road, neglected for over twenty years, a fairly stable state has been reached. The almost mature woodland, nearly all of sycamore, casts a dense shade in which little grows. In the glades perennial grasses form a dense mat from which all annuals and young trees are excluded. The monotony of this ground is remarkable.

A curious shrub, Lycium halimifolium Mill. (tea tree) is abundant in a small area of Newtown, trailing over old walls and heaps of rubble.

There are several small corners or strips of waste land, more affected by trampling, but able to support more and bigger plants than a pavement crack. These often develop a character of their own, partly as a matter of chance, partly because of the very different soil and microclimate. A few square feet of ground near Eldon Road, facing north, and little affected by human feet or litter, supports a turf largely of Festuca rubra. The hard compacted gravel against a south-facing wall in The Grove has an abundant and increasing colony of Malva neglecta Wallr. (dwarf mallow). Further out from the same wall is Matricaria matricarioides (Less.) Porter (pineapple weed), a small annual very resistant to crushing by feet or even car tyres. Where the ground is dug or disturbed, many garden weeds appear. The south edge of Queens Road car park is a strip of hard litter-strown rubble, and its plants may be influenced by their exposure to summer breezes off a large area of hot tarmac, or stirred up by the heavy passing traffic. Artemisia vulgaris L. (mugwort), which sometimes grows on exposed margins of the A4 road, is abundant here, and Foeniculum vulgare Mill. (fennel) has persisted and seeded for several years. The presence of Hemp agrimony here has already been noted. A few plants only seen in such small corners include Arctium minus ssp. minus Bernh. (lesser burdock, frequent), Althaea rosea (L.) Cav. (hollyhock, sometimes a relic from former gardens), Sisymbrium officinale (L.) Scop. (hedge mustard), Trifolium hybridum L. (Alsike clover). Polygonum arenastrum Bor. (small-leaved knot-grass) is common on trampled ground, P. aviculare L. (knotgrass) may occur. Malva sylvestris L. (common mallow) is widespread, and variable, ranging from short-stemmed or prostrate (possibly stunted) forms, to an erect plant about 1 m. high with leaves less than 5 cm. across and dark carmine flowers. Plants with pale cuneate leaves in Queens Road car park may be diseased, but Malva ssp. in towns might be worth more attention.

TREES

The trees are, with the few exceptions noted, planted, though isolated Quercus ilex L. (holm oak), Taxus baccata L. (yew), and Ulmus glabra Huds. (wych elm) may pre-date the buildings with which they are associated. Trees not yet mentioned, of which seedlings appear with some frequency, are Betula pendula Roth (silver birch), Laburnum anagyroides Medic. (laburnum), and Robinia pseudoacacia L. (acacia). Seedlings of yew and of Ilex aquifolium L. (holly) have appeared many times on firm soil, especially calcareous soil in my garden, but, though they are probably widely dispersed by birds, do not seem to find suitable conditions elsewhere.

GARDEN AND FOOD PLANTS

Food plants are often recorded, but have no claim to be

considered naturalised here, since none of them have persisted. The following have been seen: potato, tomato, broad bean, and the birdseed grasses Panicum miliaceum L. (millet), Phalaris canariensis L. (canary grass, not seen recently), Setaria viridis (L.) Beauv. (green bristle grass) and Zea mays L. (Indian corn, which rarely even flowers). More worthy of mention are garden plants which persist for many years, but lack the ability to disperse their seeds or form new colonies. Among these are Convallaria majalis L. (lily-of-the-valley), Mentha spicata L. (spearmint) and Oxalis Corymbosa DC.

NATIVE SURVIVORS

The oldest plant communities I have seen are in the gardens of the older houses, especially in the well-maintained turf of Eldon Gardens, and of some houses nearby. This may have existed in its present form for over a century. Bellis perennis L. (daisy), Cerastium holosteoides Fr. (common mouse-ear chickweed) and Plantago media L. (hoary plantain) have been seen in this old turf. Aphanes arvensis L. (parsley piert) is abundant in part of the lawn in Eldon Gardens.

The difficulty of gaining access to more than a few of these old gardens makes it impossible to judge which original plants have persisted. Several species not seen elsewhere grow near and behind Trinity Congregational Church, but do not suggest a vestige of countryside. The native form of Hedera helix L. (ivy) hangs over walls in Eldon Terrace. It was probably present in the hedges of Ort's Farm 150 years ago. My own garden when I first saw it in 1964 contained few plants, but among them were Circaea lutetiana L. (enchanter's nightshade), Geum urbanum L. (wood avens), and Viola riviniana Rchb. ssp. riviniana (common violet). Though rarely visible from the road, these plants occur in some other gardens nearby, which were walled off from a gravel pit and waste ground in the 1870s. On the other hand, the first two have hooked seeds which could easily be introduced on clothing, or carried by cats. The violet is abundant in a corner by Watlington House. Being evergreen it is well equipped to survive among a dense growth of other plants, and having a long seeding season could reappear after occasional weeding. Watlington House was built in 1688, in open country, and it is tempting to consider the violet as one of the oldest inhabitants. An isolated plant has appeared in a pavement crack in The Grove.

CLIMATE

It is not clear how much the plants in the area owe to the local climate, and how much to the specialised habitats available. Airborne pollution, including dust, traffic fumes, and especially sulphur dioxide have an overwhelming effect on the moss and lichen flora, but no comparable effects on the higher plants. Some species may have specialised mineral needs which are best

not in polluted areas. The drier and warmer climate may be important. Though the average temperature is little higher than in the nearby country, and spring bulbs, for instance, are little earlier than in the outer suburbs, there are some important effects. The heat stored in sunny brick walls and lost from buildings provides substantial protection from frost. The lowest ground minimum recorded in my garden since 1964 has been - 8° C., and no ground frost has been recorded between 20th April and 30th October. Many all-the-year plants make better progress in winter than would be possible in most country areas, increasing further their advantage over plants with a more restricted seeding season, and mature plants of Calendula officinalis and Malva spp. often overwinter without much damage. In summer, the slower fall of temperature in the evening during hot weather may help some species. The scarcity of dew is very marked.

It is worth repeating that no final list of plants is possible in an area like this. There have been many omissions, some common plants which sometimes appear. Many of the plants mentioned have been seen in similar conditions in other towns and are part of a widespread 'town flora'. Individual species of this flora often seem to have complex and puzzling ecological needs, and some of the communities they form are as well marked as those in many natural habitats. Yet plants in towns have received little attention. A close study of them is almost certain to prove rewarding.

I should like to thank Dr. H. J. M. Bowen, Dr. C. E. Hubbard and Mr. C. C. Townsend for suggesting or checking the names of some plants I have gathered.

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Some "Ramblings" of a "Nature Lover"

by W. A. Smallcombe

As far back as my memory serves me, anything that wriggled or flew, attracted my attention. Flowers always appeared "pretty", while colour and shapes intrigued me. Even now, I recall, vividly, seeing a larva of a Privet Hawk Moth at the top of a privet twig, just after a storm of rain. It seemed that little pieces of the rainbow had been laced at a slant along its bright green trunk. Whatever was that curved horn for? Was it poisonous? The following day found me telling my school fellows - at the request of my teacher - about my find. Every caterpillar that I found went into a tin or jar with bits of leaves and thus gradually the life histories of the Garden Tiger, Buff Ermine, Cabbage Moth, and a host of others became a natural part

of my life. With paternal encouragement, I collected hundreds of larvae of Peacock and Small Tortoiseshell butterflies in a huge cage, and then, on the sunny day of hatching of the gold-spangled pupae, wondered at the miracle of these lovely insects taking their first flight into the World.

Of course I kept Silkworms - in my bedroom - in a cardboard box and fed them upon lettuce or dandelion leaves as there was no Mulberry tree near. The moths mated within seconds of emerging from the cocoons. The cardboard box had a characteristic perfume, which I thought was the natural smell of silkworms, and it was not until I handled a cardboard box some 70 years later that I realised that it WAS the cardboard and NOT the silkworms that gave the odour!

But life was not all insects. Frogs, Toads, Newts, Snakes and Lizards came within my experience. I had a large pet Toad in the greenhouse and also a Green Lizard from Jersey; I used to think and believe that they both knew me, as did a Grass Snake 45 inches long, which I found in the Cotswolds. When at last I caught it, there was a big bulge in its body and later on, it vomited a large dead toad in my knapsack. Frogs and Toads always seemed to breed in separate ponds and these amphibians would spend the winter underneath a large waterbutt in the garden. (My involvement with the albino frogs in Reading, you no doubt have read about, and the research being carried out by Mr. A. Price at the present time).

Birds were fascinating and also their songs with which I became very familiar. How intrigued I was, when I heard my first Nightingale, Corncrake, Nightjar and the Grasshopper Warbler! Came the day when I tracked a nightingale to its nest in a copse. Those five olive-brown eggs in a roughly built nest; what a sensation it was - it was beyond anything to me. I crept away and later came back and heard the parents sing - I tried to whistle! At home I kept a Magpie, Jackdaw, Jay and a Song Thrush - but not in cages locked up. I fed them well but went when they in turn died.

As I grew up I consorted with a fine, very aged naturalist - Mr. H. J. Charbonnier of Olveston, Glos.. He taught me a great deal, including the wonderful ways of Ants. These I studied closely for a number of years and kept some alive between sheets of glass. One queen ant lived for five years in the artificial nest and the workers buried her after she had been dead for nine months, but until burial she was cleaned each day, although her body was broken into several parts. Within a few months I had added a number of ant species to Donisthorpe's list for Somerset and Gloucestershire. (This person thought that I was a man, but I was still in my teens.) Entomology was a great joy to me. One day, out among the Burnet moths, I caught a black

variety and then a golden yellow form, and from the latter raised some larvae, but to my disgust, they were all taken away by ants - the ants might have thought they were dealing with the larvae of the Large Blue butterfly!

I remember, too, the fun that my companion and I had when we went "sugaring" for moths one evening. On the way to the place in a marsh for collecting, we purchased a small bottle of RUM in a public house. We mixed this with the treacle in a special tin, which my friend clinged to the front of his coat. Mounting our cycles again - it was getting dark - I had cause to rebuke my friend for lagging behind and twice he fell off his cycle. At last I discovered that the smell of the rum encouraged him to lick the brush several times - in fact he became tiney and finally fell into a stream while applying the treacle to the trunk of a willow tree! After helping to pull him out, we called at a friend's cottage and a pair of oversized trousers were lent to my fellow entomologist - for his own were soaked and muddy. We finally reached Bristol at mid-night appearing more like tramps than entomologists.

At this period of my life I did not know that the Museum world was to be my fate - but it has been and my nature background has been extended very much over the years. There is not space here to talk about Geology and Archaeology which were to take up a good deal of my time. Orchids became a great attraction and interest to me. To experience the intense pleasure of seeing the Monkey, Man, Musk, Frog, Bee, Fly, Lizard and others, including that extraordinary flower, the Leafless Epipogon, growing near Reading has been a thrill that no money could buy. These experiences have brought me into contact with many kindred spirits, people whom I respect and admire. To them, who must remain nameless, I pay tribute. I treasure their memory, for they have shared with me the real joy of "rambling" in its true meaning.

So to conclude these few "Ramblings". During a recent enforced period in a bedroom 28 species of birds came within my view. The Siskins were specially welcome.

September 3rd, 1971.

Recorder's Report for Vertebrates 1970 - 71

by H. H. Carter

PISCES

ZK found a number of dead Pike Esox lucius L. on the edge of Aldermaston gravel pit in the spring and autumn of 1971. Most were between 300 and 400 mm (12 and 16") long.

AMPHIBIA

Bufo bufo (L.) Toad. Still common at Hill's Meadow, Caversham. Only one seen at Priestwood in last few years (Mrs. Dalton). One dead on Peppard Road south of Sonning Common, 22.3.71.

Rana temporaria L. Frog. Very scarce this year in the Newbury area (RSJH). Breeding in large numbers at a pool in Mrs. Dalton's garden, Priestwood, Bracknell. About 50 dead on road, presumably killed on migration to breeding grounds, New Lane Hill, Tilehurst, 20.3.71. 5 dead there on 28.9.71. and 10 dead on 12.10.71. In the same period and area single corpses were found in Purley and Long Lane on 26.9.71 and at Cane End on the Woodcote Road on 30.9.71 (all ZK - compare with very similar observations last year.)

REPTILIA

Anguis fragilis L. Slow-worm. A male about 275 mm (11") long in grass at Spring Lane near Swallowfield 6.12.70. One at Chapel Hill, Tilehurst, 26.5.71 (ZK). One at Coley Park, 28.6.71, and a juvenile there next day (Mr. Winchcombe). A male, female and several young ones in a garden rubbish heap at Pangbourne in August. One at Theale gravel pit, 24.8.71 (ZK).

Lacerta vivipara Jacquin. Lizard. A close view of one at Theale gravel pit, 2.4.71, and one at Aldermaston gravel pit, 2.5.71 (ZK). One caught in West Reading near the Bell inn, 24.8.71 (RLN). Several on Burghfield Common during the summer.

Natrix natrix (L) Grass Snake. One 400 mm (15") long, sunning itself on a gravel path at Upper Farm, Gatehampton, 6.7.71 (ZK). One about 16 mm (6") long caught at Ideal Casements Ltd., East Reading, in October. A female 875 mm (34") in length from the railway embankment at Coley Park, 18.4.71 (BS). A very small one, presumably in its first year, at Spencer's Wood (PAB).

Vipera berus (L.) Adder. Two in Cowpond Piece, Padworth, 2.5.71 (BRB).