

QUATERNARY NEWSLETTER

No. 26

November 1978

Quaternary Newsletters are issued in February, June and November. Closing dates for submission of copy for the relevant numbers are 1st January, 1st May and 1st October. Contributions, comprising reviews, notices of forthcoming meetings, news of personal and joint research projects, etc. are invited. They should be sent to the Secretary of the Quaternary Research Association, Mr. J. Rose, Geography Department, Birkbeck College, London University, 7-15 Gresse St., London W1P 1PA.

THERMOKARST DEPRESSIONS IN SOUTHERN CAMBRIDGESHIRE

by A. Taylor

Air photographic interpretation and ground survey throughout southern Cambridgeshire have revealed the widespread existence of surface depressions. These are particularly well developed in the parish of Whittlesford (TL 4748). Recent extraction of gravel in the north of this parish is providing sections through a series of depressions and hummocks on the surface of the Intermediate Terrace of the River Cam. New faces are still being cut (September, 1978) in the field immediately to the east of the B 1379 road from Whittlesford to Shelford (TL 464495) and permission to visit these should be obtained from Spicers Ltd., Whittlesford. Exposures to the west of the road, at Wells Farm, have now mostly disappeared.

Hummocky ground occurs particularly in low-lying, damp locations on terrace gravels, in the tributary valleys of the Cam and on the lower hill slopes. A survey of the area prior to gravel extraction showed that the depressions varied in shape from circular to elongated sinuous hollows. In places these overlap with complete depressions superimposed on fragments of former ones. The depressions in the small tributary valley occupied by Wells Farm (TL 462492) show conspicuous downslope elongation east-northeast towards the main valley. Mean diameters range from 24 m to an exceptionally large 98 m, and the depths of complete hollows vary from 0.3 m to 2.5 m.

The sections show that the hollows have been partially filled with a sequence of up to 0.5 m of silty or sandy clay containing scattered, angular flints, overlain by a maximum of 0.8 m of Flandrian peat. This in turn is succeeded by not more than 0.54 m of clay containing a molluscan fauna typical of the post-glacial Cam floodplain (Dr. R. B. G. Williams, University of Sussex, pers. comm.). The thickness of the infilling, plus the present depth of the depressions indicates a maximum

original amplitude for some hollows of 3 m.

A section through a hollow immediately west of the B 1379, close to the parish boundary (TL 463495) revealed the following sequence:

Shelly clay with post-glacial molluscan fauna	0.20 m
Peat, with a 'buttery' texture towards the base and yielding fragments of <i>Quercus</i>	0.20 m
Yellow-grey sandy clay with a thin (2 cm) seam of peat and scattered, weathered flints up to 1.5 cm long.	0.15 m
Silty clay with scattered angular to sub-angular flints, 1 - 4 cm in length and pellet-shaped weathered flints 0.4 - 1.4 cm in length.	0.20 m
Gravel	base not seen.

Further west, in the Wells Farm tributary valley, an exceptionally large hollow was found to contain black, organic rich detritus mud overlain by shelly clay with *Chara*.

In the light of the recent note by Coxon in Quaternary Newsletter No. 24, these hollows could be interpreted as fossil naleds resulting from sedimentation associated with the development of icings on the floodplain surface. Certainly the occurrence of soliflucted chalk pockets in the terrace gravels themselves indicates that aggradation took place in a cold climate. However the pattern of the south Cambridgeshire depressions is widespread, not being confined solely to the terrace gravels, and an alternative interpretation as a form of ground-ice thermokarst is suggested. The genesis of these depression as fossil pingo-ice casts is also excluded by their extensive distribution and absence of ramparts. Preliminary pollen analysis by Dr. A. Mannion (University of Reading) suggests that the formation of the hollows took place in the Late Devensian.

Reference

- Coxon, P., 1978. The first record of a fossil naled in Britain. Quat. Newsl., 24, 9 - 11.

A PRELIMINARY REPORT ON QUATERNARY FOSSIL CADDIS LARVAE (TRICHOPTERA)

by K.A. Moseley

Introduction.

The existence of caddis larval sclerites as Quaternary fossils is by no means a very recent discovery. Coope *et al.* (1961) noted the presence of such fossils in the Middle Devensian deposits at Upton Warren along with less numerous but identifiable adult remains. Since that time caddis has usually only been briefly mentioned in the

faunal lists of several sites (Gaunt et al., 1970; Bell et al., 1972). Recently, Williams and Morgan (1977) have reported specifically on fossil caddis larvae from Canadian deposits with the view to obtain information about the aquatic environment and limited climatic deductions. They identified five larvae to definite species and a further seventeen at least to the generic level. During the last year Miss B. Wilkinson and I have worked on caddis larvae from British deposits of Devensian age and so far have been able to identify eighteen species and recognise an additional twelve that at present can only be allocated to genus.

The difference in the level of determination between Canadian and British Quaternary caddis faunas ultimately reflects the taxonomic coverage of modern caddis larvae which is incomplete in Europe, but even more so in North America. It is for reasons of taxonomic coverage that caddis larvae of the Family Hydropsychidae have been chosen for attention in this report, as the larvae of this family are better documented than most. It is the intention though to cover other families of caddis, found as fossil larvae, in further reports.

Ecology of Hydropsychid Larvae.

Nearly all the larvae of the Family Hydropsychidae live in running water and spin nets to filter out animal and plant matter carried in suspension. The larvae do not construct protective cases (except at the time of pupation) but live in their nets on the undersides of stones. The flow rate of water required varies from species to species, with some larvae tolerating considerable variation in the rate of flow whilst others are more particular. Those species which prefer fast flowing water include Cheumatopsyche lepida (Pictet), Hydropsyche instabilis (Curtis) and H. siltalai (Döhler) all of which are found in streams and the upper, more rocky, reaches of rivers. Hydropsyche pelucidula (Curtis) and H. angustipennis (Curtis) prefer slower, warmer waters (Philipson and Moorhouse, 1974) which are characteristic of the lower reaches of rivers. H. contubernalis (McLachlan) may also be found in such conditions (Hildrew and Morgan, 1974). H. fulvipes (Curtis) is apparently rare throughout its distribution at the present day, and Hildrew and Morgan (1974) found larvae at only one locality in Britain: a small stream flowing off the Carboniferous limestone near Cardiff.

Mode of Occurrence of the Fossil Larvae.

Like all fossil larvae those of the Family Hydropsychidae are represented only by the more robust parts of their anatomy. The soft abdominal segments do not usually survive. Those sclerites that do occur are pronotal plates, lateral head sclerites, labra, frontoclypeal apotomes, mandibles and fragments of legs, all of which are normally disarticulated. As the sclerites of modern larvae are strongly bound together the most likely reason for the disarticulation of fossil sclerites is that they were once components of cast larval 'skins'. Most caddis larvae shed their 'skins' up to five times during their lives and can

thus multiply their presence in deposits as each individual leaves several fossils of itself. This fact is confirmed by the presence of very large numbers of caddis sclerites in some deposits.

Fossils of caddis larvae can be extracted from organic silts (and less easily from peats) by the usual process of washing out the silt and then separating the insect chitin from the vegetation, using the paraffin technique. Thus it is highly likely that these fossils will be encountered by anyone studying Quaternary coleoptera or macroscopic plant remains. In fact it is the object of these notes to draw attention to this group of much neglected fossils that must be frequently encountered by other Quaternary palaeonologists.

Identification of Fossil Hydropsychid Larvae.

The most useful sclerite for the identification of fossil Hydropsychid larvae is the frontoclypeal apotome though other sclerites can be used to confirm the identities of some species. The apotomes and other sclerites are mounted on glass slides using D.M.H.F. as a mounting medium, and are best observed in transmitted light, using a low to medium power binocular microscope. This method of examination is often used for modern larvae and reveals a greater amount of detail than observing whole larvae in reflected light. The sclerites used for the identification of modern larvae by this method are obtained from cast skins in the bottoms of pupal cases.

The frontoclypeal apotomes of all Hydropsychid species are brown in hue and, with the exception of Cheumatopsyche spp., possess yellowish marks referred to as flecks. In many, but not all, cases the flecks are a fairly reliable indicator of species. However, they may have been given secondary status (except for separating Cheumatopsyche spp. from Hydropsyche spp.) after various other more reliable characters. Such characters are sculpturing, shape, and puncturation of the frontoclypeal apotomes all of which remain constant in samples of more than fifty specimens.

The key is for apotomes of fifth instar larval fossils as these are the most conspicuous. Nevertheless, apotomes and other sclerites of third and fourth instar larvae have been observed in abundance in some deposits. They differ little from the fifth instar sclerites except that the flecks on the apotomes may be more poorly defined and the overall colour of the apotomes may be paler.

The terms used in the key are defined in Figure 1.

All the species in the key are found living in Britain today. It must be emphasized that the larvae described do not make up a comprehensive list. Additional species examined for comparison, but not yet found as fossils are Hydropsyche guttata (Pictet), H. silfvenii (Ulmer), H. saxonica (McLachlan) (all in Sedlak, 1971), H. ornatula and H. nevae (Kolenati) (in Lepneva, 1964). There still remain a number of European species of Hydropsychidae of which the larvae have not been described.

A key for the identification of fossil frontoclypeal apotomes of fifth instar larvae of the Family Hydropsychidae.

1) Smaller apotome lacking evident well defined flecks. (Dense puncturation over the entire aboral region. Colour pale brown; with up to six strongly marked muscle scars in the aboral region.)

-----Cheumatopsyche lepida (Pictet)

Larger apotome with evident pale flecks ----- 2

2) Apotome with dense puncturation and rugose sculpturing over entire surface (except flecks). (Colour medium to pale brown with lateral flecks always brighter than the aboral and anterior flecks which are often absent.)

-----Hydropsyche angustipennis (Curtis)

Apotome lacking dense puncturation except near the aboral margins (H. contubernalis) and anterior corners.----- 3

3) Posterior margins of aboral area heavily sculptured, lateral flecks continued into aboral region. (Anterior fleck bright and often confluent with lateral flecks.)

-----Hydropsyche fulvipes (Curtis)

Posterior margins of aboral area not heavily sculptured.---- 4

4) Posterior margins of aboral area heavily punctured. (Apotome with a characteristic pattern consisting of a large pale anterior fleck and a 'V' shaped smaller posterior fleck separated by a lateral darker bar.)

-----Hydropsyche contubernalis (McLachan)

Posterior margins of aboral area smooth with a few fine punctures at most. ----- 5

5) Apotome elongate with evident tapering of lateral margins towards aboral end. Lateral flecks always brighter than anterior or aboral flecks which are occasionally absent. (Apotome smooth with widely scattered fine punctures except at anterior corners.)

-----Hydropsyche pellucidula (Curtis)

Apotome not elongate; with parallel lateral margins.----- 6

6) Apotome with a tightly looped aboral fleck (Fig. 14). (Apotome smooth with widely scattered fine punctures except at anterior corners.)

-----Hydropsyche instabilis (Curtis)*

Apotome with an open and wider aboral fleck (Fig. 13). (Apotome again smooth with widely separated fine punctures except at anterior corners.)

-----Hydropsyche siltalai (Döhler)*

* See text.

Species Descriptions.

Cheumatopsyche lepida (Figs. 15 and 16)

The apotome of this species is approximately two thirds of

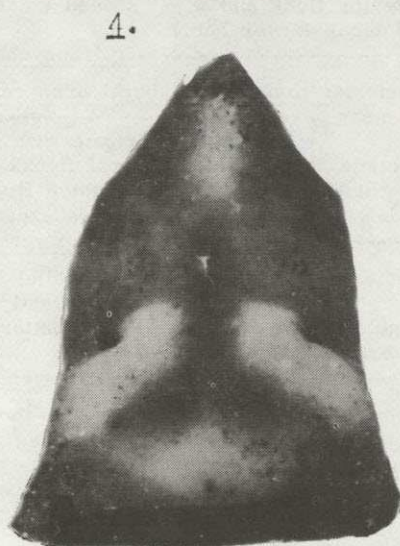
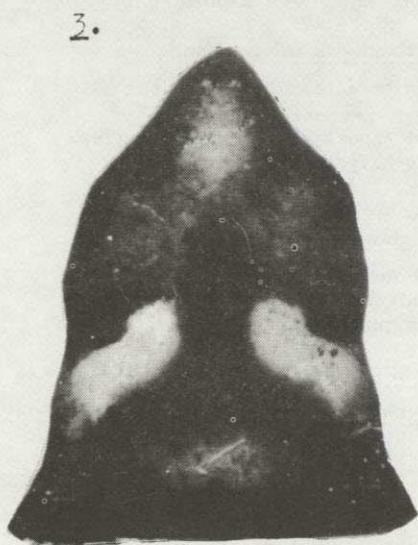
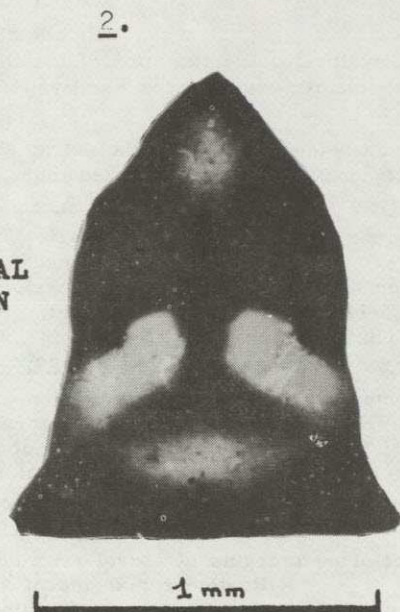
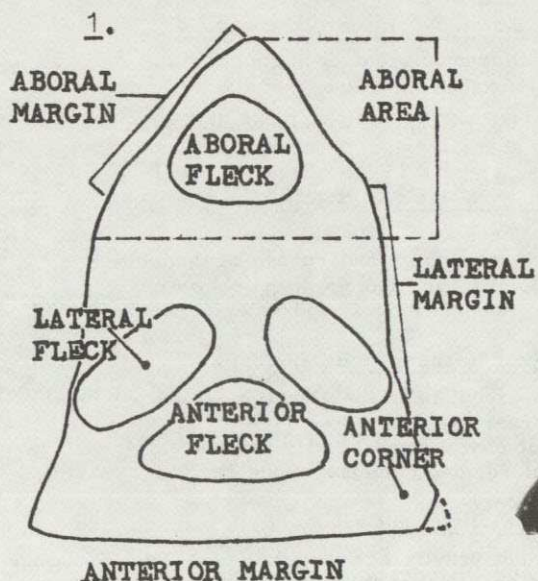
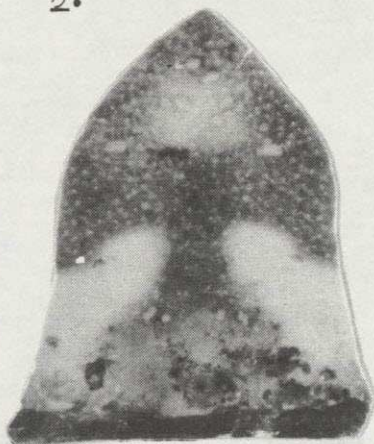


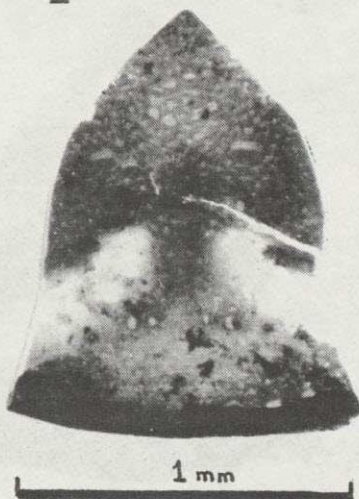
Fig.1 Diagram showing terms used in the key.

Figs 2-4 Hydrosyche pellucidula

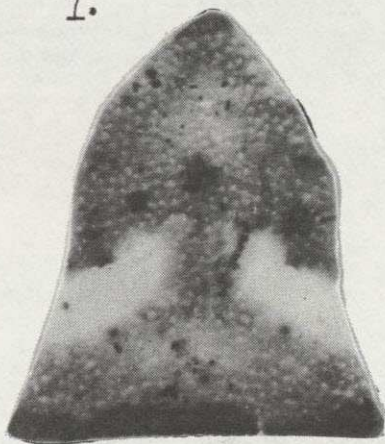
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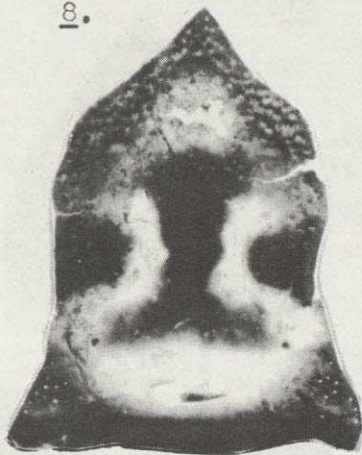
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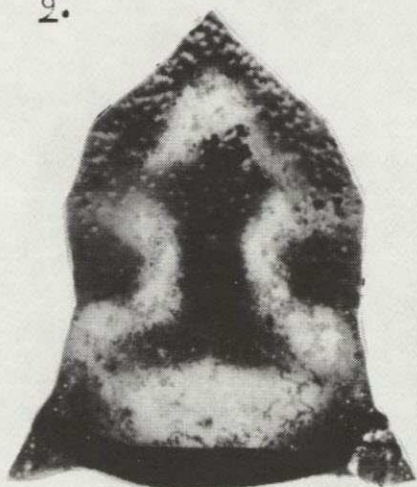
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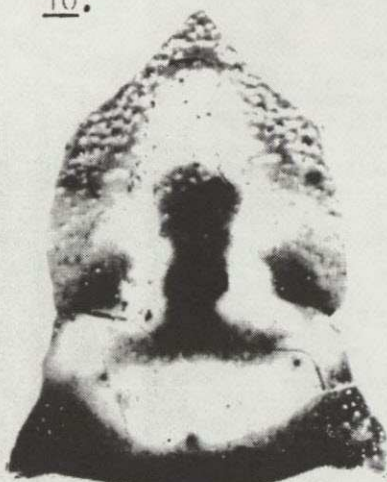
Figs 5-7 Hydropsyche angustipennis

Fig. 8 Hydropsyche fulvipes

9.

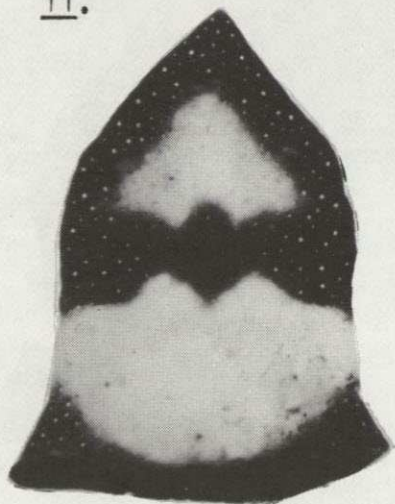


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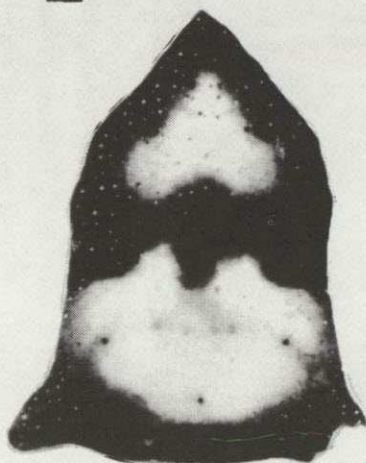


1 mm

11.



12.



Figs 9 and 10 Hydropsyche fulvipes

Figs 11 and 12 Hydropsyche contubernalis

13.

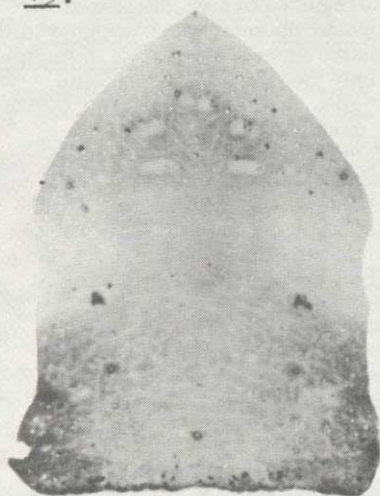


14.



1 mm

15.



16.



1 mm

Fig.13 Hydropsyche siltalai Fig.14 Hydropsyche instabilis Figs 15 and 16 Cheumatopsyche lepida

the size (in terms of length and width) of the apotomes of most Hydropsyche species and it is unlikely to be confused with them as there are no well defined flecks. At most there is a hint of a pale marking emanating from the lateral margins just before the aboral region and this is ill defined. The aboral punctures bear setae in living specimens and this gives them a hairy appearance as described in Hildrew and Morgan (1974). This species is infrequent as a fossil probably because it lives in fast flowing water and only turns up when it is washed into a site from elsewhere.

Hydropsyche angustipennis (Figs. 5, 6, and 7)

Scattered muscle scars are often evident in the aboral region of the apotome of this species. H. angustipennis resembles H. pellucidula as both species possess lateral flecks which are always brighter than the other markings. However, H. angustipennis is easily recognised by its rugose sculpturing and less elongate apotome. This species prefers slower water and thus is frequently encountered in Quaternary deposits.

Hydropsyche fulvipes (Figs. 8, 9, and 10)

This species has a close relative H. saxonica of which the only accurate description available is in Sedlak (1971). From the photographs in Sedlak (1971) H. saxonica appears to have a less elongate apotome lacking the aboral margin sculpture present in H. fulvipes. In addition, H. saxonica has an anterior fleck which, unlike H. fulvipes, is frequently darker than the lateral flecks. H. fulvipes appears to be a rare fossil and has only been found in one site.

Hydropsyche contubernalis (Figs. 11, and 12)

The heavy puncturation of the aboral margins spreads over the entire aboral region of the apotome of this species, but it is only along the dark margins that the puncturation can be observed. The dark lateral bar of the apotome occasionally produces a dark 'Y' mark projecting into the large anterior fleck, with the double prong of the 'Y' facing anteriorly. This species is found in many sites and is occasionally present in very large numbers.

Hydropsyche pellucidula (Figs. 2, 3, and 4)

The colour of the apotome of this species varies considerably from a pale to a very deep brown, with buff to deep yellow coloured flecks. It is a common fossil encountered in deposits of both Devensian and Ipswichian age.

Hydropsyche instabilis and H. siltalai (Figs. 14 and 13 respectively)

The only reliable way of separating the larvae of these two closely related species is by use of characters on the abdominal segments. H. instabilis possesses gills on the seventh abdominal segment whilst H. siltalai lacks them. Unfortunately, as previously stated, the abdominal segments are not preserved as fossils. According to the apotome fleck diagrams of Hildrew and Morgan (1974) there is an indication that the aboral fleck is more closed in H. instabilis.

Nevertheless doubt has been expressed by Barnard (pers. comm.) about the aboral fleck character and the possibility of separating these two species on apotome characters alone. Thus the last couplet of the key must remain provisional at this stage.

Conclusions

At the present time the study of Quaternary fossil caddis larvae is in an embryonic stage and the lack of information about modern caddis larvae presents some handicap. Nevertheless there is much ecological potential in their study.

The key presented in this report is intended only as a guideline and is no substitute for comparative material. I would be delighted to help with any problems concerning fossil caddis larvae, especially those belonging to the Family Hydropsychidae. Problems concerning other caddis families may be sent to either Miss Bridget Wilkinson or myself.

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Miss B.J. Wilkinson, 15 Manor Drive, Southgate, London N14.

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THE LLAY TILL AND THE PADESWOOD KETTLE-DRIFT, CLWYD.

by S. Peake.

The June 1978 Quaternary Newsletter included (p. 11) a book review of the Soil Survey's Record No. 48, Soils in Clwyd I, Sheet SJ 35 (Wrexham North). That new detailed work on this very interesting area has been published is indeed excellent news. In the review reference was made to my paper of 1961, with mention of the 'Llay Readvance', and in the book itself the section on glaciifluvial drifts and till raised the whole question of possible readvances of the last Irish Sea ice sheet. Discussion of the 'Ellesmere Readvance' is beyond the scope of the area north of Wrexham under present consideration, but I would like to make some rejoinders on the postulated minor readvance to Llay (SJ 333558).

When drawing my conclusions in 1961 the date of the Main Irish Sea Glacier in the Cheshire basin was held to have been Early Devensian (Coope et al., 1961). By the end of the sixties it had been shown that Britain's 'Newer Drift' maximum was Late Devensian (Shotton, 1967; Penny et al., 1969). In the dating of the Dimlington Silts, Penny et al. established that this maximum occurred about 18,000 years B.P. The shorter time interval makes readvances of the ice sheets in lowland areas seem less credible.

At Llay there is no doubt that over a considerable area a heavy clay with erratics overlies a thick deposit of water-laid sand and gravel, which is the northern part of the Wrexham Delta-terrace. The clay maps out as a lobe spreading southwards from the thick till body of the area immediately to the north, and the surface of which is at no greater elevation. Colliery borehole evidence (Wedd et al., 1928) and sand and gravel pit exposures confirm the superimposition of up to 8 metres of till on bedded sand and gravel of a general thickness of 30 metres.

King (in Wedd and King, 1924) writing of the comparable area bordering the Dee lowlands a few miles north of Llay, but where the slopes are steeper, has written that the "local drift of the high ground seems to have crept down over the upper edge of the sand". At Llay there is no question of slope. Solifluction would have had to take place across a virtually horizontal surface for a distance of at least two miles. If however the Llay till can be shown to be a solifluction deposit I would agree that its superimposition on the sand and gravel could have taken place by movement soon after its emplacement from the ice in a saturated and unstable condition, or that its present position could be attributed to subsequent solifluction during a cold oscillation.

At Padeswood (SJ 275623) kettle-drift which I linked with the 'Llay Readvance' very tentatively in 1961, is a feature of the Alyn valley a little beyond the north western limit of the Soil Survey's map. Morphologically there is no other deposit in the Alyn basin to compare with it. Lamplugh (1912) remarked that "nowhere in the British Isles have I seen 'kettle-structure' so well shown as in the 50 acre tract forming part of the Golf Links and its surroundings at Padeswood". Elsewhere the glacial terraces in the Alyn valley, although pitted with kettle holes, appear to represent deltaic outwash connected with the development of the glacial river system. At Padeswood the platform of waterworn gravel blocking the abandoned Alyn valley is so pitted with kettle holes that it resembles an egg-rack. (The larger Padeswood Pool depression developed due to subsidence over colliery workings). Contrast is not only morphological. The Alyn's deltaic terraces contain a relatively high proportion of northern erratics. Erratic content at Padeswood and for some distance downstream is very predominantly Welsh (Wedd and King, 1924), although the till lining the valley is of Irish Sea ice type.

New observations in the area have convinced me that the enigmatic Padeswood kettle-drift, far from having any connection with the Llay till, originated as outwash from the Terrig valley in the west, which reopened on the retreat of the Irish Sea ice from Hope Mountain and Leeswood Hill. This river, one of the Alyn's largest tributaries, drains wide areas of the western moors, over which huge erratic blocks of Arenig, Bala and Silurian rocks are still scattered today. Initially the Terrig's gravel outwash would have been thrown out in flood-time over and amongst the ice stagnating in the Alyn valley, some of it reaching Padeswood a little downstream on the opposite side. The main body of this Welsh gravel spread was later swept away as the Alyn re-established itself on the valley floor. However, because the river by-passes Padeswood via its marginal rock-cut gorge at Pont-blyddyn (SJ 277605) the kettle drift of the Padeswood area has survived undisturbed.

This conclusion implies that stratigraphically the Padeswood kettle-drift correlates with the last major retreat of Irish Sea ice from the north Welsh border, and that it was not part of the deposits of a minor readvance of the ice. It would seem that the status of the 'Llay Readvance' rests on the question of whether the Llay till is a solifluction deposit or an undisturbed lodgement till. The Soil Survey have termed it both boulder clay and till, making no distinction between it and the tills of the Cheshire plain. The question remains open.

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QUATERNARY DEPOSITS AT BROOM, DEVON.

by N. Stephens and C.P. Green.

As the result of investigations during the summer, two new sections are now visible at Broom. These show sands and clays that appear to be part of a channel fill sequence. The sections have been cut in the abandoned working face of the old Southern Railway ballast pit (ST 326020). The site is owned by Mr. C.B. Gittins, Fortfield Farm, Hawkchurch, near Axminster, Devon (Telephone - Hawkchurch 327). The site may be visited by individuals or small groups, provided that Mr. Gittins is informed either by phone or by writing beforehand, or by calling on Mr. Gittins at the time of the visit (Fortfield Farm is located at ST 327021). We shall be grateful if visitors will leave the sections undisturbed as further work on the site is planned. We hope to publish the results of this summers work as soon as possible.

REPORT OF A SHORT FIELD MEETING AT OBAN.

September 25th-29th 1978

by J.M. Gray.

On 25th September 1978, 23 members assembled in Oban for a short field meeting led by Dr. Murray Gray and Dr. Brian Sissons. Three days later they emerged, battered by controversy and rain. The controversy was not just confined to Quaternary matters. Some members raved over the Laphroig malt whisky; others christened it Glen Dettol.

Day 1 - Isle of Mull

On the crossing from Oban to Craignure many members got their first view of the Main Rock Platform which is well developed in this part of the Firth of Lorn. It was seen developed on the conglomerates of Oban and Kerrera, the limestone of Lismore and the basalt of Mull, with particular features being the Dog Stone raised stack, the rock knob islands off the west of Kerrera and the completely planed islands off south Lismore. The absence of the platform from the Morven granodiorite was also noted. Discussion on the controversy over whether the erosion could have occurred during the Lateglacial was saved for another day. Instead the

main dispute on Mull concerned whether relative sea-level was higher than the Main Post Glacial Shoreline during and immediately following the Mull valley glaciation. Francis Synge argued that it was and the group examined most of the accessible evidence. At Loch Don, a feature interpreted as a "planed-off kame" had recently been sectioned by roadworks and proved to be made of bedrock and some doubts were expressed about other pieces of evidence. Most of the party seemed unconvinced by the "washing limit" in Loch Spelve for example, and even Francis had changed back to his pre-1977 interpretation at Glen Forsa. The party also examined a gravel pit in the Loch Don sand moraine, dug some rather weathered shells out of the Kinlochspelve moraine and agreed that a section in the latter, previously interpreted as showing evidence for deposition before the ice advance, could have been interpreted as showing evidence for deposition during recession. The highlight of the return sail were the spectacular lighting effects as crepuscular rays broke through the rain clouds over Mull.

Day 2 - Glen Roy

Spectacular lighting also proved to be one of the reasons for the great success of the Glen Roy day, with the "parallel roads" picked out dramatically by sun and shadow. Even Brian Sissons who has been in the glen on scores of occasions was kicking himself for not bringing his camera. After a brief stop at the Viewpoint where he explained the evolution of ideas on Glen Roy and summarised the basic story, the group proceeded up the glen to Brae Roy Lodge examining a section in the lake floor sediments on the way. This showed well developed drop stone structures and slump structures. From Brae Roy Lodge a walk of 3 km took us to a stretch of "road" about 10 m wide eroded in bedrock. Comparisons with the Main Rock Platform were inevitable for if the erosional lake shorelines were cut in a few tens of years as the Loch Lomond Advance ice receded then it becomes easier to envisage 50 metres wide sea-coast platforms forming in the longer period of the whole Loch Lomond Stadial. There was argument however on the details of the processes responsible for the erosion of the shorelines. Brian Sissons favoured frost shattering at lake level and removal of debris by freezing into shore ice which subsequently floated off. Others favoured frost shattering over the whole cliff face and removal of the debris by waves. Yet others believed that the rock-cut "road" was partially controlled by bedrock structures and shoreline erosion was less significant.

After crossing the River Roy (by various means) the party returned along the north side of the glen via the top "road" which began as little more than a sheep track, but gradually broadened to a 50 metres wide terrace. We then dropped onto the controversial Turret terrace. Brian Sissons interpreted this feature as the remnant of a sub-aerial fan, similar to features seen at the mouths of other valleys. Jim Rose, however, suggested that it should be interpreted as an ice-contact slope, an arcuate moraine ridge (continued upslope by lateral ridges) and an outwash fan beyond. In order to explain the presence of the "roads"

inside these ice-marginal landforms he suggested that they formed before the pro-glacial lakes, and supported this suggestion by referring to lake sediments that rest on the surface of the terrace. He therefore considered that the landforms at the mouth of the Turret constitute evidence for a stationary ice marginal position before that associated with the Loch Lomond Advance which blocked the mouth of Glen Roy. Brian Sissons outlined some objections to these suggestions, but added that until the detailed work he intended to do in the area was complete it was pointless to argue at length about the features. Some of the party then studied the fine sections developed in the terrace.

Day 3 - Oban area

The weather forecast had been for prolonged heavy rain and it proved just that. The party first visited Ganavan Sands to examine the spot where ice-moulded rock has been described on the platform surface. Murray Gray argued that the features in question were not actually on the platform. He then took the party to a piece of horizontal platform backed by an undercut conglomerate cliff, and by using an auger demonstrated the presence of about 0.7 m of peat overlying the rock platform. The difference between "clonk" onto bedrock and "crunch" into gravel was explained and the techniques for measuring the altitude of the platforms were discussed. Postglacial and Lateglacial beach fragments were examined briefly, but some members were not convinced by these. It was agreed that a lot of work, particularly on the sedimentological side, remains to be done.

After passing the reversing tidal rapids at Connel the party examined the Loch Etive kame terrace and outwash system. Of particular interest to the group seemed to be Roger Anderton's interpretations of the load, liquifaction and imbricated slump structures in the fine grained sediments partly composing the terraces, the classic kettle holes perforating the front edges of the kame terraces, and the Main Postglacial Shoreline notching the terraces and sealing some of the kettles with beach bars.

By lunch-time continuous rain had set in, but most of the party were game to continue. A section dominated by water laid sediments in an area of hummocky moraine above Loch Creran was examined, and Peter Worsley gave an "instant interpretation" involving fluvial and lacustrine processes. Finally, the features on the north side of the Benderloch peninsula were examined. The party seemed happy to accept the ridges near Barcaldine Castle as submarginal eskers and were able to dig numerous shells of various species from the glacially transported marine clays and silts at South Shian. Here the trip was officially ended but eight intrepid and very wet members visited a further site at Balure where three postglacial beaches occur in a staircase and where the beach sediments overlies undisturbed Lateglacial marine clay and silt. For the second time in six months a funny thing happened on the way to this site... but that's a long story, which I'll save for a future field meeting, after a few Glen Dettols.....

REPORT OF A SHORT FIELD MEETING TO THE VALE OF ST. ALBANS

June 2nd - 4th 1978

by P.L. Gibbard.

Fifty six members and friends of the Quaternary Research Association attended the weekend field excursion to study the Quaternary Geology of the Vale of St. Albans. The meeting was led by Dr. P.L. Gibbard and Mr. J. Rose with contributions from Dr. J.A. Catt, Dr. C.P. Green and Dr. R.W. Hey (in writing). The excursion was designed primarily to demonstrate results of recent work on the Vale of St. Albans, in particular the Anglian glacial events leading to the Thames' diversion (Gibbard, 1977). Complementary topics concerning lithology and fabric of tills, the character of aeolian silts and the lithology of river terrace gravels were also represented.

The party assembled on the evening of Friday 2nd June, 1978 at High Lodge Conference Centre, Hoddesdon, where accommodation was provided. After dinner Dr. Gibbard gave an introductory lecture on the Quaternary Geology of the Vale of St. Albans and adjacent areas.

The morning of Saturday 3rd June was spent examining evidence for the pre-Anglian course of the river Thames through the Vale of St. Albans. At Northaw Great Wood the oldest deposits, the so-called '400 foot' Pebble Gravels, were studied. Although these gravels cover much of the dissected high ground of south Hertfordshire they are rarely well exposed. Discussion centred on their problematic fluvial or marine origin and on their age. Dr. B. Avery pointed out that the Pebble Gravels are occasionally overlain by the so-called Pebbly Clay Drift, and that this is most probably weathered chalky till, and not an earlier glacial deposit as was previously thought. At Essendon, the party inspected an exposure in the Westland Green Gravel, the oldest indisputable terrace aggradation of the Thames, and the first evidence of the drainage route which now constitutes the Vale of St. Albans. Dr. Green mentioned that recent work on the lithology of this gravel confirmed Dr. Hey's original conclusions (Hey, 1966). In Essendon village, Dr. Gibbard pointed out the view over the Vale that inspired Prof. T.M. Hughes to write his classic paper 'On the two plains of Hertfordshire and their gravels' (Hughes, 1868).

At the western end of the Vale near Watford, the party, led by Dr. Green, inspected sections at Westwood Quarry. Here the braided river gravels and sands rest on Chalk and small-scale, graben-like solution structures were observed. Members of the party examined the structures and concluded that they were formed syndepositionally with the overlying gravel. The gravel contained lenses of brown pebbly clay which were probably soliflucted into the channel from the valley side. Mr. Rose pointed out some evidence for palaeosol development at the top of the section. There was discussion of the correlation of the gravels. Dr. Green suggested that they should be equated with the Higher Gravel

Train of the middle Thames region, whilst Dr. Gibbard correlated this unit with the Leavesden Green Gravels.

Large sections at Westmill Quarry near Ware expose the Anglian sequence at the eastern end of the Vale of St. Albans. From the base upwards the sequence comprises the Westmill Lower Gravel, the Ware Till, the Westmill Upper Gravel, and the Eastend Green Till. This site is the type section for the gravel units which indicate an eastward flowing Thames in the Vale until the second major ice advance, represented by the Eastend Green Till. Discussion centred on the large and small scale events represented in the sections, the timing of the events and the eastward extension of the Thames drainage line into Essex. An ostracod fauna was discovered in samples collected by Dr. E. Robinson (Robinson, 1978) in a silty sand lens in the Westmill Lower Gravel.

The Sunday excursion began with a visit to the Waterhall Farm Quarry near Hertford. Anglian tills and gravels are exposed at this site, but it was not possible to study them because access was prohibited. It was possible however, to study sections in the Spring Wood Silt which overlies gravels in the Lea Valley containing an Ipswichian vertebrate fauna. Dr. Catt described analyses of the silt and suggested possible origins of the material. The complex glacial sequence at the neighbouring Bunkers Hill Quarry was described by Dr. Gibbard and Mr. Rose. The sequence here records a period of ice advance represented by till, followed by a period of stand-still during which ice marginal drainage developed, followed by a second ice advance. Evidence from regional study of till fabric and lithology indicate that both till units and the intermediate beds belong to the Eastend Green Till. Glaciotectonic and sedimentary structures were examined at this site.

The glacial sequence at the western end of the Vale was inspected at Moor Mill Quarry. Here laminated clays rest on Westmill Gravel and are overlain by Eastend Green Till recording the damming of the eastward flowing Thames by the Anglian ice. Advance of the ice over the lake as far as Watford caused the river's final diversion to the south. Smug Oak gravel overlies the till at this locality and represents the southwest flowing outwash from the receded ice front to the north east. The party closely examined the laminated clays and several members found trace fossils, originally described from here by Dr. Gibbard and Dr. A.J. Stuart.(1974).

Finally, the party visited the excellent exposure at the Hatfield Polytechnic pit where a kettle hole in late Anglian gravel and flow till is overlain by silts, marl and peat of late Anglian to Hoxnian age, overlain by cryoturbated Wolstonian solifluction gravel (Sparks *et al.*, 1969). Mr. Rose described the results of fabric analysis from an adjacent section which indicate that the till originated by flowage and slump processes in association with masses of buried ice. Dr. Gibbard remarked on the non-sequences recorded in shallow, biogenic kettle hole-fill successions at this and other sites in Hertfordshire (Gibbard and Aalto, 1977). Dr. C. Baker pointed out that contemporaneous non-sequences also occur in a

Hoxnian deposit investigated by him at Quendon, Essex. The absence, at the Hertfordshire sites, of high frequencies of *Carpinus* pollen usually found in Ho IIIa of the Hoxnian stage was discussed by Dr. C. Turner.

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IGCP PROJECT 158 - PALAEOHYDROLOGY OF THE TEMPERATE ZONE DURING THE LAST 15,000 YEARS

This IGCP Project has been formulated to identify the palaeohydrological changes in the temperate zone. The intention is that work should take place under two Sub Projects. Sub Project A is concerned with changes in the fluvial environment on the basis of multi-disciplinary studies of fluvial sediments and fluvial landforms during the last 15,000 years. The hope is that each country should compile information on a major basin which is more than 5,000 km² in area. Sub Project B is intended to relate environmental changes in lakes and mires to their catchment areas on the basis of multi-disciplinary studies of lake sediments and peat deposits formed during the last 15,000 years.

We hope that a significant British contribution will be made to this Project, and that the Severn basin will be suitable for studies for Sub Project A. Anyone who is working in this area and is interested in the Project is invited to write to the U.K. National Correspondent, K.J. Gregory, Department of Geography, University of Southampton.

THE GEOLOGICAL CONSERVATION REVIEW

In 1977 Cambridge University Press published the two volumes of the "Nature Conservation Review" prepared by the Nature Conservancy Council. This describes the range of habitats in Britain and identifies over 700 key floral and faunal localities. In October 1977 work commenced on the Geological Conservation Review. This will follow a similar approach to the Biological Review and will identify all those localities in Britain where conservation is considered essential for the continued prosecution of Geological and Geomorphological research and education. The preparation of the Review is now being undertaken by the Nature Conservancy Council Review Unit which has been set up solely for this purpose.

Compilation and writing of each chapter of the Review is being entrusted to a single Earth Scientist recruited specifically for his or her research background. Recruitment of personnel for the Review continues, and suitably qualified workers on British Pleistocene landforms and sediments are being sought.

Applicants, or anybody wishing to nominate candidates with suitable research experience should write to Dr. W.A. Wimbledon, Nature Conservancy Council, Pearl House, Bartholomew St., Newbury, Berks, RG14 5LS.

INTERNATIONAL MEETING ON HOLOCENE MARINE SEDIMENTATION IN THE NORTH SEA BASIN.

This meeting will be held at Texel, in the Netherlands from September 17th to 23rd 1979. Topics to be considered include:

Holocene sea-level fluctuations.

Tidal, estuarine and inshore sedimentation.

Shore and nearshore sedimentation.

Shelf sedimentation.

Geochemical and biogenic processes related to sedimentation.

Papers are invited on each of these themes. In addition special lectures on each theme will be given by invited speakers.

All those interested in attending this meeting are requested to write, as soon as possible, to: IAS - NORTH SEA 79, Sedimentary Group, Geological Institute, Oude Gracht 320, 3511 PL Utrecht, The Netherlands.

BOOK REVIEWS

Quaestiones Geographicae.

Quaestiones Geographicae is a journal published by the Institute of Geography at the Adam Mickiewicz University, Poznań, Poland. It is published annually, and so far four issues have appeared. Its senior editor is Stefan Kozarski, head of the Institute of Geography in Poznań. All the articles are in English, and the content has a strong Quaternary bias. Most of the articles are by Poznań geographers with notable contributions by Rotnicki, Kaniecki, Kozarski and Stankowski, as well as some significant articles by contributors from other countries.

In the short life-time of the journal certain themes are discernable: the periglacial environment (permafrost, pingos, ice-wedges and icings); fossil sand dunes and coversands; formation and subsequent evolution of Riss age glacial landscapes; present day and palaeohydrological changes in Polish river channels and floodplains. The emphasis is clearly morphological, lithological, and hydrological, and biological studies are represented mainly as a part of wider analyses of Quaternary problems.

The journal serves effectively to introduce English readers to less well-known aspects of Polish work such as Krygowski's studies of quartz-grain abrasion in different environments. But also, work of international importance is represented, such as Kozarski and Rotnicki's (1977) paper on valley floor stratigraphy and river channel patterns.

Copies of the journal can be obtained either by direct purchase or exchange with an English publication. Communication should be made either with Professor S. Kozarski, Institute of Geography, Adam Mickiewicz University, Fredry 10, 61-701 Poznań, Poland, or through the official distributors: Ars Polona, Krakowskie Przedmieście 7, 00-068 Warszawa, Poland.

J. Boardman.

RECENT AND FORTHCOMING PUBLICATIONS

Paleoecology and archeology of an Acheulian site at Caddington, England.

Edited by C. Garth Sampson. 1978. Price \$12.00

This volume gives the results of a multidisciplinary study of the sediments surviving at the old brickpits at Caddington near Luton, where G. Worthington Smith collected his famous assemblage of Acheulian artifacts. It also provides a comprehensive review of archaeological discoveries and an analysis of some of their properties using recently developed techniques. The topics considered, along with their authors

are listed below:

Introduction - C. Garth Sampson.

Geological background - J. A. Catt and R. E. Hagen.

Excavation and stratigraphy of the Radley site - C. Garth Sampson.

Sediments from the Rackley site - J. A. Catt.

Biological investigations of the Rackley site - J. B. Campbell and R. N. L. B. Hubbard.

The Cottages site - J. B. Campbell and C. Garth Sampson.

Artifacts from the Cottages site - B. Bradley and C. Garth Sampson.

Summary and Conclusions - J. A. Catt, R. N. L. B. Hubbard and C. Garth Sampson.

The book can be ordered from the Department of Anthropology, Southern Methodist University, Dallas, Texas 75275, U. S. A.. Cost \$12.00 plus \$0.66 postage for surface mail. Cheques should be made payable to "Caddington - Department of Anthropology".

Brighton Polytechnic Geographical Society Magazine.

The November issue of the Brighton Polytechnic Geographical Society Magazine will include four articles on the Slindon Sands of West Sussex and associated sediments. These are by E. R. Shephard-Thorn and G. A. Kellaway (a review of recent research at Eartham); E. Kennedy (Foraminifera from the sands); N. Haslem (a review of the literature on the upper flinty clays and silts); A. Woodcock (archaeology). Copies may be obtained from John Boardman, Humanities Dept., Brighton Polytechnic, Falmer, Brighton, BN1 9PH. Price: 35 p including postage.

CALENDER OF MEETINGS

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| December 8th 1978 | Geologists Association. A lecture by Dr. David Keen on the Pleistocene Geology of the Channel Islands. At the apartments of the Geological Society, Burlington House, Piccadilly, London, at 6.00 p.m. |
| December 16th -23rd 1978 | Quaternary Research Association Study Course. The Quaternary of Majorca. Further details from Dr. K. Crabtree, Geography Dept., Bristol University, Bristol BS8 1SS. |
| January 3rd 1979 | Institute of British Geographers. Manchester. A joint BGRG/IBG meeting to discuss Problems of longterm landform development. Further details from Dr. Chris Green, Geography Dept., Bedford College, University of London, Regent's Park, London NW1 4NS. |

- January 5th - 6th 1979 Quaternary Research Association Discussion Meeting, University College London. The Lateglacial Environment of the British Isles and North-west Europe. Further details and booking forms are in the Circular issued with this Newsletter.
- April 6th - 10th 1979 Quaternary Research Association annual field meeting and Annual General Meeting, Dublin. Further details and booking forms are in the Circular issued with this Newsletter.
- July 9th - 14th 1979 South African Society for Quaternary Research, Conference with field excursions. Principal theme: Hominid sites in southern Africa. Venue: Bernard Price Institute, University of Witwatersrand, Johannesburg. Details from Prof. T.N. Huffman, Dept. of Archaeology, Univ. Witwatersrand, Johannesburg 2001.
- September 4th - 17th 1979 Joint British Geomorphological Research Group/ Quaternary Research Association Study Course, Switzerland. Glacial and Periglacial Features of High Alpine Areas. Further details from Dr. W.B. Whalley, Geography Department, Queen's University of Belfast, Belfast BT7 1NN.
- September 17th - 23rd 1979 International meeting on Holocene sedimentation in the North Sea Basin. To be held at Texel, Netherlands. Further details are given in this Newsletter.
- September 19th - 23rd 1979 Fourth Meeting of the Geological Societies of the British Isles. To be held at Sheffield. The Q.R.A. will contribute with a series of lectures and a field meeting related to the problem of the Limits of the Last Glaciation on Friday 21st Sept. and Sunday 23rd Sept. respectively. Further details will be given forthcoming Newsletters.
- September 24th - 28th 1979 Quaternary Research Association Short Field Meeting, Channel Isles. Further details are given in the circular issued with this Newsletter.

next

Compiled and printed for circulation to Quaternary Research Association members and others by the Honorary Secretary to the Quaternary Research Association, Mr. J. Rose, Geography Department, Birkbeck College, London University, 7-15 Gresse St., London W1P 1PA. England.

