Settlement Patterns of the Draper and White Sites

1973 Excavations

Department of Archaeology
Simon Fraser University
Publication Number 6

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Organized and Edited by
Brian Hayden

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ABSTRACT

The 1973 excavations at the Draper and White sites were part of the Pickering airport salvage project which was oriented toward the recovery of settlement pattern information. There is strong indication that a major determinant in the location of both sites was proximity to soils suitable for maize horticulture, to water sources and possibly to areas of high game density. Defense may also have been a major locational determinant at both sites. There is tentative evidence for a palisade at Draper.

It is postulated that the White site – only over a mile from Draper – may have been used during a part of its occupation as a summer encampment or village for groups from Draper tending maize fields and/or obtaining other economic resources in bulk such as fish or birds. In support of this the boundaries of the maize gardens cleared by the Draper and White occupants were mapped, and the White site falls within the radius of these Draper fields. Moreover, faunal and floral remains are very different at the two sites, White having much more fish, few mammals, a high ratio of worked bone and a very high ratio of human remains. Average radiocarbon dates are relatively close for the two sites. Concerning the intra-site settlement patterning, no structures were encountered at White (a product of small sampling). At Draper, house orientations and positions relative to middens appeared to conform to the standardized pattern of northwest orientation in Lake Ontario Iroquois. Because of this and the unique *in situ* nature of deposits at Draper, we concentrated on intra-structure settlement pattern data of structure 2. The patterning here was characterized by an unexpectedly pronounced degree of activity specialization and coordination throughout the structure. This seems to imply a highly organized corporate residence group. Because of the requirements of such economic articulation and because there were definite concentrations of pits and other features plausibly associated with feasting activities, it seems reasonable to postulate a kind of longhouse big man or head man. Because authority seems to have been expressed in economic spheres, it also seems reasonable to argue that economics (namely trade goods) were ultimately the influence basis of head men and the integrating force behind the longhouse corporate structure. Trade itself, or warfare engendered by competition over trade, was probably responsible for increases in settlement sizes at this time. Draper is one of the earliest large Lake Ontario Iroquois settlements. On the basis of ceramic styles associated with household locations within structure 2, residence does not appear to have been strictly matrilocal, although there are definite stylistic groupings within the structure, indicating some tendency toward matrilocality.

Site abandonment does not appear to be due to game depletion in the area.

Two infant burials were discovered in the floor, and at both sites there were indications of human mutilation.

RESUMÉ

Les fouilles de 1973 aux gisements de Draper et White faisaient partie du projet de sauvetage de l'aéroport de Pickering. Les fouilles étaient orientées vers la recherche d informations sur les schèmes d'établissements ("settlement patterns"). Il semble que parmi les facteurs principaux déterminant la position des gisements était la proximité des sols bons pour la culture du mäis, la proximité des ressources en eau, et la proximité du gibier dense. On pense aussi que la protection était une autre considération dans le choix de location des deux gisements, car à Draper il semble qu'il y avait une palissade.

Il y a plusieurs indications que le gisement de White, qui se situe vers un mile de Draper, était peuplé par des groupes de Draper pour s'occuper des champs de maïs pendant l été et/ou pour obtenir d autres ressources en grande quantité tel que poissons ou oiseaux. Les limites des champs de maïs utilisés par les habitants de Draper ont été determinés et le gisement de White se trouve dans ces limites. De plus, les restes de faune et de flore des deux gisements sont très differents. White contient beaucoup plus de poissons, très peu de grands mammifères, beaucoup d'os travaillé, et une forte proportion de restes humains. Les dates moyennes obtenues par radiocarbon pour les deux gisements sont relativement proches.

Concernant la morphologie intérieure des gisements, nous n'avons pas trouvé de résidences au White site, mais l'exploration était très limitée. A Draper, l'orientation des résidences et leur location relatives aux dépôts de déchets semblent être conformes à la pratique habituelle de l'Iroquois Ontarien Tardif. C'est à dire une orientation parallèle et nord-ouest. A cause de cette similitude avec la pratique habituelle, et à cause du caractère unique des dépôts à

Draper qui est d'être *in situ*, nous nous sommes efforcés d'établir la morphologie des dépôts à l'intérieur de la résidence 2. Les résultats montrent une répartition des objets qui fait penser à une forte spécialisation donc une forte coordination des activités ce qui est inattendu et surprenant pour la période. L'implication est que les habitants des résidences longues constituaient des groupes corporés ("corporate groups") très organisés. A cause des éxigences dues à cette coordination, et à cause de la concentration des trous et autres phénomènes qu'on peut rattacher aux activités de festivités, il semble raisonnable d'imaginer une espèce de "grand homme' ou une personne dominante dans la résidence. Puisque l'autorité semble être reliée au domaine économique, il semble raisonnable de penser que les données économiques (en particulier les objets de commerce) étaient à la base du pouvoir ou de l'influence de ces grands hommes, et en même temps la force intégrante dans les résidences corporées. Il semble que le commerce, ou bien les combats suscités par la compétition entre groupes pour le commerce, étaient sans doute responsables pour l'augmentation en grandeur des gisements pendant cette période (Draper est un des premiers grands sites du Ontario Iroquois Tardif). L'analyse stylistique de la céramique provenant des endroits de résidence familiale dans la résidence 2, montre que les règles de résidence n'étaient pas exclusivement matrilocales, quoiqu'il y ait des similarités très fortes entre plusieurs foyers, donnant l'impression d'une tendance vers la matrilocalité.

L'abandon du gisement ne parait pas être du à la surexploitation du gibier.

Par ailleurs il y avait deux enterrements d'enfants dans le plancher de la résidence 2, et aux deux gisements il y avait des indications de mutilation humaine.

ACKNOWLEDGEMENTS

We owe a great deal to Mr. and Mrs. Draper and their family for permission to excavate extensively on their land, and for the indispensible help and hospitality which they showed toward the crew. Before passing on to others whose help has been instrumental in making this project what it was, it is necessary to acknowledge the previous work of research workers in Ontario prehistory. For without basic information as to sequences, and residence patterns, and some idea of what kind of changes were taking place throughout this period – as well as previous excavations at the Draper Site itself –, the interpretive formulation of the problems we hoped to resolve in this project would have been impossible.

I would like to gratefully acknowledge permission to excavate, as well as the provision of funds for excavation, provided by the Ministry of Transport, for both the Draper and White Sites, and the services of the National Museum of Man Archaeological Survey, Salvage Section in aiding the operationalization of the project. Material equipment, provided by the University of Toronto, Department of Anthropology, was very generous.

Mr. Victor Konrad of the Ontario Archaeological Society was instrumental and generous with his time in helping to organize the project and insure its success. Dr. J. Norman Emerson and Mrs. Martha Latta were indispensible in the experience and help which they brought to the project, as well as the additional data which they provided through their field school operations.

The value of everyone who has agreed to undertake the analysis of this material from the sites is self-evident: they are the individual contributors to this report; I would like to once again express my appreciation to them. Last, but far from least, for they are ultimately the ones who made this project possible, I would like to express profound thanks to everyone who worked in the field and gathered the raw data: Ann Balmer, Margaret Ann Clark, Allan Clarke, Patsy Cook, Isabelle Czuba, Martine Dawding, Donna Forbes, Marion Gassenauer, Paul Kent, Maimu Malberg, Rita Naras, Stephen Sawford, Allan Simmons, Mary and Phil Wright.

Special thanks to Patsy Cook for assuming responsibilities at the White Site, and to Paul Kent for discussions and critical readings on ceramic technology and techniques. J. Peter White also lent a critical eye to a previous draft resulting in several improvements.

The present volume was completed and ready for press in 1975. However, because of publication delays stemming from a number of sources it was not possible to issue it until 1979. Rather than return all the manuscripts to the numerous authors for revision and updating, it was deemed best simply to print the entire volume as expediently as possible, largely as it was originally submitted to the National Museum of Canada. This will undoubtedly result in some seeming anachronisms, such as the low estimate of the site size at Draper, the lack of references to work done since 1974, and the lack of any mention of European trade goods at the Draper Site. I can only ask that readers be indulgent in this regard.

The Draper and White Sites: Preliminary and Theoretical Considerations

BRIAN HAYDEN

BACKGROUND AND SITUATION OF THE DRAPER SITE

Situation and Natural Features.

The Draper Site, named after its recent owners, is situated on the left bank of West Duffin Creek in Ontario County (Figs. 1, 2). It is in lots 29 and 30 of Concession 7, Pickering Township. Elevation on the site varies from 740–754 feet above sea level, and the distance to the shore of Lake Ontario is about 10 miles in a direct south line. Borden designation for the site is AlGt-2. Cultural remains are in the Huron tradition, and age estimates based on ceramic seriation place occupation in the early 16th century A.D. Radiocarbon dates can be found in Appendix A.

The site lies on glacial till deposits (Gartner 1973) which have been incised by West Duffin Creek, leaving a 30 foot slope of generally high relief at the eastern edge of the site. This slope is very steep in the northern and mid-sections of the site, and slightly more gentle in the southern sector. Given this steepness, a feature not extremely common along the creeks in the locale, and the fact that the slopes at this point form a slight semi-promontory, it appears that this particular location might have been chosen as a village site at least in part for defensive reasons. If occupation of the heights was primarily to avoid long-cycle, intensive, spring floods, it seems unreasonable to choose a site with the most pronounced relief of the locale, since this would render water fetching much more difficult and subject to more frequent miscarriage and breakage. In addition, the presence of scattered human skeletal parts in houses and middens, sometimes bearing evidence of violent death and even scalping (Ramsden 1968:119), the probable presence of an often rebuilt or remodeled palisade (see Fig. 2) and the general proximity to Lake Ontario and the southern battle front with the New York Iroquois all tend to indicate that defense was a primary consideration in positioning and constructing the site, as well as in the daily lives of its inhabitants. One may also reasonably postulate that 500 years ago, when the site was occupied, the steep stream banks may well have been freshly eroded, and presented a sheer sand face, very similar to those left in the Rouge River valley after heavy flooding and lateral cutting in the late 1960's. Certainly, the steeper parts of these slopes cannot be much older than 500 years, for one would expect slope erosion of the poorly consolidated, underlying sands and till to have proceeded much further, and a much more gentle relief to have developed, even within 1,000 years. In spite of recent selective lumbering, these slopes and the stream bed appear to be largely in a climax vegetation state at this locale.

The size of the site has not been exactly determined. However, on the basis of artifact spread into the plowed field area (Fig. 2), the occupation area may be as large as 10 acres, and it appears certain on the basis of excavations thus far completed that the site covers at least 8 acres. Approximately 6 acres of the site lie to the east of the plowed field and have never been disturbed by plowing activity or any other detectable large scale disturbances. In this area we might expect to find from 10–15 longhouses, and since the first 2 structures excavated are considerably longer than usual, we can probably think in terms of a population of about 1,000–2,000 (Heidenreich 1972: 53-4) for the entire site. Assuming that longhouses at the Draper Site are longer than the average for the Ontario Iroquois tradition, this may indicate that corporate residence social structures were particularly strong at this time period and at this site, and should be exceptionally suited to archaeological detection.

In contrast to the plowed field where the poorly developed B and C soil horizons are abruptly and sharply truncated, and overlain by a homogeneous plow zone about 20 cm thick, the undisturbed portion of the site has a natural podzolic soil development, with an A horizon about

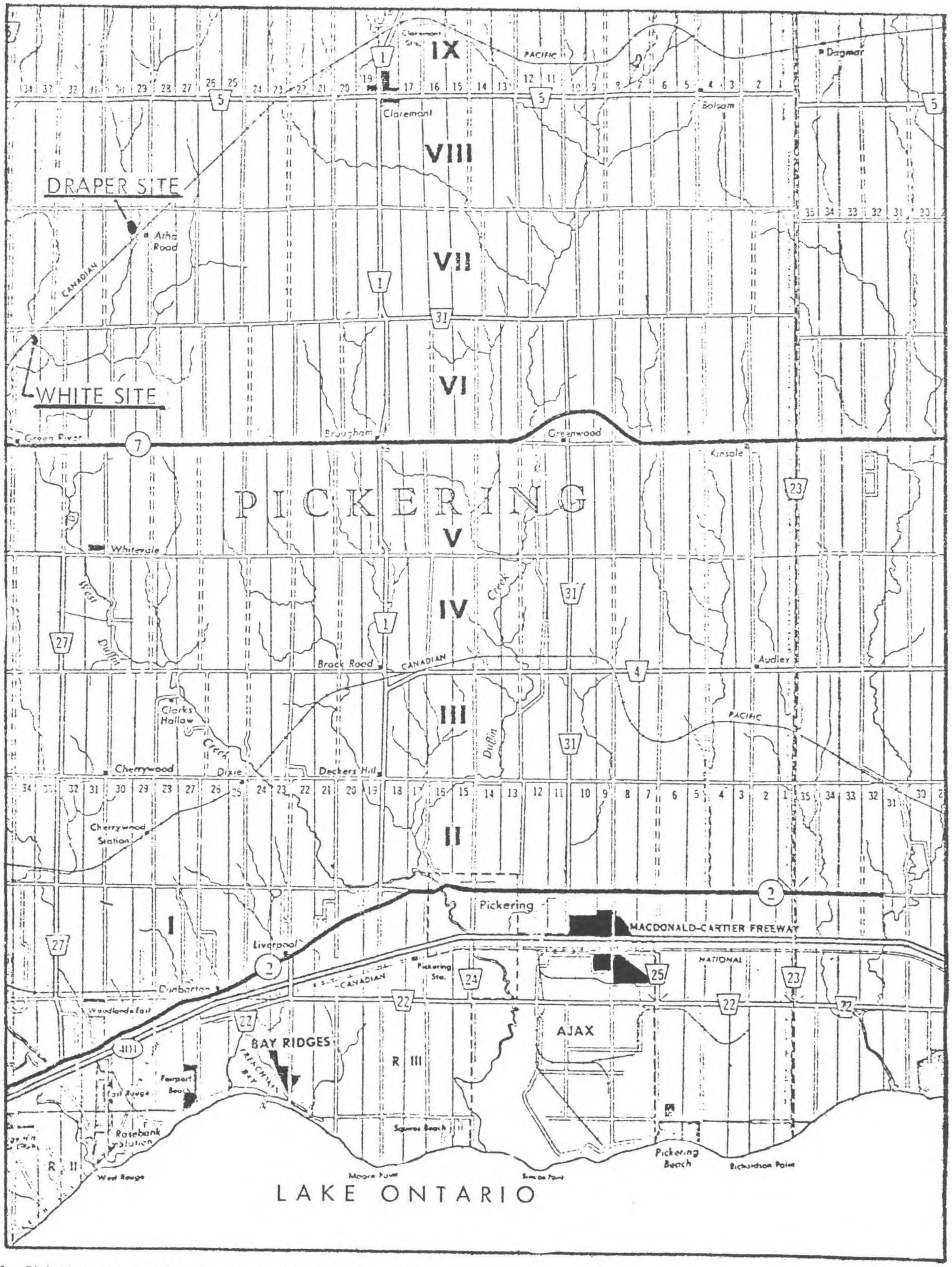


Fig. 1. Pickering area showing Draper and White sites. Toronto is about 5 miles west of the map. Concessions (bold Roman numerals) are about 1¼ miles wide.

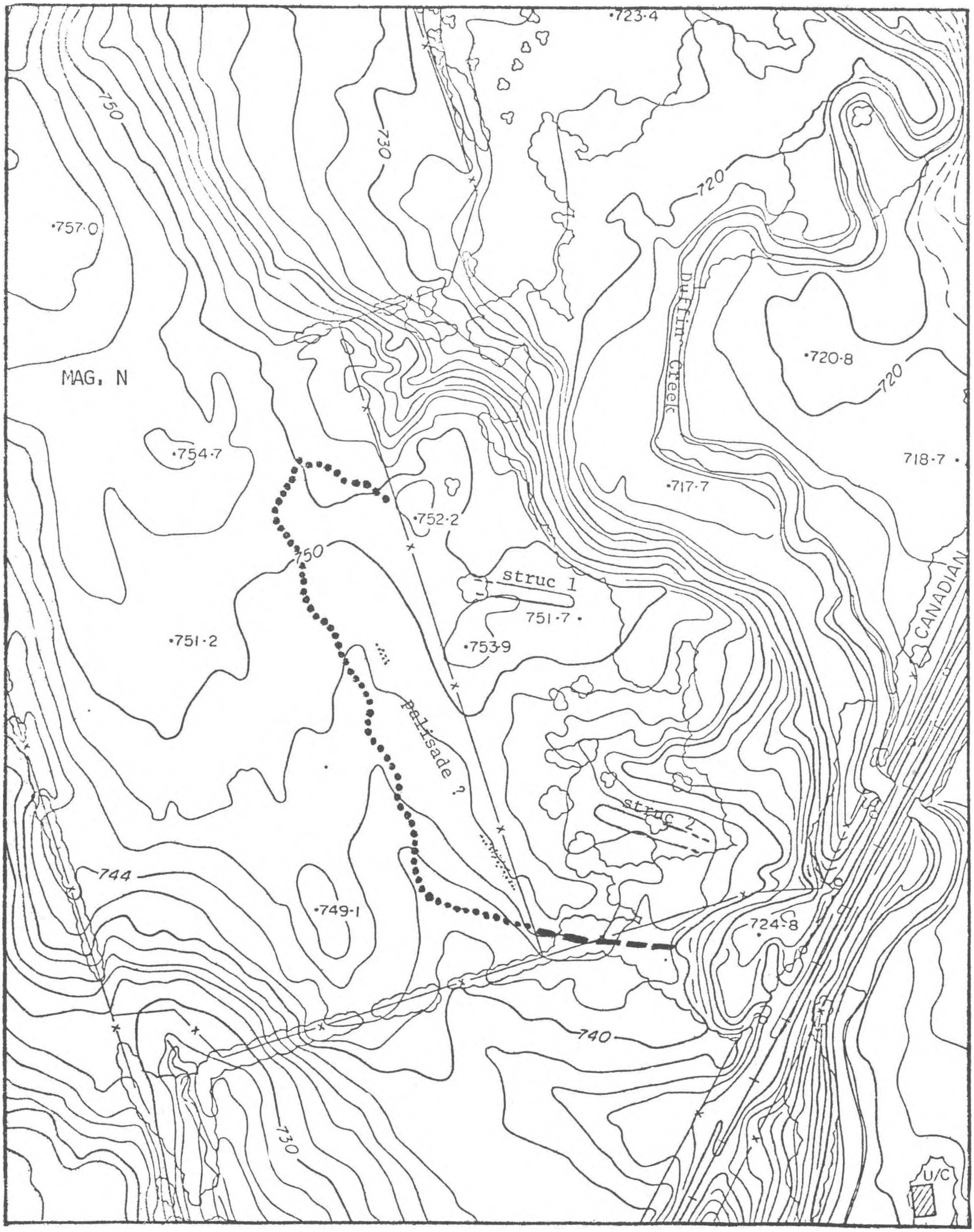


Fig. 2. The Draper site. Dotted line indicates maximum extent of surface artifact occurrence in the plowed field (west of the fence line). The area east of the fence line is undisturbed. Contour interval = 2 feet; scale is 200 feet per inch.

15–20 cm thick. It is almost entirely within this natural A horizon that non-pit artifactual material occurs, usually between 9 and 18 cm below the surface (Plate 1). Pit features, of course, occur in B and C horizon contexts as well. Hearths were found, undisturbed, at depths as shallow as 15 cm below surface. Middens display no indications of smoothing off due to plowing or other disturbance. All these factors leave little doubt that the majority of the site is in undisturbed, primary, archaeological context – a condition relatively rare for Ontario Iroquois sites.

The only other striking morphological feature at the site is an east-west trending ravine which divides off the southern 2–2½ acres of the site from the main area. This ravine affords a gently sloping, ramp-like feature extending down to the stream bed for any who wish to use it. We postulated that the ravine was probably used frequently for fetching water, and thought that human denudation of the surface, or even intentional modification might have resulted in a change of ravine form during or immediately after occupation. A well-travelled path might also be expected to have a higher concentration of broken ceramics, etc. In order to find out if these ideas were accurate, we excavated 2 test pits in the middle section and mouth end of the ravine (Fig. 2). We recovered no artifacts from either, however the test in the mid-section of the ravine appeared to cut through ill-defined cultural deposits for the first 50 cm, and then gradually graded into undisturbed, natural, bedded sands and clays. Charcoal was relatively abundant in the upper portion, and there was at least one good posthole. The excavation cut through a slight mound, apparently of cultural origin and a broad lens of charcoal, which was possibly a root burn. Lateral excavation did not continue far enough to make any more definite statements. At the mouth end of the ravine, the A horizon was underlain locally by a brown undulating clay lens, which appeared to be natural, and the contact between the A horizon and the underlying clay was probably an unconformity, indicating that active erosion had occurred in the past, but whether by natural agencies such as torrential rains, or cultural activities as from repeated trampling and denudation, is

Plate 1. Soil profile at the Draper Site showing undisturbed nature of the deposits. Note particularly the gradual transition from the A to the B horizon on either side of the ash lens of hearth B. Also note the shallow depth of the hearth ash and the minor degree of disturbance.

unknown. All sediments below the A horizon appeared to be undisturbed glacial deposits, being bedded at about 50 cm below surface.

Exactly what was going on in the middle section of the ravine with the posthole and cultural disturbance must await future excavation. The lower part of the ravine yielded no evidence of definite cultural disturbance or use.

One of the effects of the ravine is to create a natural division in the site, which could be effective in separating the occupants into socially meaningful residential groups such as clans, original vs. incoming groups, ceremonial affiliations, etc. if such special divisions were present at Draper. The area to the south, being smaller, would accommodate a minority social unit of the size of 4–5 longhouses very well. The relative isolation from the rest of the site would probably tend to increase the sense of coherence of the residents as a separate group. Again, if any strong social-residential divisions did exist among the occupants, one could reasonably expect them to be manifested strongly on either side of this ravine. This was a key assumption in deciding to excavate a longhouse in the southernmost part of the site, that is to see if there were any differences between it and the contents of the house excavated in 1972 at the northern end of the site. Some conjecture has been advanced that the southern and northern sections of the site represent 2 sequential occupations with at least some hiatus between their dates of occupation. However, Ramsden (1968), who sampled most of the middens on the site, found no reason to assume that two time periods were represented in the ceramic assemblages; work done in 1973 has only reinforced this interpretation. In addition to the ceramic data, the palisading gives every impression of running along the entire inland perimeter of the site (Fig. 2), indicating that all area within the site bounds was occupied at once.

The stream bed has been selectively timbered, and it is possible to see felled trees and rotten stumps both in the valley and on the unplowed portion of the site. The valley has been left otherwise untouched, while the site area has been maintained as an open grass and secondary growth area for the grazing of cows. Exceptionally large maple and elm trees, which may be several hundred years old, occur on the unplowed portion of the site. Cedar is not plentiful except on the edge of the site, although a number of rotten cedar stumps and roots were encountered during excavation. Given the advanced state of decay of stumps with chain-saw marks on them, we have assumed that virtually all uncarbonized wood was more recent than the aboriginal occupation. Large amounts of charcoal were often found in the A horizon within the house, but some of this may be the result of pioneer tree burning. Whitevale, a village only 3 miles from the Draper site was established in 1820 as a lumbering post, and it is probably safe to assume that the Draper locale has been selectively lumbered intermittently at least from the middle 1800's to the recent, as indicated by Bowman's data (see Bowman, this volume).

Clay Deposits at Draper:

There are two types of clay which occur rather sporadically in the geological deposits at Draper. The first of these is a brownish clay which can be seen in patches near the surface of the drift deposits, and which extends to an unknown depth. The brown color of this clay suggests a fairly high ferric oxide content. It is possible that some of this clay was used for packing occasional posts, and for providing a hard, durable floor for certain areas within the longhouse, which contrasts markedly with the soft yellowish sand that makes up the majority of the flooring. The other variety of clay is light to mid grey in color, and is found imbedded between sands belonging to the Late Wisconsin outwash and till. Duffin Creek is cutting through some thick beds of these grey clays near the settlement area. Experiments were made with some of this grey clay. A small bowl and a pipe were fashioned: the bowl was heavily tempered with fine sand in order to prevent sudden shinkage of the vessel during the firing process, while the pipe was untempered. When dry, these objects were covered with coals and fired in an open hearth, the temperature of which caused commercially produced glass bottles to bend and melt. After firing, the sherds were a uniform dark grey, and poorly fused. Although limited in scope, these experiments indicate that the grey clays at Draper may be completely devoid of iron oxides, therefore making them very different in chemical composition from the brown clays also found at the site. It is apparent that the Huron occupants may have selected only the brown clay for making ceramics since Draper ceramics display various degrees of reddening, which was certainly due to oxidation. These inferences are supported by a pipe stem found in surface collecting the plowed field. The stem was of grey clay from Duffin Creek, but the surface was neatly slipped with brown clay fired to a redder color.

Some of the Huron sherds which were recovered in yellowish sandy contexts (in the B horizon), seemed to take on the color of the surrounding sand; these sherds were much lighter in value than sherds recovered from A horizon contexts. A possible explanation for this phenomenon is that the B horizon may have provided a reducing environment, and converted any red ferric oxides present in the sherds to yellowish ferrous oxides.

As mentioned, both clays occur sporadically in the till plain, and patches of each have even occurred in the same excavation square. Corings with a soil probe as well as distributions in strata sections, and the occurrence of postholes in clay areas, all seem to indicate that these clays occur naturally in the till, and that settlement factors are minimally influenced by clay deposits. The patches of brown clay may be remnant pieces of a locally developed interglacial soil which were incorporated into the till. Both clays are of exceptionally pure consistencies.

History of Excavation:

Members of the Ontario Archaeological Society have conducted intermittent test excavations since the 1950's at Draper. The aim of most of these has been to obtain adequate ceramic samples from the various middens. The only published data from these excavations was issued by Donaldson (1962) who worked on the site in 1955. The analysis of the material is very short, but places occupation in the Black Creek Lalonde stage, characterized by ground deer phalanges, trumpet and ringed-barrel pipes, triangular points, and a general eastern Iroquois influence.

Wright (1966) mentioned Draper in passing, and situates it at the beginning of the Late Iroquois tradition (1966:101).

By far, the most detailed study which has been made of Draper material formed the body of an M.A. thesis (Ramsden 1968), in which the first site map was formulated with positions of all known middens indicated. These middens were tested and compared for ceramic differences.

In 1972, the Ontario Archaeological Society, under contract from the National Museum of Man conducted excavations at the north end of the site and discovered a longhouse 25 feet in width and over 160 feet in length. Complete definition of the house length was precluded by the presence of an exceptionally large maple tree in the centre of the house at one end. An analysis of the results has been prepared by Ramsden. Eight hearths were situated along the central axis, together with 57 pits scattered about the same axis. There was no definite evidence of bench structures, although large centre posts did occur.

AIMS

In the OAS (Ontario Archaeological Society) grant proposal (1972:2-3) considerable emphasis was placed on the value of the Draper and White sites in terms of the valuable settlement pattern data contained in the respective deposits, and the grant was requested largely to investigate such data. The mere fact that both sites are largely *unplowed, undisturbed settlements* — a very rare occurrence among the sites reported in the literature of Ontario Iroquois archaeology — should be indication enough of the unusual value of these sites for settlement pattern analysis. Thus, the basic approach adopted for the project, was to recover settlement pattern data.

As an indication of the range of goals and types of problems which settlement pattern studies deal with, Trigger (1968.53-4) has given a brief general overview, noting dominant tendencies. These dominant tendencies fall into two classes:

1. The relation of settlement characteristics to the surrounding ecology and the technology available to the occupant groups;
2. The inferring of social, political and religious organizations in the prehistoric cultures from the patterning of material remains.

Trigger (1968:55) goes on to divide the realm of settlement pattern analyses into three levels, at each of which the above approaches can be operative. The 3 levels are:

1. The individual building or structure.
2. The manner in which these structures are arranged within single communities.
3. The manner in which communities are distributed over the landscape.

For the purposes of expediency, it has been assumed in the formulation of our approach, that ecological factors will be most evident in determining factors at the level of community distribution over the landscape (3), whereas social factors will primarily be evident in intra-structure and intra-community patterning.

These are the considerations around which the objectives of the report were built. For those who have followed developments in archaeology over the past decade, it should be evident that recovery of data which can be labelled "settlement pattern data," or any other kind of data, is no longer sufficient rationale or directive for the excavation, or the salvage, of a site. The development of a theoretical framework which deals with settlement pattern problems, or alternate problems, is a prerequisite to any intelligent and coherent attempt to excavate or "salvage" a site. Without well defined theoretical constructs or problems, it is impossible to gauge the worth of the types of data which are being "salvaged," and one runs the considerable risk of collecting data which will be of no practical use to anyone, while ignoring other types of data which can advance archaeological reconstruction and understanding of cultural processes. In digging blindly, one may well destroy a site for minimal results in the name of "saving" it. Because the Draper and White sites are so unique in terms of preservation, and because they have so much potential in terms of adding new dimensions to our understanding of the Iroquoian development, considerable effort has been devoted to formulating searching theoretical propositions related to the excavations. In more specific detail these propositions were formulated in the following terms:

Location of Both Draper and White Sites:

Although other determinants of settlement location plausibly enter into the positions of these sites (e.g. Draper is situated at the top of a very steep stream embankment with high relief, a situation possibly dictated by defensive considerations), we wanted to find out if the area immediately around the Draper and White sites had any special ecological advantages for the Iroquois occupants. To this end a small investigation of the localized climax vegetation was undertaken; pollen samples were analyzed from midden and pit deposits; we obtained floral evidence from carbonized plant fragments (separated by flotation techniques); early historical accounts and surveys were searched for pertinent data; and we arrived at a limited reconstruction of the environments being exploited by the occupants (see Mulstein; Mulstein and Bowman; and Bowman, this volume).

Special attention is being focused on the position of the White site, which contrasts strongly with that of Draper and most other Ontario Iroquois settlements. Instead of being on top of a stream terrace, it is located in between two stream terraces and is consequently relatively hidden from anyone travelling on the interfluves. The location thus makes one suspect a possible specialized function for White site. In order to test this idea thoroughly, more extensive excavations will be necessary than we had resources for in 1973; however, preliminary results point toward probable validation of this point of view.

Another very important aspect of the location of the White site is its proximity to the Draper site – just over a mile. Heidenreich (1972:68) estimates that major Huron villages eventually exhausted land roughly within a 1½ – 1¾ mile radius of the village. Moreover, ethnographic sources indicate that main villages were virtually deserted in the summer owing to the absence of able-bodied men who were on trading and warring expeditions, while the women and children – and presumably older men with perhaps a handful of warriors – camped in the fields, and tended the gardens (ibid: 60). It was therefore very tempting to see the White site as an ideal summer camping spot or seasonal settlement used for tending fields once land had been cultivated to such a radius. This impression is reinforced by the paucity of other Ontario Iroquois sites in the immediate vicinity. If our hypothesis is correct, the White site is unique in the literature of Ontario Iroquois sites, and might yield valuable information on segmenting and reorganizational principles in Late Ontario Iroquois culture. With male members absent, the residential alignment in structures might be completely rearranged. On the other hand, matrilocal patterns might stand out even more strongly. In any event, the potential for gaining valuable insights into Ontario Iroquois social structure and economic bases is extremely promising. First, it is necessary to demonstrate that the White site is contemporaneous with the Draper site, and it is essential to show that the site was economically specialized, as well as to discover the nature of the ecomic specialization. Longhouse structures may or may not be present. If they are present one should expect significant content differences from Draper structures in terms of tool type frequencies and organic remains. It should also be kept in mind that the site could have served additional functions e.g. as a travel stop-over for trading groups, or other short occupations.

Although unique in Ontario literature as a probable economically specialized site, I am confident that this is merely because of the past theoretical orientation of prehistorians toward problems dealing with major villages. It seems inevitable that more such economically specialized sites will be discovered in the future.

Site Size:

Site size undoubtedly played an important role in determining site locations – especially for Draper (ca. 8–10 acres). Moreover, if we trace the locations of sites in relation to each other over time, a high degree of covariance is observed at certain time periods, indicating that the location of one site is dependent on the location of another, or other site(s). It is noted in at least one place that these covarying sites seem to coalesce at a given time period (Tuck 1971). Thus, when projected into time, our concern with settlement patterns involves us directly in the mechanics of, and reasons for, increases in settlement sizes.

The reasons why settlements increase and decrease in size is probably one of the most important archaeological and anthropological problems that we are capable of dealing with at the present. Upon the size of settlements largely rests a group's ability to make war, to produce material, to engage in large scale trade, to control resources, to support large scale stratified institutions, specialists, etc. Yet it is an incredible fact that the reasons why settlements change size is one of the most neglected problems in the literature. Rarely if ever have any ideas about *why* changes took place been tested; rarely if ever have such changes been dealt with in a systematic and nomothetic fashion. There are many suggestions, cursorily thrown out for acceptance or rejection, about why specific cases of changes in settlement sizes have taken place, but there has been no real investigation of the problem.

Since Draper occupies a temporal position very germaine to this entire question, one of the primary aims of the 1973 excavation season was to *begin* to provide some data on the mechanics of the increase in site sizes characteristic of this time period. As noted, sites the size of Draper only really begin to appear at the beginning of the Late Ontario Iroquois Period (Wright 1966:99). Since Draper is generally assigned to the beginning of the Late Ontario Iroquois Period (Wright 1966.101), one should be able to detect some indication of the mechanics by which settlements increased in size. Obviously, the Draper site forms only one part of this puzzle, although possibly an important part. For, in fact, it appears that settlements were increasing in size in Southern Ontario during the Middle Ontario Iroquois Period (1400–1500 A.D.) while during the same period settlements in the New York area remained small (Noble 1968:310-311).

It should be made clear that the 1973 excavations were *not* meant to settle, in any definitive way, the broad question of why and under what circumstances settlements increase in size as a class of phenomena; nor were the results of the season's excavations supposed to be very definitive in terms of certainty that increase in site size occurred via one mechanism rather than another or for one reason rather than another. Such definitive results require much more work at the Draper site, as well as some good comparative data. Rather, what I hope to have accomplished is an awareness of the problem, the delineation of some of its major features, the formulation of several hypotheses, and the testing of these (on a limited scale) with the data which are available from the Draper settlement.

Elsewhere (Hayden 1978), I have argued that large settlements are uneconomical, difficult to administer, and promote higher morbidity and mortality rates than smaller settlements. Therefore, the most economical, least stressful, and most healthy settlement size is the smallest feasible – e.g. the homestead or nuclear family. Given this situation, increases in settlement sizes are unexpected outcomes. During the course of excavations, two models capable of explaining such unexpected trends were developed: 1) a simple internal growth model which assumed that mankind was inherently gregarious and increased community size whenever possible, especially when more productive subsistence technology became available; and 2) a model which related settlement size growth to external forces such as warfare and increasing localization of critical resources (e.g. water in arid regions). Neither of these models was found to be completely satisfactory, however, and one of the conclusions stemming from the 1973 investigations at the Draper site was that a third major type of model can be used to explain increases in settlement size. This third model postulates that monopolistic trade will result in wealth concentrations, which act as internally generated forces, drawing population to those centres with concentrated wealth. I feel that it is this model which has most explanatory power regarding settlement size increases as represented at the Draper site (see also Ramsden 1978).

Because we were only examining the first two models at the time of the excavations, great emphasis was placed on the different types of patterning expected within the site given the two models. If simple internal growth was the primary mechanism of settlement size increase as expected with the first model, then stylistic differences throughout the site should have been minimal. If, on the other hand, the second model of settlement size increase was more pertinent, a very different pattern of archaeological remains should have appeared in the analysis. Under defensive pressures, groups coalescing into a single village should combine within that larger settlement several independent stylistic traditions. Thus, with this second model, the inter-house structure stylistic variance within a large community such as Draper should have been developed to a maximal extent, and should certainly have been much greater than the variance found within any one of the previously independent, smaller settlements (all other things being equal). Because not enough data is currently available, it shall be assumed that contemporaneous independent villages differed in stylistic pottery traditions. This assumption needs future substantiation.

It seemed reasonable to expect coalescent groups to maintain some distinctiveness and segregation immediately after, and even relatively long after, coalescence. It was also reasonable to expect social "distance" to be highly correlated with physical distance (Sahlins 1972:197), especially given non-industrial communications. Thus, one could expect social separation to be greatest where physical separation was greatest. At the Draper site, there was an additional natural dividing line which could tend to act as a marker between differing social groups: the ravine dividing the site into northern and southern sectors. This appeared to be an excellent situation in which to test the two models proposed above. The previous season's excavations dealt with a house at the north end of the site. Our objective was to find a house at the southern end of the site, on the other side of the ravine, where according to the postulates of the second model and assumptions of social distance, we should find a noticeably different pottery assemblage or male lithic assemblage – depending on residence prescriptions. It was for these reasons that we excavated where we did. Exact location of our testing was determined by local features such as the position of middens, relatively flat areas, etc.

In orienting our research in the above manner we are in reality testing two propositions: 1) that settlements only increase in size under external influences, such as defense, strong enough to override the inherent disadvantages of larger settlements at the egalitarian subsistence level; and 2) that the Draper community represents the coalescence of several independent villages.

Again, it should be emphasized that to answer questions of this nature, it is usually necessary to have a relatively good body of comparative data. Data for comparative studies of this type do not appear to exist in published form for this region, and it seemed dubious that after our analyses, we would be able to make assertions with as great a level of confidence as .05, if that – although with a great deal of luck this might be possible. Rather than providing a definitive answer to these questions and problems, we hoped simply to obtain a preliminary indication of how our results fit these alternate models, and provide a solid data basis for future work and analysis at the site.

Site Movement:

It has been traditionally assumed that the regular moving of Iroquois villages at 10, 20, 50, or even 100 year intervals was necessitated by land exhaustion around the site (Trigger 1969:17; Heidenreich 1972:68). However, ethnographic observations from other parts of the world indicate a possible alternate explanation for this movement behavior. It is commonplace to find swiddening groups such as the Tsembaga of New Guinea (Rappoport 1968) which have no difficulty in establishing permanent villages by means of a long term fallowing period during which the fertility of the land is re-established by natural reforestation and Carneiro (1956:233) suggests that soil depletion is generally not a limiting factor in the degree of sedentism among swiddeners. There is no *a priori* reason to assume that the Huron could not have easily maintained a similar system. On the other hand, an argument can be made that among swidden groups which are known to move settlements, there seems to be a general correlation between frequencies of moves and importance of wild game in the subsistence strategy. For instance, Carneiro (1964:16-18; 1968:134-135) notes that Montana swiddening groups in Brazil such as the Amahuaca, give soil depletion as an emic reason for moving their villages, although it is empirically demonstrable that they were far from exhausting their soil resources, and in fact had much more usable land available. Carneiro (personal communication) affirms that in fact these Montana groups rely to a much greater extent on wild game than groups such as the Kuikuru which move villages much less frequently. One possible cause of village moves may therefore be game exhaustion (Carneiro 1964: 16). Thus it might be argued that the Huron abandoned their villages when game became depleted within accessible distances from the villages. It should be stressed that given the large amounts of time and energy needed to construct villages (e.g. Callahan 1973) one should not expect moves to occur for trivial reasons.

If Huron villages were moved because of game exhaustion, one might expect to find:

1) substantially fewer faunal remains in the uppermost levels of middens or fewer staple animal remains or,
2) different butchering patterns in the tops of middens reflective of increasing distance of game transport, or
3) possibly greater evidence of malnutrition in human bone, as well as a higher miscarriage rate or infant mortality rate, during the later phases of occupation.

Structural Arrangements Within the Settlements:

Although this was not our main area of concern in 1973, we did add to the available data on positions of former house structures and probable exterior work areas. With the help of the University of Toronto and Scarborough College field schools, limited testing for a possible palisade structure was undertaken. Such data was also usable in relation to the models of settlement size increases based on threat of warfare. As for the White site, it was hoped that the discovery of some sort of structure with undisturbed contents might indicate a specialized economic role of the site occupants. However, we found no structures during the excavations at the White site.

Settlement Patterns Inside Structures:

It would appear that little if anything has been attempted or published on the internal composition of social units of Ontario Iroquois longhouses. Noble's (1968:264-308) unpublished treatment of the lineage nature of longhouse units and the possible archaeological visibility of lineages and clans is the exception. It has generally been a standing assumption for nearly a century that longhouses constituted matrilocal, matrilineal clans. However, Tuck (1971:221) argues that in the 17th century the little information which is available indicates that residence was only occasionally matrilocal. To what extent was this situation characteristic of prehistoric Iroquois groups, and what in fact was the basis for residence in the longhouse structures so characteristic of this era? Did the inhabitants form a corporate lineage, or was a corporate structure entirely lacking in regard to the residents of each longhouse? It is difficult to believe that the small oval structures of the Early Ontario Iroquois Period could have expanded as extensively as they did and incorporated much larger populations inside each structure, without some sort of corporate structure channeling decisions as to who would reside with whom, as well as determining the size of the habitation group and thus the structure's length. However, as the 17th century data indicates, if the corporate structures governing residence were not matrilineages, what were they? There are few reasonable alternatives. One possible source of residence orientation might be the family head's affiliation with a festival or religious lodge, all the members of which might reside in the same longhouse; another possibility might be the creation of a "following" around dominant traders, if in fact trade or redistribution was of overriding importance in the economy.

In any event, although there are only two partially excavated houses at the Draper site, which is far from a statistically valid sample, both houses (160+ feet and 150+ feet [in neither case were both ends of the houses located]) go well over the average length of structures for the Late Ontario Iroquois Period (Heidenreich 1972:47). If it does turn out that the occupants of Draper resided in exceptionally long longhouses, it would seem reasonable to infer that whatever forces were operative in creating residence-determining corporate structures, and making these groups adaptive for Iroquois society, such forces were at an apogee of social strength and development at this time. Since behavior relating to any given institution should be patterned to the most extreme degree at the apogee of that institution's power or development we might reasonably expect the nature of the institution to be most discernible archaeologically in such a maximally developed context. If this is the situation at the Draper site, patterning of material remains should reflect the nature of these residence dominating forces or institutions better than at other Ontario Iroquois periods.

If these corporate structures were matrilineal-matrilocal clans, the homogeneity of ceramic styles within longhouse structures should be maximal, whereas stylistic differences between longhouses should be more pronounced.[1] On the other hand, if the corporate structures dominating residence behavior were not matrilineal, or at least not matrilocal, then there should be a much more homogeneous spread of pottery styles throughout the village, and more heterogeneous mixture of styles within each longhouse structure. It should be emphasized that these are relative differences, and that only with an adequate comparative base can definitive inferences be made. The operational and theoretical assumptions are very similar to those employed by Longacre (1964: 1968) and others. Examinations of the validity of these assumptions can be more profitably discussed elsewhere.

Although outside the purview of our research, the reasons for the development of longer and longer longhouse structures from small oval structures would make a fascinating study.

In order to begin to answer the above questions, we have attempted analysis of the ceramic styles within longhouses, and hope to find clustering of specific types in the vicinity of hearths within the longhouses.

In the ceramic analyses we used traditional typology and assumed that this was a relatively accurate reflection of Iroquois culturally patterned behavior or cultural "rules" (conscious or unconscious). Whallon (1972) has convincingly argued for the validity of this typology and has cast serious doubts on the worth of other statistical typological definitions. For these reasons we have not become involved in the generation of alternate typologies.

Since the ceramics were made by women, the analysis yields data on residence patterns of women. Again, because no comparative data exists in Ontario for such an analysis, and because the interpretation generally depends on comparative data for its validity, it was assumed that we would only be able to glimpse the answers which we sought; it was not expected that anything definitive would result from our researches at this stage; it is expected that our data, used in conjunction with data obtained in the next years' excavations will provide the basis for much more definitive conclusions.

An additional facet of concern with settlement patterns and social implications of intra-structure settlement data, has to do with the repartition of space within structures, areas which were communally shared for general and/or special activities, separate social-economic units within the structures, etc. This, of course, involves a very traditional goal of archaeologists: the discovery of activity areas. If these can be identified within or without structures, it is a very small additional analytic step to delineate tool kits, and postulate tool functions. It would be wasteful to have engaged in such detailed analysis without taking this additional, relatively minor step. Therefore, two further aims were considered in handling the material from the 1973 excavations: 1) the delineation of activity areas with their social implications for intrastructure activities and occupant relations; and 2) the delineation of tool kits, and an attempt to make inferences about the functions of tools.

[1] It should be realized that we can expect a relatively high level of statistical "noise" due to other sources of ceramic stylistic variation. For instance, Stanislawski (1973) has emphasized that women acquire stylistic habits not only from their immediate family but from several sources including neighbors when learning how to make and decorate pots. Individuals usually alter their stylistic repertoires as they grow older as well. In spite of such potential interfering influences, it is hoped that corporate group traditions will be detectable, even if they account for only a minority of the total ceramic variability. Obviously, any definitive resolution of this issue lies in a much more expanded comparative context, for which adequate data has yet to be collected.

EXCAVATION TECHNIQUES

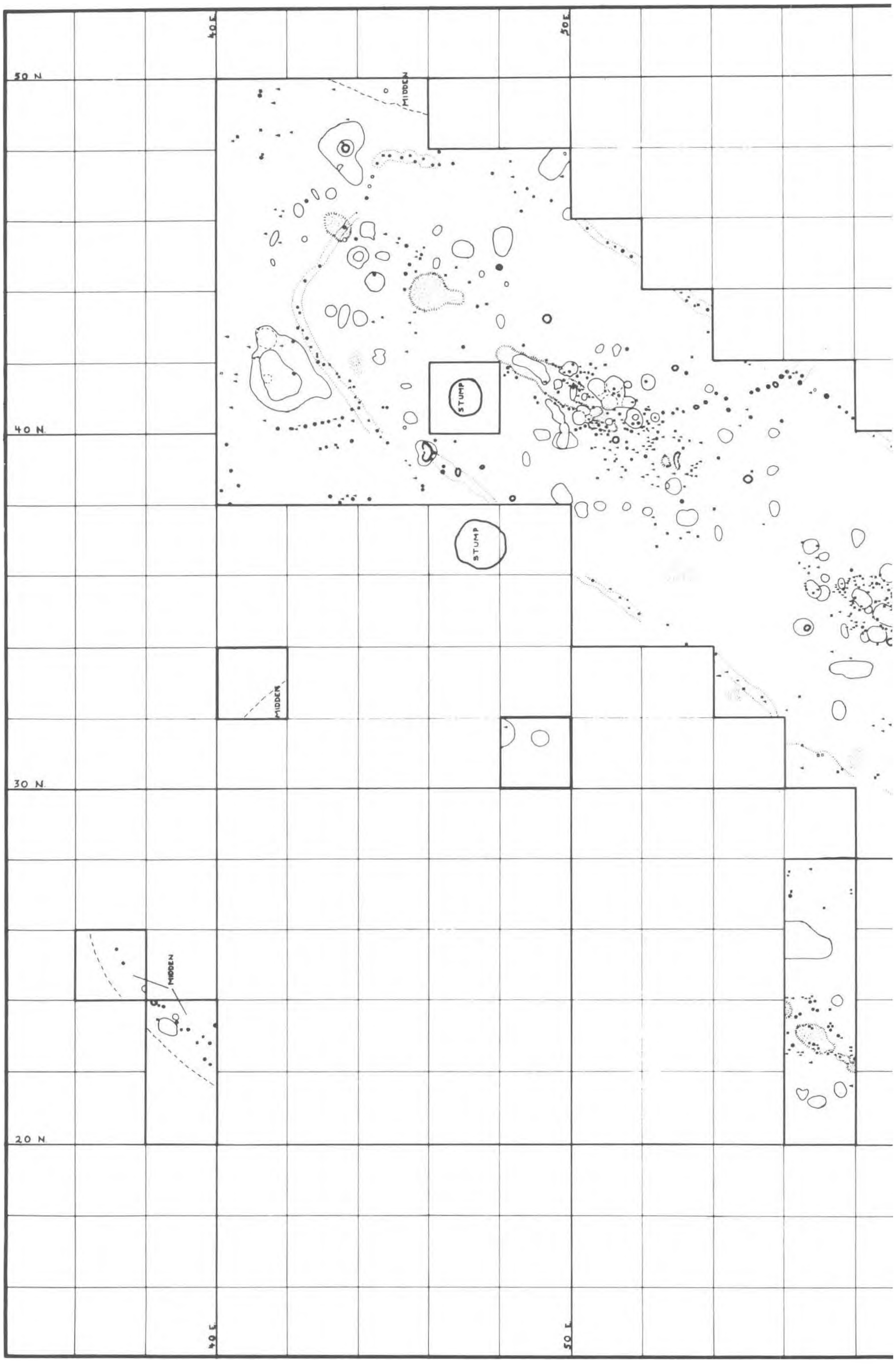
From the foregoing, it should be apparent that the primary emphasis in the project was on a deductive, hypothesis formulation, and hypothesis testing method. However, it should again be emphasized that this was only possible in any meaningful sense because of the wealth of data which was provided from previous research. Besides this major aspect of the project, a minor aspect of the project was purely information gathering in orientation, i.e. much more inductive. This minor aspect consisted of attempts to delineate midden and structure positions by means of remote sensing techniques, namely: via a restricted magnetometer survey in the vicinity of (and partially overlapping with) our excavations; and a low altitude, multi-spectrum aerial survey of the two sites (see Farquhar, this volume).

In regard to excavation methodology, it is hoped that the foregoing sections have adequately explained the unique nature of both Draper and White sites, and the relatively unique types of analysis which have been attempted at these sites in the Ontario context. As noted, neither site has been plowed and the artifactual material was essentially in an undisturbed, primary depositional context. This is an unusual condition for Ontario Iroquois sites, and it is only because of this situation that the types of analyses proposed were at all feasible. In view of this special circumstance, it was deemed that much more precise excavation and recording was required than has been habitually practised on plowed Ontario Iroquois sites. In fact, the types of analyses which were attempted absolutely necessitated a high degree of control over provenience of every artifact which was excavated. This control essentially meant that two dimensions were added to our interpretations. In the first place, some temporal control was possible, even within house structures, for the deposit was generally about 15 cm thick, and field observations detected localized differences in artifact materials from top to bottom, indicating some sort of change over time. In the second place, it was possible to do a horizontal distributional analysis of the various styles and artifacts, thereby making possible inferences about social units, activity areas, tool kits, and variability between social units. If the provenience controls were not precise enough, none of the above would have been systematically possible. Of course, in order to procure usable data for such interpretive analysis, an additional outlay in time and energy was required over and above what has been expended in most Ontario excavations of plowed and disturbed sites.

On the one hand, it would have been unnecessarily meticulous to record the exact provenience of every body sherd and every bone sliver; on the other hand, simply recording material in units of 5 foot squares or 2 metre squares is so gross as to make most correlations meaningless or of exceedingly low value. Therefore, I broke our recording unit – squares 2 metres on a side – down into a number of smaller excavation and analytic units. These smaller units were 50 cm on a side, which meant that there were 16 small units per 2 metre square. We sequentially numbered these within each square in a standardized form. In order to increase the rapidity with which these units could be recorded and excavated, we had a metal frame constructed with 50 cm cross-wires, which could be laid over each square. We then placed 25 cm spikes in the ground at the cross-wire points, and the spikes were pushed completely into the ground, and further embedded as the square was taken down in excavation. Precise subsquare limits were not kept since this would require an inordinate amount of time, and because slight inaccuracies on the order of a few centimetres would not substantially affect the magnitude of correlations which we obtained (by using 50 cm squares instead of precise locations of artifacts, reliability and magnitude of correlations was already affected, and variance of a few centimetres would not greatly increase this, while the magnitude of correlations possible with this recording system are still high and significant).

All material was troweled down and sifted with an 1/8" mesh screen where it appeared there were possibilities of significantly increasing recovery of floral or fish or microfaunal remains. Generally where used, however, it appeared that about 90% recovery of material over 1 cm in diameter was attained by troweling in the deposits.

Where fish bone and/or seed material was present it is obvious that the rate of recovery in troweling was much lower. Given this fact, it was often difficult to tell when the use of the screen was warranted. This may be a significant skewing factor in our final results. I would strongly recommend that if resources and personnel permit at least one house be excavated in the future using fine screens throughout. For the 1973 excavations it is hoped that, even given the lower recovery rate, concentrations of fish bone and seeds will be visible in distributions, etc., simply due to the fact that they would more likely be spotted, even in troweling, in areas where they were most abundant. Again, individual differences in experience and troweling techniques, etc., will probably affect the data and analysis of these artifact categories adversely. The reason sifting was not regularly carried out was that we were primarily attempting to obtain a large enough sample of floor area from the site to try the above mentioned techniques of analysis, and to see if anything meaningful would come of such an approach, especially in regard to the ceramic analysis. Moreover there were problems of screen clogging



40 E
50 E
50 N
40 N.
30 N.
20 N.
MIDDEN
STUMP
STUMP
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MIDDEN
40 E
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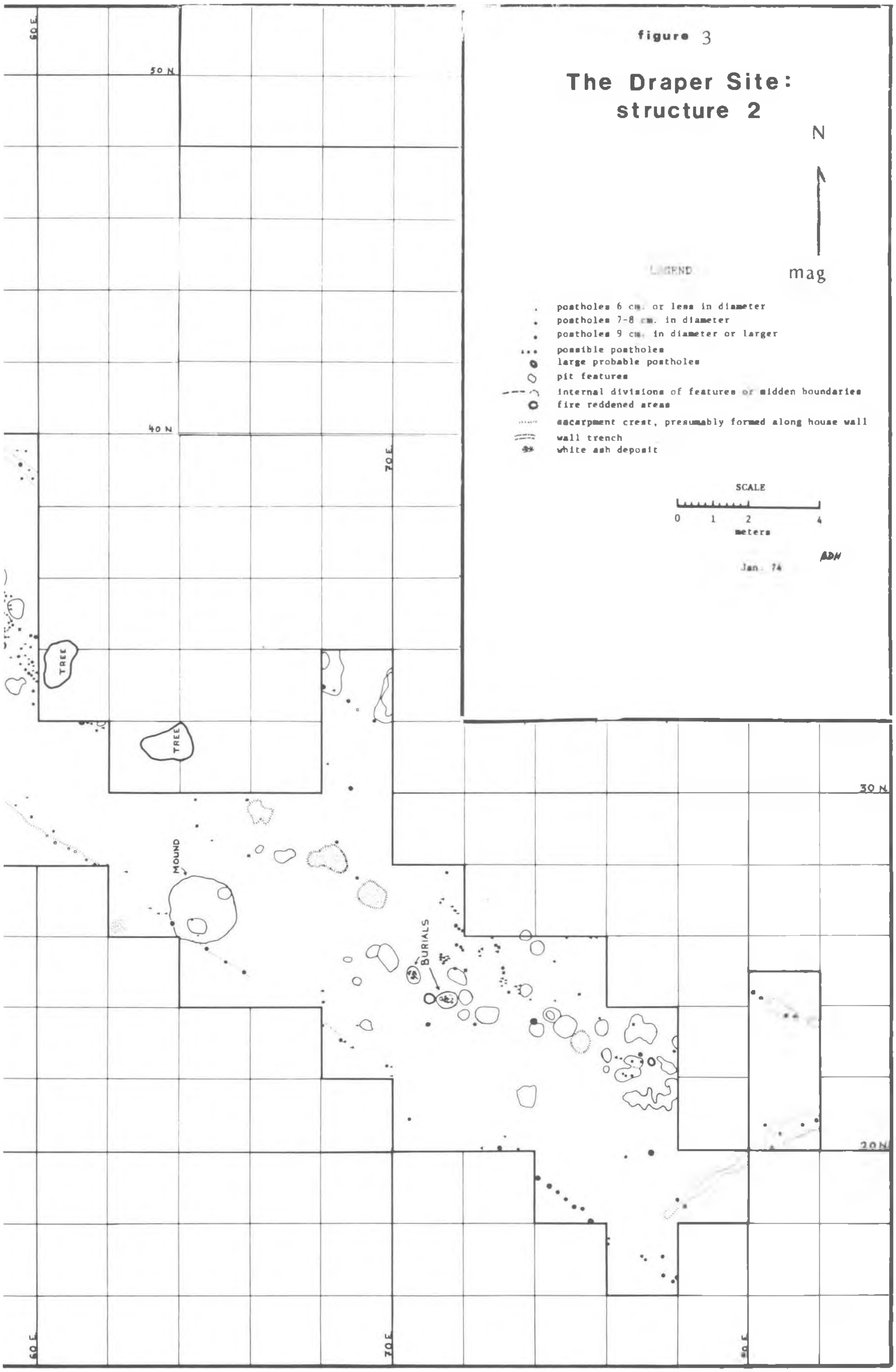


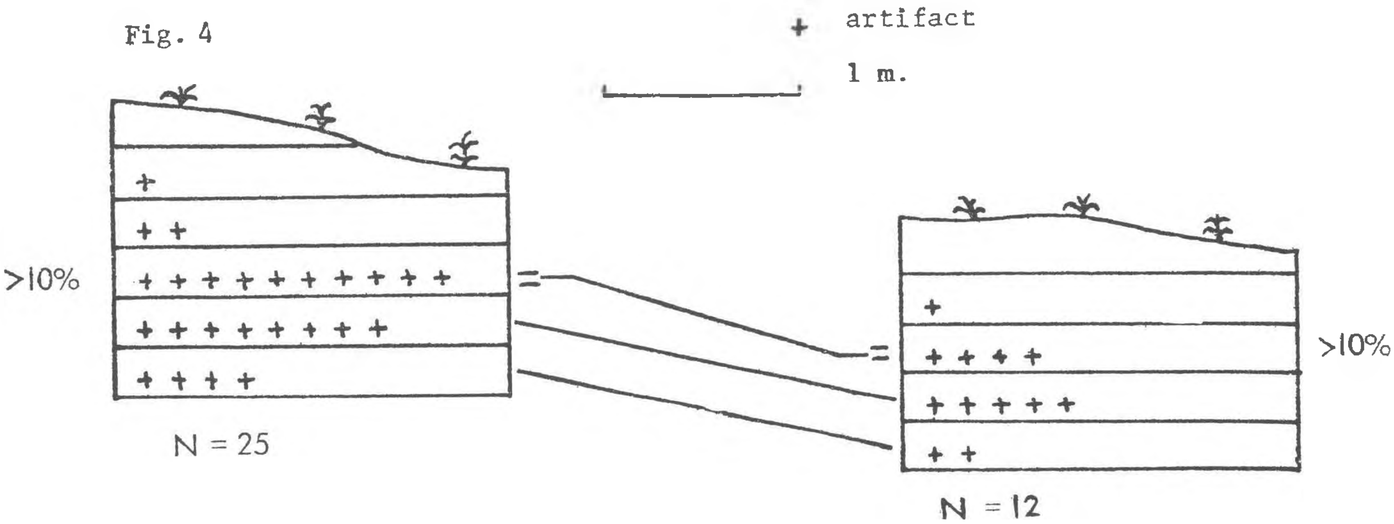
figure 3
The Draper Site:
structure 2
N
mag
LEGEND
postholes 6 cm. or less in diameter
postholes 7-8 cm. in diameter
postholes 9 cm. in diameter or larger
possible postholes
large probable postholes
pit features
internal divisions of features or midden boundaries
fire reddened areas
escarpment crest, presumably formed along house wall
wall trench
white ash deposit
SCALE
0 1 2 4
meters
ADH
Jan. 74
50 N
40 N
30 N
20 N
60 E
70 E
80 E
TREE
TREE
MOUND
BURIALS

and lack of water to resolve this.

As for the vertical controls, almost the entirety of the deposits lay in the black "A" horizon of the soils at Draper and White – very close to the surface. Because of the black color of this topsoil, natural stratigraphic units were exceedingly difficult to observe visually. For this reason, and because we could not assume that surface contours necessarily represent the shape of the surface when the sites were occupied (due to tree falls, localized erosion and deposition, etc.), we excavated the 2 metre squares in arbitrary, horizontal, 3 cm units. Because the cultural deposit was so thin, anything larger than this ran the great risk of becoming meaningless in terms of detecting changes in the 10–50 year period during which the site was presumed to have been inhabited. A finer recording unit – 2 cm units, or even 1 cm units – might be preferable, however, this would entail considerably more time, and it was thought best to try an initial analysis with slightly larger units to see if any meaningful changes were apparent. It should be emphasized that this solution to vertical and temporal controls of the deposit was far from satisfactory, it being exceedingly difficult to be sure about the temporal correlation of a level in one square with any other level in any other square. The best that can be attempted is an approximate correlation based on the relative position of levels in relation to the total, vertical artifact spread in the squares concerned.[2] It seemed equally, if not more, futile to attempt to follow the natural contour of the surface, in arbitrary units, especially given depressions indicative of pits, post-occupational mounds, subsurface concentrations of rotted roots, irregularities in desodding, etc. The problem of how to maintain the most meaningful vertical controls under such circumstances remains unsatisfactorily resolved in my mind.

To facilitate and expedite excavation, the first 6 cm of sod and soil were stripped away without being recorded. Spot checking confirmed that no cultural material occurred in these first two levels. The square was then excavated in

Fig. 4



[2]Operationally, this means that all artifacts from a subsquare should be summed, and the first level to have more than 10 per cent of the total considered to be the "first" cultural level. All such "first" units would then simply be considered contemporaneous. (Fig. 4). Units below this initial designation would simply follow sequentially and would be correlated according to their sequence position (e.g. all "2's" being considered contemporaneous, etc.). Again, there is very evident room for error, however this crude model seems potentially the best for determining approximately contemporaneous artifacts in a simple majority of squares. Significant correlations indicating change over time should be discernible amidst the "noise." The criterion of using 10 per cent to mark the initial level is arbitrary, but seems to be a statistically useful level for excluding artifacts occurring in higher layers due to change and natural disturbances.

One further caveat in regard to interpretations derived from the vertical and horizontal data, is that changes in artifact patterning within the longhouse might also be subject to the vagaries of cleaning habits, type of flooring (the east end had a predominantly clay floor which may have facilitated cleaning and/or made occupation less desirable due to hardness), and other factors. Nevertheless, given the nature of the deposits we were unable to determine how such differences could be detected stratigraphically. This type of "noise" may reduce the certainty with which we can present the sequencing of materials. On the other hand, we may discover that sequencing correlations are relatively accurate and have high confidence levels. In any event, results should be testable with future data from other houses at Draper, and at this point we feel that if any technique is going to yield meaningful results, it is the one discussed above. General trends should also be evident in the associated midden deposits. Middens are particularly intricate puzzles to take apart and put back together again, and no detailed effort was devoted to their decipherment in 1973.

horizontal 3 cm levels until artifact occurrence stopped, at which point, shovels, trowels, and hoes were used to rapidly take down the mottled A3 and B1 soil horizons (which were relatively deep, unfortunately) so that post molds and pit features could be seen, recorded and excavated. Features were recorded as separate units, and except for the very large ones were not dug in terms of subsquares and 3 cm levels. They were excavated and recorded as another class of analytic units. One other exception to the above system was where living floors were detected due to differential compactness of the soil within the topsoil (A horizon). Such occurrences were rare, although we had one or two instances in areas close to hearths. In these circumstances, the deposits were excavated down to the living floor and recorded in terms of those depths. Such living surfaces were followed as far as possible, however only restricted areas were detected.

All points from which measurements were taken in the 2 metre squares were tied in to the datum point being used for the site, so that there was relatively good elevation control in relation to surface contours, in case it was necessary to analyze the data in this fashion.

The entire southern portion of the site was carefully gridded with squares which measure 10 metres on a side, and each of the corner stakes was measured for elevation below datum.

In terms of the techniques used for other aspects of the analysis, most of the pits and hearths have gone through a floatation process which greatly increased the recovery rate of carbonized plant remains and fish bone and other microfauna. In addition, radiocarbon and thermoluminescence samples were taken for analysis in order to obtain some idea of the relative temporal positions of the Draper and White sites -- it would be especially interesting if they were contemporary. Pollen samples were taken, and limited ecological studies undertaken to provide data on the past ecology and how it might have influenced the location of each settlement (see infra).

Standardized forms were made up for the recording of data pertaining to the excavation of each 2 metre square, features found within these squares, and the stratigraphy and soil development of each square. This insured some degree of control on uniformity and comparability of types of data recorded.

All material was kept and recorded (only rocks were discarded, although their frequency in each level and subsquare was recorded). All material was washed and catalogued in the field, providing a preliminary breakdown of artifacts and their distributions in the areas excavated. Squares were backfilled as they were finished in order to save on future backdirt moving as well as time spent on transporting backdirt out of the excavation area.

In sum then, we have added two complete dimensions to the analytic armory at Draper and White sites. This means it will be possible to carry out studies of change through time at these sites, as well as undertaking the detailed settlement pattern analyses outlined in the first part of this report. The price for adding these dimensions to the information which we derive from the archaeological context is a reduced amount of earth moved, and a reduced total area excavated. However, both Draper and White sites are extremely rich in terms of the many varied types of information which can be culled from their deposits. Indeed, in many ways, these sites are ideal as well as important. It would be a tremendous loss and setback for Ontario archaeology as well as a blow to archaeology as a science investigating laws and principles which govern culture, if these sites were simply dug as disturbed Ontario Iroquois sites have been dug in the past. More so than at any other site in Ontario now being excavated, these sites should be excavated so as to derive the maximum amount of useful information from them. At least in the case of Draper, all data may be lost in the next 2–3 years if concerted efforts are not made immediately, on a much larger scale to deal with the site.

It must be added that, within what I consider reasonable bounds, all efforts have been made to increase the efficiency of the detailed recording used at these sites.

GENERAL SETTLEMENT CONSIDERATIONS AND INFERENCES ABOUT STRUCTURES

In this last introductory section, I will discuss the major aspects which we examined while still in the field. Some of these aspects could be dealt with directly, such as post hole size, while others were more of a problematical nature, and could only be formulated in terms of preliminary theorizing. If the discussion of problems is framed in an unresolved hypothetical fashion in this introduction, it is because none of the detailed analyses of the artifactual material was available when the section was written. Much of this section thus represents only the first phase of deduction: hypothesis formulation. Evaluation of the various possibilities will be carried out in the summary chapter of this volume.

Site Location.

In terms of general determining factors for site locations, two considerations seem to stand far above all others at both the Draper and White sites: defense, and economic potential. The lines of evidence which point to defense as an important factor at Draper have already been discussed. Briefly the evidence consists of: a probable, often rebuilt palisade; location on a semi-promontory with high relief which would also be disadvantageous for water and stream bed resource fetching; relatively common, scattered and sometimes mutilated human skeletal parts; and a general geographical situation near the border with known historic enemies, the New York Iroquois. For the White site, the emphasis is less pronounced, and would seem to follow more of a concealment pattern.

As for the economic potentials of the areas around both sites, these will be dealt with in detail in the ecological report (see Bowman; and Mulstein and Bowman, this volume).

DRAPER SITE:

Structure 1:

For the purpose of establishing a consistent reference system at the Draper site, the structure excavated in 1972 (Ramsden, n.d.) will be designated as Structure 1; the principle structure excavated in 1973 will be designated as Structure 2. Although there are indications of other probable structures, no designation will be given these until further testing demonstrates that they are definitely structures.

Structure 2:

This was the principle object of the 1973 excavation season. The following will deal with its general description, as well as inferences which can be drawn from the house-pattern data.

Excavations began in a location which soon became the northwest end of a longhouse structure. At this end of the house, walls were very distinct; we therefore followed wall patterns toward the opposite end of the house, i.e. toward the southeast. By the end of the season, we had followed the house 45.5 metres (ca. 150 feet), and had still not reached the opposing end (see Figure 3), although the paucity of artifacts around the southeast end might be an indication that the end was not too much further – perhaps another 5–10 metres.

This appears to be an extreme length in comparison to most other longhouses in Ontario (Heidenreich 1972:47). The width, 8 metres (26 feet), was more characteristic of Ontario Iroquois houses. Orientation of the house was northwest–southeast, which is again in good accord with many Ontario alignments.

Postholes:

All postholes were excavated to determine width, depth, and angle from the surface. Depths were recorded in centimetres from the surface datum of the 2 metre square in which they were found. This information was collected so that we might gain some idea of the structural properties of the building. Almost all postholes were dug perpendicular to a level horizontal surface. The few which were 80–85 degrees to the horizontal were random, isolated occurrences, and seem to be best explained as slight errors in post emplacement, rather than functionally angled posts of racks or other such features. There is one exception to this: a pit feature which appeared to have several relatively horizontal shafts stuck into its side.

Given a situation where wall posts were placed vertically in the ground, it seems more likely that the roofing was made up of lashed cross pieces, rather than ends of saplings embedded in the ground, bent over, and lashed. Moreover, there is an irregular, staggered line of larger, and very large posts, which runs more or less down the central axis of structure 2.

This certainly seems more consistent with a structure carrying cross roofing pieces, since such pieces would probably need supports over a 26 foot span. Alternatively, a ridgepole device might have been employed to make roofing more economical (in terms of wood pieces shorter than 26 feet). The exceptional diameter of these "probable" postholes indicates some sort of major support. A parallel set of ridgepoles, would be another alternative, which would establish a trapezoidally shaped roof in longitudinal cross-section. Another possibility is the use of convex crosspieces. Observations from Structure 1 generally correspond to those made here, with very large interior posts occurring at staggered, irregular intervals in the area of the centre aisle.

Certainly, the data does not support a parabolic-shaped house cross-section, with wall posts being driven in at an angle and lashed together at the peak. This is a common form of longhouse reconstruction, e.g. at Sainte-Marie Among the Hurons, and Midland; but the structure excavated in 1973 bears no detailed resemblance to such reconstructions. Rather the principles of support post construction employed at Draper appear more in accord with Burmaster's model reconstruction (see Speck 1955:8). Another interesting feature in both houses so far excavated at Draper is the absence of evidence for bench structures along the walls.

On an intuitive basis, postholes were plotted on the floor plan (Fig. 3) for structure 2 in terms of diameters in the following categories: 6 cm and less; 7–8 cm; and 9 cm and larger. Few if any postholes were recorded which were under 4 cm in diameter because it proved exceedingly difficult to distinguish such traces from root, worm, and insect holes. The number of cases where we could be confident that these were posthole remains, were exceedingly rare. On the other hand, postholes of unexpectedly large diameters occurred more frequently. In the beginning of the excavations, it appeared that posts with diameters of about 12 cm were about the maximum sizes used. It became apparent later that postmolds occasionally reached sizes of 14–20 cm and even larger. However the larger of these posts, as well as even larger "probable" postholes, enter the range of pit feature dimensions. Certainly, some of these larger holes were for posts, based on depth, narrowness, and straightness of profiles; however, for some others – especially the very large ones – we could not be absolutely confident that the excavated holes were for posts. These have therefore been indicated on the floor plan as "probable postholes."

It should be stressed that many of these exceptionally large postholes, if not all of them, do not represent the diameter of the posts placed in them, but are, in reality, pits dug out with some sort of digging implement previous to emplacement of the posts. There were at least 3 definite instances where these "postholes" could be seen to have been dug out, and then filled with packing materials surrounding a more normally sized postmold within the pits. Obviously, in digging such pits to any great depth, the pit may be widened in order to facilitate deeper, or easier excavation thereby approaching dimensions of pits used for other purposes.

In retrospect, it would have been helpful to establish another diameter category on the floor plan for posts between ca. 14–19 cm.

In terms of distributions of sizes, it was hoped that a simple frequency histogram would establish whether or not there were distinct sizes of posts being used in construction for distinct functions. If this were so, one could expect a bimodal distribution. On the assumption that posts in the wall construction may have been different from posts used in interior features of the longhouse, postholes were divided into two populations: those used in the exterior wall (Fig. 5), and those inside the walls (Fig. 6); no posts over 16 cm in diameter were included in the analysis. As can be seen, the resultant curve for wall posts is not really normal; but on the other hand, it is not really bimodal or trimodal. There are hints of bimodality in the peak at 10 cm, and of trimodality in the peak at 12 cm. If this were a unique isolated set of data, it would be very poor criteria for postulating 2–3 functional post types. However, the distribution of interior house posts duplicates this same pattern of minor peaks at 10 and 12 cms. This duplication may of course be the result of chance, but it looks less likely. If this conclusion is borne out by other data, it would mean that posts of ca. 7, 10 and 12 cm diameters had distinct and different functional roles in construction. Uniform sized posts often occur in clusters around hearths or features, and where found in wall construction, can probably be assumed to be more of a secondary structural nature.

It is particularly interesting to note that all the smaller postholes associated with hearths were placed vertically in the ground. This tends to suggest that something was suspended from them, or perhaps that a cross piece was extended between two forked sticks, which thus formed a type of drying or roasting skewer. The drying, smoking or storage of foods and/or wet skin clothing should not be ruled out either.

There is a fairly good correlation between the depth to which a post was embedded and its diameter (see Figure 7), especially considering the occasional occurrence of hard shallow clay beds in the deposits.

In some areas postholes became exceedingly difficult to discern, as was the case with the midsection of the southern wall; this area was particularly sandy, and the difficulty in recognizing postholes may explain why we found no house wall in the test extension further to the south, where we suspect another longhouse to be.

Wall Trenches:

One interesting feature, which helped us to identify parts of the house wall with near certainty, was what appeared to be a shallow trench which had been dug in some spots to outline the shape of the longhouse, and guide the positioning of wall stakes, and/or to remove ground so that secondary posts would not have to be driven in as far and earth could simply be filled in around the posts (Callahan 1973:19). This trenching showed up as a linear zone of dark humic soil about 15 cm wide in the B1 horizon, and almost inevitably there were postholes immediately beneath it. Along the northwest corner of the structure, this "trench" was filled with ash, which indicates that it was not filled immediately after the house was constructed, but was left open long enough for considerable ash from the hearths to accumulate and be thrown away in the corner. This corner may well be a garbage corner given the high density of artifacts found there. The trench may also have served to sink bark walling material below the ground surface, thereby reducing cold air seepage along the ground.

Aboriginal trenching was restricted largely to the western half of the house. Abrupt breaks in the trench outlines at the edges of 2 metre squares are presumably due to recording omissions and perception oversights by different excavators. Along the south wall, it was replaced by another form of distinctive wall marker, which appeared as a terrace with the area inside the wall being scooped out or worn down, while the surface outside the wall remained at its original level. One soil profile in particular yielded clear evidence of this reduction of the surface levels and soil horizons inside the walls.

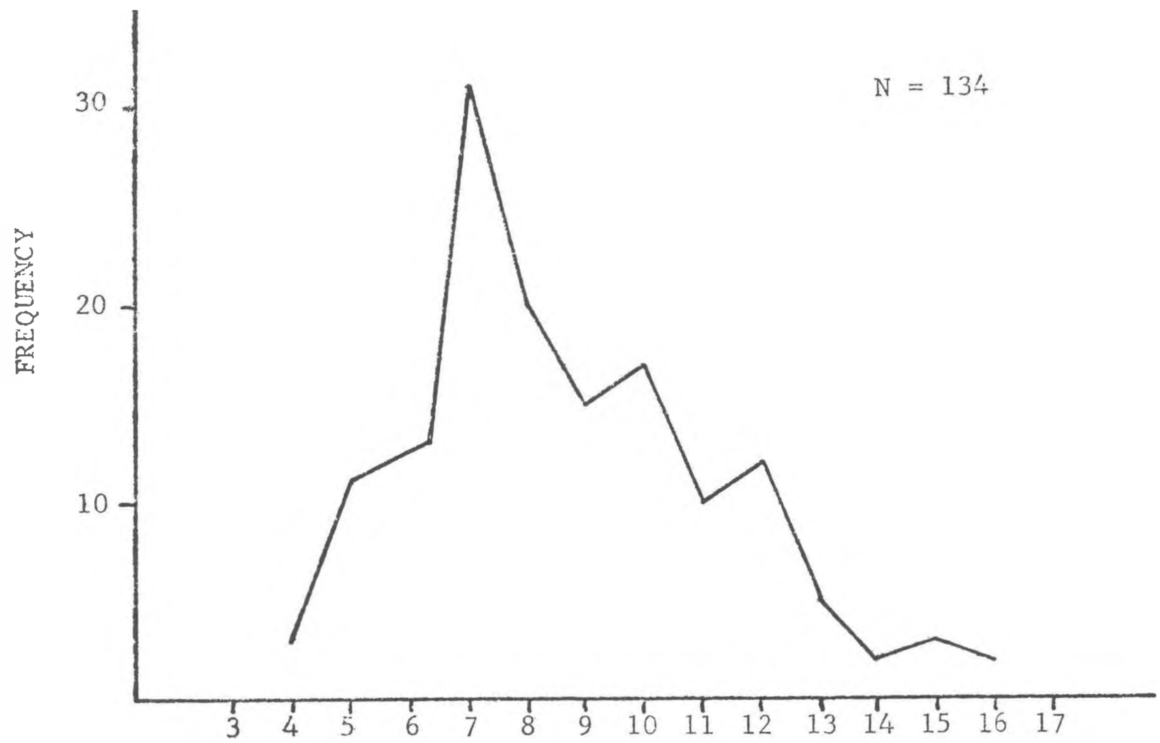


Fig. 5. POSTHOLE, DIAMETER (cm) Size distribution of wall postholes, structure 2.

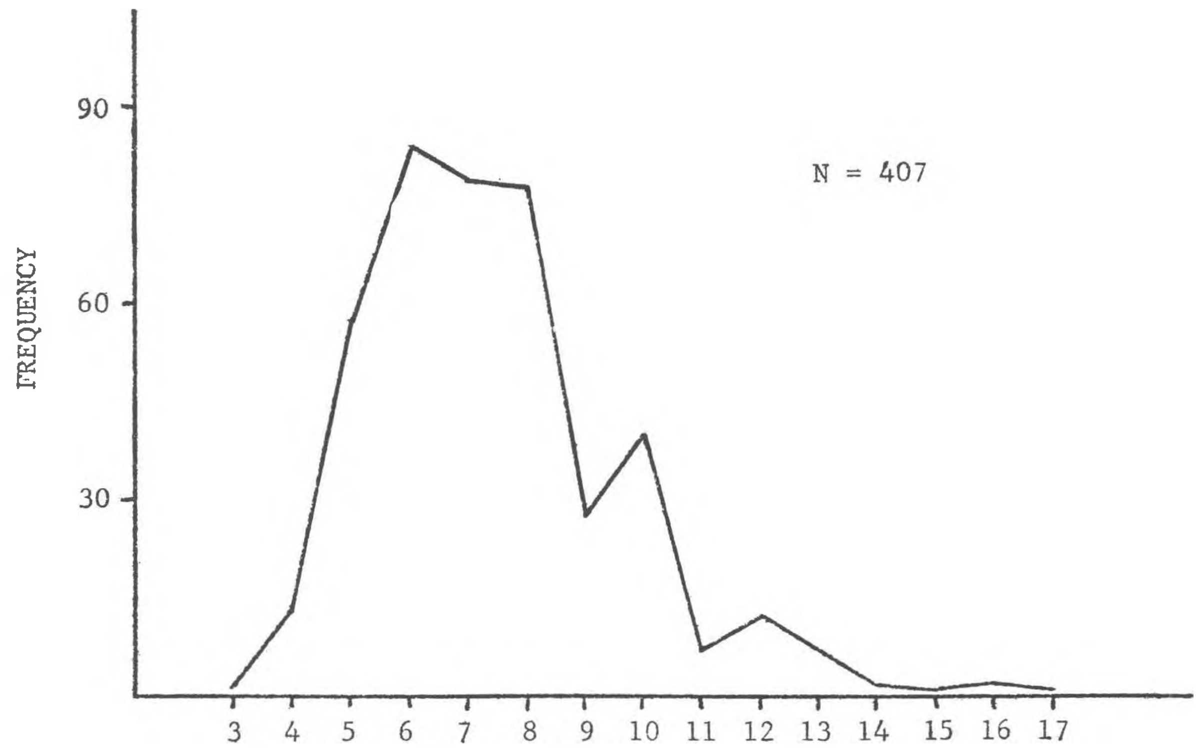


Fig. 6. POSTHOLE, DIAMETER (cm) Size distribution of interior postholes, structure 2; does not include "large probable" or other "possible" postholes.

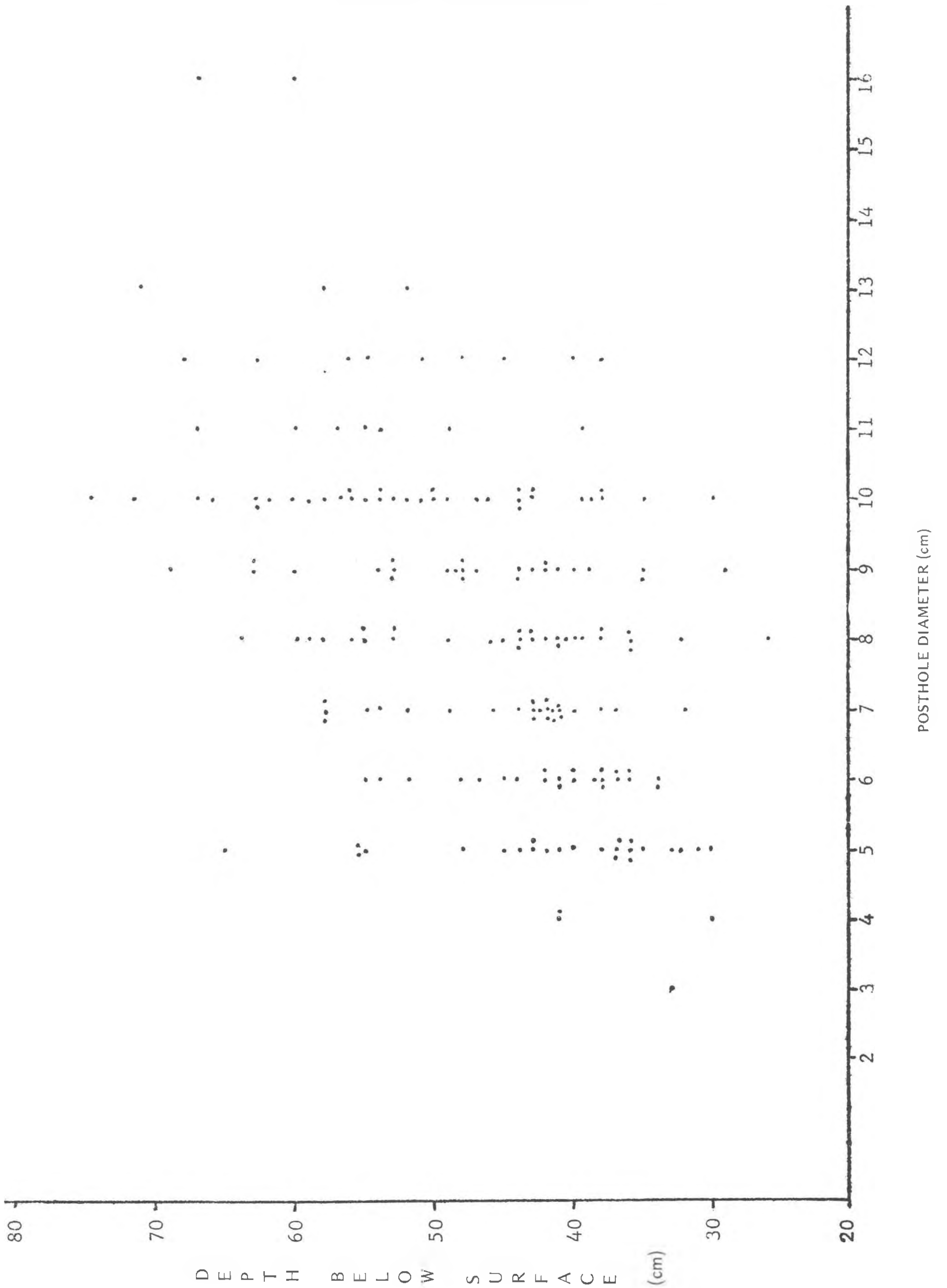


Fig. 7. Scatter diagram: posthole diameter plotted against posthole depth.

Storage Areas:

In the eastern half of the house no wall trenches were apparent. However, an unexpected and very definite trench with postholes did materialize perpendicular to the direction of the walls. This trench has the allure of a partition, however, time was exceedingly short when it was uncovered and we were unable to explore its termination, or the rest of the house. It may be that it represents a partition to a storage area, an idea which would be supported by the unparalleled sterility of the adjacent squares in terms of artifacts. Such storage areas, or porch-vestibules, situated at either end of longhouses (for storing maize and firewood) were observed ethnographically (Heindenreich 1972: 47), rendering the interpretation more plausible.

Doors:

Because postholes were not well preserved in many areas, the exact placement and number of doorways for the structure is somewhat conjectural. However, there is one arrangement of posts which is very probably a doorway. This occurs in the south wall, very near the southwest corner (ca. 38–40 north/44–46 east). Here, the wall leading away from the west end begins heading off at an unexpectedly wide angle, and then stops (i.e. presumably; a large modern stump obstructs its continuation as well), while another line of posts begins a few feet just to the interior and continues the wall lines at a reasonable angle parallel to the north wall – moreover there is a very large "probable" posthole beginning this line in the interior. This arrangement has all the appearance of a wall-overlap type entrance.

One other distinct possible entrance is the centre point of the west end of the house. Several things indicate this: 1) the wide spacing of posts at this point; 2) there is a high density of artifacts in the area surrounding this central point on the outside, whereas a low density of artifacts runs more or less through the supposed doorway from the outside to the inside; 3) there is a very definite hearth which occurs almost exactly in the centre of the wall at this point. This hearth exhibited no evidence of having had its white ash deposits disturbed beyond the presence of the wall trench, which cut through it. The trench and posthole definitely were cut *into* the hearth. The situation is somewhat enigmatic since there is an astonishing lack of indication of any other superimposed occupation, as well as the fact that this hearth is in perfect line with every other major hearth found in the structure, i.e. in line with the central axis. The situation is very difficult to interpret, but one possibility, since the hearth seems to be associated with the other major hearths in the structure, is that this hearth occurred in an open doorway which was later, or possibly seasonally, closed off. Certainly an open doorway in such a position would increase ventilation during excessively hot summer months, being oriented towards the direction from which prevailing winds come. Repeated use is indicated by a number of ash-filled pits surrounding this hearth, both outside and inside the structure. The hearth therefore might have been seasonal, or used for a special occasion, like torturing prisoners. Obviously, the other major option is that the hearth is indeed from a previous occupation.

Multiple vs. Single Occupation:

Besides the position of the hearth mentioned immediately above, there are a few vague indications that other occupations *may* be present in the area excavated. I do not believe these indications are substantial, and feel the case for a single house structure being represented in the excavations is much more convincing. One indication of a second occupation is the hearth situated at 52 north/44 east. This is a poorly developed hearth – little discernible fire-reddening of the sand – in fact there is some question as to whether it was in fact a hearth or merely an ash scatter since other ash scatters occurred further along the southwest wall. It is not aligned with the other hearths, it displays atypical traits, and peripheral ash extended beyond the house wall. Thus, it may represent a small, temporary hearth where low temperature fuels were used (possibly to create smoke for potting or to keep away flies).[3] In this case the occurrence of ash across the wall boundary might be because of loose walling, or spread after desertion of the site by occupants. On the other hand, it could represent a hearth which was made by someone either after or before the main occupation of the site, and used for a short time only, without any kind of shelter construction. In any event, even if this does represent a second occupation, it is not of major importance, and can probably be neglected for most purposes. One other indication of a possible secondary major occupation is the line of postholes which runs east-west between the 40 and 42 m north lines. These may also be partititons, and certainly seem more intelligible as such, given the fact that the line is headed downslope into the ravine which divides the site, and the fact that there is no companion parallel line which should be identifiable, to indicate the opposite wall of a house. Moreover, there are no features which can be construed to align themselves in a parallel line with this axis, whereas *all* major clusters of features, hearths, and occurrences of interior postholes

[3] In our own campfires, we found that some hearths created no fire-reddening of the underlying earth, even though hearths were dug into the B horizon, while others did. Tentatively it seems most reasonable to explain this by fire temperature differences, due to different woods used and sizes of the fires, although this is unconfirmed.

align themselves down the centre of the longhouse which has been defined. Aside from the above, there is nothing to indicate any anomaly in a single structure/single occupation interpretation of the excavated area. Many, if not all, of the above atypical features can be fitted into this context given unforeseen behavior and conditions of preservation, which forever create minor curios for the archaeologist.

The resolution of this question is of obvious importance given the types of analysis that we have proposed, and the necessary underlying assumption that we are dealing with a single living floor. I feel confident that this assumption has been satisffied, and that no significant secondary occupation of the area is represented in the 1973 data.

Interior Aspects of Structure 2:

Storage area; doors; see above.

Pits:

Peter Ramsden has compiled a floor plan of structure 2 showing the relation of ash and midden filled pits to hearths and structural features (Fig. 8).

Burials.

Two infant burials were found in pits close to each other near the east end of the excavations. All bones of one of the infants appeared to be present, whereas only the torso, spinal column, arms and head (all articulated) were found in the second pit (see Kapches: this volume for further detail).

Given the circumstances, it is tempting to see these burials as placed along a very frequented pathway within the house (perhaps leading to a doorway or storage area at the east end), so that the spirit of the infant would rise up and re-enter the womb of a woman passing by. This practice and motivation is recorded ethnographically for infants who died less than a month old (Heidenreich 1972:40). If this area was, in fact, frequently walked over, average sherd sizes near the burials should be low.

Hearths and Associated Features:

Two of the more enigmatic hearths have previously been discussed (see above: doorways; multiple occupations). In addition to these, a series of hearths and former hearths were discovered running down the central axis of the longhouse, and except for the single hearth already discussed, no other evidence of other hearths on one side or the other of the central axis was uncovered. Proceeding from west to east, there was a major hearth only 2 metres from the west end of the structure. This is a very developed hearth with deep fire-reddening of the soil and thick white ash deposits. Two metres further east a hearth with very little white ash, but considerable fire-reddening was found. White ash ceased to occur within 50 cm, although the fire-reddening earth continued to occur intermittently amid pits which cut through it for another 4 metres to the east, and another 2 patches of fire-reddened sand occurred almost 6 metres from the beginning of this hearth area. This entire zone is extremely dense with postholes and pits, many of which were ash-filled, or partly ash-filled. In addition to this, in the eastern portion of the concentration and occurrence of the fire-reddened earth, there was a peculiar layer of ash overlying part of the fire-reddened sand (40–41 north/50–51 east). It was unclear as to whether this represented an ash scatter, or whether it could have been *in situ* material from a fire, for unlike other ash which was of a smooth compact consistency, this ash was granular and hard, very much like friable sandstone.(Moreover, it was broken up ash, due possibly to a special type of wood which burned into pebble-size lumps.)Certainly, it was a particular kind of a high salt residue in its ash. The fact that it was not entirely covariant with the fire-reddening and even covered some pits, is strong indication that it was dumped at the spot rather than accumulated in place as hearth residue.

Another extremely high concentration of postholes and pits (again, many of which were ash-filled) occurs as a distinct cluster several metres further to the east and runs directly under several large trees. Due to the similarities with the last mentioned cluster of pits and postholes, and especially because we were finding numerous ash-filled pits in this second area, we fully expected to find another hearth in this vicinity. We did not. Speculating that such a hearth might be under the two trees occurring along the central axis of the house or in their root systems, we employed a soil probe to extract small columns of soil at 50 cm intervals in the relevant unexcavated squares. The only result was the location of several additional ash-filled pits. On the other hand it was extremely difficult to obtain any samples relatively close to the trees because of large dense roots, and it is still possible that a hearth may lie directly beneath either tree, and, in fact, may have provided nutrients favorable for tree growth, and thus been responsible for the location of the trees. Similarly, a large tree obstructed the 1972 excavations and it too was in the central axis of the longhouse, in addition to which the largest tree on the site is located adjacent to, or in, an unusually ashy outside activity area (see p. 25). It may be significant that all these trees are white maples.

East of these trees, there is another fire-reddened area with very little ash, and then another hearth about 2 metres further east with a similar paucity of white ash. Immediately to the east is yet another area of fire-reddened sand and poor ash. Finally, there is a hearth almost 7 metres further

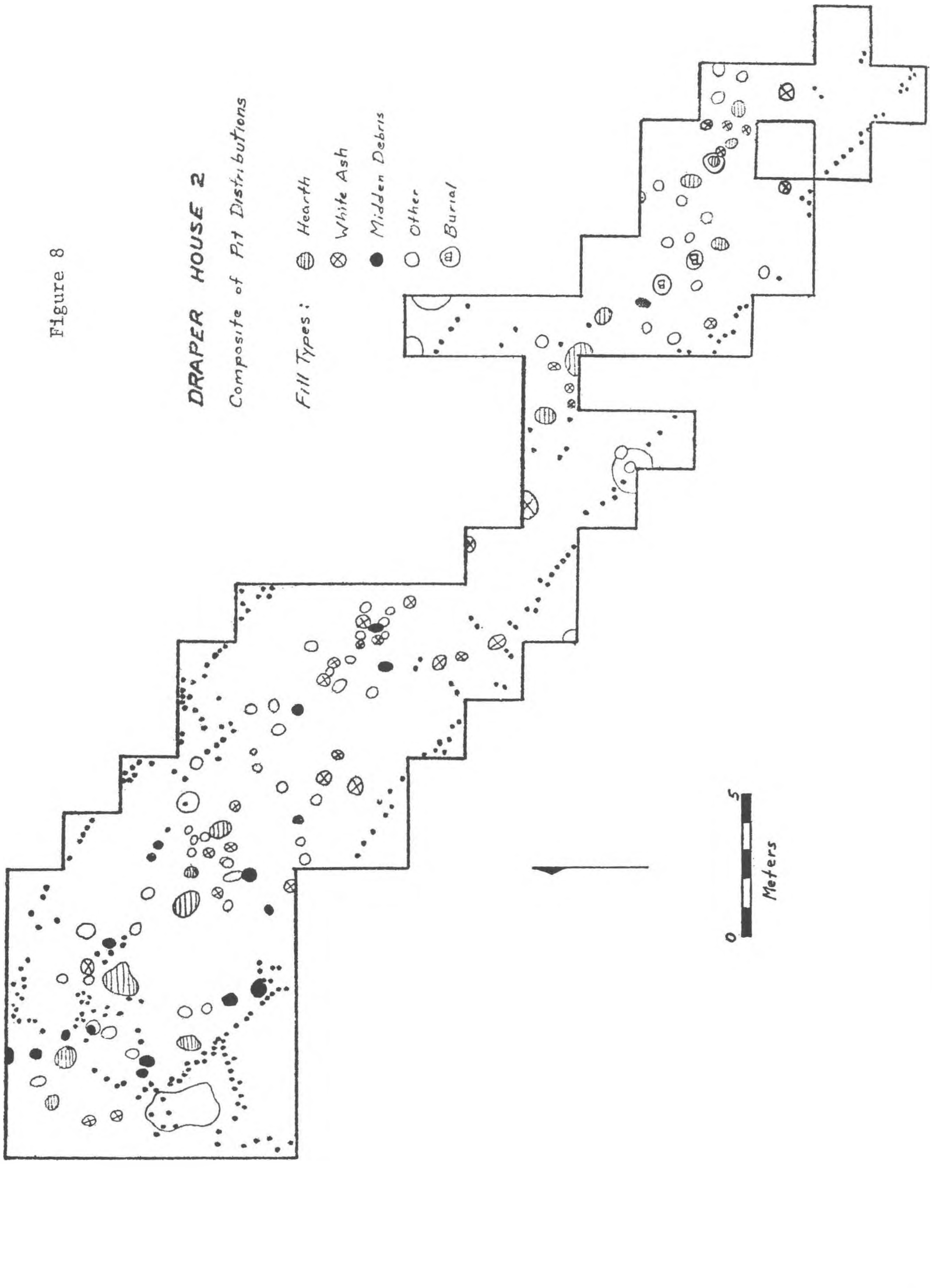

DRAPER HOUSE 2
Composite of Pit Distributions
Fill Types:
Hearth
White Ash
Midden Debris
Other
Burial
0
5
Meters

Figure 8

east, and this is the last found in our excavations.

It is curious that the hearths in the east end appear so poor in white ash content, and that the artifact density at this end of the house is considerably less than in the west end of the house; in the extreme east end, some squares were virtually sterile. This might be explained by a number of factors, including: 1) less use of the east end, (hard clay predominates in the east end; this may have rendered habitation and pit storage undesirably due to the hardness); 2) more fastidious or easier (due to clay floor) cleaning by the occupants of the east end; 3) or possibly gradual desertion of the occupants of the entire house, with those from the east sector leaving first, and those in the west end staying on longer and cleaning the entire house periodically. It is difficult to imagine that occupants of this longhouse would have gone to considerable pains and substantially more work to build a longhouse, much of which would remain largely unused.

These possible explanations of the scarceness of material in the east end engender a rather important theoretical issue. If it can be demonstrated that the east end of the house was relatively unused during the occupation of the house as a whole, one must then ask why. What would cause such mis-planning and waste in construction and labor? There are two readily apparent possible answers.

1) residence behavior was strictly unilocal and intervening circumstances such as death, celibacy, or emigration prevented the corporate "family" from adding married offspring nuclear units according to expectations;

2) residence was much more flexible, and houses were constructed in terms of verbal agreements of residence which were not always met.

Here, I would like to suggest a rather different model of residence than has been traditionally assumed for the Ontario Iroquois. This entails assumptions about the nature of the corporate groups made up by the members of given structures. I would like to suggest that longhouses were organized around one or two titular heads who controlled trade routes, activities, and directed to some degree longhouse economic activities; that members of the longhouse were recruited from as many kinship connections as possible, whether lineal or affinal; that these members worked fields and engaged in economic production as a corporate unit which provided the basic materials of trade and subsistence; that the titular head would attempt to attract as many kinship related persons to his longhouse as possible to enhance his trading ability and status; and that families would join or abandon a given longhouse depending on a number of factors, but especially the ability of the head and membership to provide benefits, whether in the realm of trade, ritual feasts, wealth, leisure, or other commodities. This would be a scaled down variation of the type of system suggested for the Northwest Coast settlements (see Harris 1971: 250, 324; Suttles 1968: 66-67); it is also consistent with observations on the mixed residence patterning at contact (Tuck 1971:221); and since everyone in such a longhouse would be related, even if distantly, it would be consistent with early descriptions of the members of longhouses as "families". This construction is also consistent with the archaeological evidence in structure 2, and may be responsible for the general failure, so far, to isolate local ceramic stylistic traditions, i.e. because of variable residence behavior. One other modification of traditional interpretation is necessary to make this model viable, contrary to most viewpoints, trade must be seen as a significant factor in social organization, and by implication in the economics of the everyday man. If this should be established, it may be necessary to reorganize thinking on the causes of increases in village sizes as well (see footnote 2). As a redistributive system, the Huron would have shared many structural similarities with other redistributive social systems such as the Northwest Coastal groups. Many descriptions of such groups are equally applicable to the Huron, although often not in extreme forms. Particularly relevant should be trade relationships. For the Northwest Coast, Suttles (1968:67) observes that:

> . . . chiefs (lineage heads?) held monopolies over trade in their territories. It seems possible that such monopolies may have had their origins in exchanges between affines in areas of different resources.

Is the similarity with the ethnographic Huron merely coincidental?

Although it is far from definitive, a crude indication of residence patterning might be gleaned from the average sizes of sherds throughout the house, and in particular in the east end. Given the hard nature of the flooring at that end, and the reduced probability of sherds becoming embedded in the earth, one would ordinarily expect sherds at that end to be more easily and consistently crushed, and therefore to be smaller, all other things being equal. If the sherds are in fact the same size or smaller than sherds in the west end, then it can probably be assumed that the east end was occupied by a similar family group consisting of regular residents. On the other hand, if the average sherd size in the east end is larger than in the west end this would constitute good grounds for assuming that the east end was only infrequently used, or used in an atypical fashion, and that it represents a portion of houses built in the hope or expectation that families would occupy it. If this is the pattern, it may well be that the hopes, or expectations were never fully realized, or only realized for a short period of time.

It can be argued that over a 10, or even 20 year period, the number of nuclear families in kin bound corporate groups should be relatively accurate since the number of children at the date of building would be known and maturation to marriage of any newborn children would take nearly 20 years. One would also expect some spatial flexibility within structures to accommodate nuclear family additions. Under these conditions one anticipates a minimum of unused space in houses, and virtually no extensions of houses. By contrast, the fortunes of economically-based residential units (even if couched in a kinship framework) are much more variable and may well drop below expectations in a 10–20 year period, resulting in major portions of houses being unoccupied; or the fortunes of the group may unexpectedly rise, thereby drawing more nuclear families to the residence corporation than can be accommodated, and necessitating additions, and sometimes even multiple additions. Periods of village moves might be times of particularly high rates of residential changes, and longhouse heads might well construct houses slightly longer than necessary, in the hope of attracting another family or two. It is maintained here that the degree of failure of prehistoric Iroquois groups to accurately predict residential requirements for the duration of site occupations, as particularly evidenced by additions onto longhouses, is more consistent with the posited model of residence based predominantly on economic rather than kinship considerations. Obviously, the applicability of this model and this hypothesis still lie in the unexcavated portions of the Draper site.

Ethnographic literature is somewhat ambiguous on the spacing and meaning of hearths located within longhouses. There seems little doubt that 2–4 families could use a single hearth with one to two families along each wall. On the other hand "typical" houses are recorded as having 4–5 hearths, which were only 2–3 paces (2–3 metres) apart (Tooker 1967:40, Heidenreich 1972:47). This yields a very minimal sized longhouse. Heidenreich maintains that these main hearths were usually 7–10 feet long. This would increase the length of the longhouses, but certainly seems an unrealistic size fire to maintain, and does not correspond with the size of the majority of hearths which were excavated in structure 2. The only hearth which could compare in length to this would be the rather confused complex of postholes, pits, and areas of fire-reddened sand between the 48 and 52 east lines. As has been seen, there are a number of hearths in this central axis which are situated about 2 metres from each other, which accords well with ethnographic observations; however, there are also larger hearth-less spans which seem to occur predominantly in the middle of the longhouses. This thus accounts for the short distances ethnographically observed between hearths, and the smaller number of total hearths actually found vs. the number that would be suspected by consistent spacing of 2 metres in average length longhouses. It may be that a pattern is suggesting itself here, in which nuclear families tend to group close together near the ends of the houses at about 2–3 metre spacings, possibly because doorways were located near the ends; whereas large hearth areas occur more towards the centre of the house, are associated with many more pits and postholes, and tend to be further apart. In the case of structure 2, there is at least 10 metres between large central hearths, assuming that there is in fact a hearth under the trees in the middle of the structure.

There is one other ethnographic reference to hearths which may be relevant to archaeological interpretation. This has to do with the kindling of up to 11 fires in a single house, about 5 feet from each other, on a ceremonial occasion of prisoner torturing (Tooker 1967:36). This and other types of festival activity may well explain some of the fire-reddened areas in structure 2 which have little to no ash associated with them, such ash being displaced by walking or being swept away in cleaning activities after the festival or feast was over. It is also one possible explanation for the extensive but irregular occurrence of fire-reddened sand and ash scatters over a 4 metre area in the west end of the house. When festivals or feasts were held, the normal sized "family" hearth might be extended into a larger "feast' hearth up to the 10 foot size mentioned by Heidenreich; or a number of temporary hearths might be kindled alongside the main cooking hearth. Again, because of the very temporary nature of these extended fires, white ash would be removed after the festival either by cleaning the floors or because of activity in the area, leaving only the fire-reddened sand. This seems more probable when it is realized that numerous pits and postholes actually cut through fire-reddened sands in this area. The other major explanation of this particular complex of fire-reddened sand, pits, etc., is that the position of the hearth gradually shifted over time, or migrated. There is no real reason for assuming this to have taken place, especially given the lack of evidence of such migration of other hearths, and the special association in this case with exceptionally numerous pits and postholes.

Assuming that other hearths were also used by two nuclear families, the question presents itself as to why two areas in structure 2 have exceptionally dense concentrations of pits, postholes, and presumably more than usual indications of fire (either bigger, and/or longer – again assuming that a hearth is associated with the unexcavated areas under the trees), while other hearths are associated only with scatterings of pits and postholes?

There seem to be two explanative possibilities:

1) such clusters represent the habitation site of persons with dominant, or high, status among the residents of the longhouse, and therefore they occupy central positions within the house (possibly because house centres were

warmest in winter and therefore imparted privileged status to persons occupying those locations). It makes most sense at this point to see such status situated within the corporate residential framework, although the possibility cannot be ruled out that this status may have been of a non-residential corporate group nature, e.g. religious, age grading, kinship (if this is not related to residence), etc. Given such higher status, festival activity would naturally tend to centre around these family locations, not only in terms of people congregating around them spatially, but also in terms of frequencies of minor feasts, etc. Such feast activities and obligations would naturally entail more food preparation, more food storage, and greater fires, which is probably reflected in the greater density of postholes, pits, and extension of hearth areas.

2) such clusters represent sexual areas of congregation and socialization among the inhabitants of the longhouse: areas where gambling, craft-making, gossiping, and household chores might be carried on. This concentration of activity might include taking meals and making large group fires at such centres which would logically account for the greater concentration of postholes, pits, and hearth area. If this construction is correct, there should be a pronounced division of tool types associated with the two clusters within the house; whereas if the first postulate is correct, there should be no such pronounced division, although a greater concentration of ritual related objects (e.g. pipes) should be associated with the large hearths, as opposed to the smaller hearths. I believe that analysis will show the first construction to be the more probable. As a thought for future consideration, if trade should appear to have been important economically to the Draper population, these large hearth complexes may well represent the households of dominant traders — or persons with access to trade activities.

In the course of excavation, it was suggested that the central concentrations of postholes, pits, and hearth indications were probably areas where sweat baths were erected. However, there is no convincing patterning for these features. Moreover, one would expect a large concentration of fire-cracked rocks to be associated with any such feature; what we found was the exact opposite. If anything, fire-cracked and normal rocks seemed to be even scarcer in these areas than in most other parts of the house. It is also hard to explain the concentration of pits in terms of sweat baths, whereas they quite logically occur in association with hearth areas used for cooking: as storage pits for food in areas which would not freeze up during the winter, and located in places which would be convenient for cooking activity; as postholes for cooking and/or drying food or clothes; as pits in which to place hot, round-bottomed vessels, etc.

Mounds:

There are a number of small mounds on the Draper site. One mound of low relief, about 2 metres in diameter was situated inside the walls of structure 2 along the south wall, east of centre (26–28 north/64–66 east). This mound was composed of light brown to dark brown soil, and little A horizon development had taken place on its surface. Artifacts occurred scattered in its deposits together with some rotted cedar parts; there was no paleosol under the mound, which indicates that deposition was not recent. The provenience of the mound, right along the inside wall of structure 2, indicates that it is probably associated with the occupation, however what its function may have been is problematical.

Outside Activity Areas:

West End:

Considerable outside activity seems to have taken place immediately outside structure 2 at its west end. On the south side of the building there was a wall extending out from the side of the building at a 60^{o} angle, and within this angle, between the out-wall and the house wall is situated a large broad pit with staining around it which extended deeply into the C horizon almost a metre below surface; artifacts were scattered variously throughout this pit but were mostly concentrated in the upper levels. It is also of interest to note that this "enclosure" is relatively close to the doorway. Due to the staining, situation, and size, one might wonder if this was not perhaps a latrine used by residents. Certainly, it makes sense to conceive of such "conveniences" as being relatively close to residences (no one is going to walk to the edge of a village at night in the winter just to be proper) which is in fact where they are located among some other unsophisticated groups in the world. Notably in Guatemala, peasant latrines are often simple, scooped out shallow pits along the outside wall of the house, usually shielded from sight by a low wall of posts. To reduce the unpleasantness of this proximity, it can reasonably be assumed that the ubiquitous Huron dogs made off with and consumed the worst of the waste. Such features naturally are targets for occasionally unwanted garbage as well. Staining corresponds well with this posited function. Unfortunately, we did not have the foresight to collect soil samples and test them for phosphorous and other chemicals.

Continuing around to the extreme west end of the house, there is a concentration of pits (some ash-filled), and artifacts are relatively dense in a semi-circular pattern around the end of the house. This strongly suggests an open air working and activity area, where crafts were worked on, food possibly processed, and outside socializing might have taken place. This interpretation is supported by the presence of a shallow midden immediately to the north of this "activity area." The midden is just on the edge of the ravine and is separated from the northwest corner of the house by a narrow open strip of ground, about a metre in width, which we presume to have been a pathway (this "path" appeared slightly more compact than surrounding soils). Such a position of a midden makes sense not only in terms of the discard of waste materials from an outside processing-craft area, but also in relation to refuse being carried out from an end doorway, which was postulated earlier. One receives the impression that the major social focus was towards the west of structure 2, and not in the opposite direction, partly because of the lack of outside activity areas in the east (although sampling is not very satisfactory), and partly because the greatest clusters of artifacts, pits, postholes, and etc. tend to occur toward the west end inside the structure (assuming that we are relatively close to the east end of the house in excavations).

More evidence of outside activity areas was found further west of structure 2 near an extremely large maple tree. A north-south test trench, 1 x 10 metres, was excavated about 12 metres west of the end of structure 2, (50–60N/29–30E) in the hope that other structures might be found. The central area of this test trench was a mass of roots and what appeared to be decayed cedar roots or wood. In the entire trench only one post hole was found, and one ash-filled pit (these were at opposite ends of the trench). However, an ash lens of variable thickness, which undulated and was intermittent, extended from the south end of the trench, almost 8 metres to the north. Artifacts were not particularly abundant, although carbonized plant remains were evident in some areas, as well as non-carbonized plant remains, the status of which is problematical. The strong impression gained from this limited test, was that the general area was probably some sort of open air activity area where abundant use of fire and/or smoke took place. It is difficult to explain the undulating nature of these ash deposits without further, even more detailed excavation. Analysis of material coming from this test area has been delayed until a more meaningful sample of artifacts can be acquired, and a better idea of the probable nature of the area has been established.

Other Test Areas.

Several test excavations were made to the south of structure 2 in an attempt to locate other structures.

32–34 North/40–42 East:

This was a test pit which contained no features, except for the side of a midden which we unexpectedly cut into, thinking that it was a natural rise. The midden is important because the first layer deposited in it was clean yellow sand, which nicely marks the old surface, and conveniently preserved a paleosol immediately beneath the midden. The midden is at the edge of a broad flatish terrace of slight relief which runs more or less south-east from the test pit, and which appears to be a good location for a house; such a house would explain the position of the midden deposits on the north-west slope of this slight terrace.

20–24 North/38–40 East;
+24–26 North/36–38 East. Fig. 3)

These test pits were excavated because they occurred in the side of a very elongated depression which trended northwest – southeast, and was roughly parallel to structure 2. We surmised that an additional structure might have been built in this long depression. In fact, a definite line of postholes did appear on the north side of the depression, and these postholes were oriented in the manner we anticipated. However, they were also overlain by several decimetres of midden refuse from the edge of the previously mentioned terrace. This refuse rapidly diminished toward the centre of the elongated depression. The most likely interpretation of this situation seemed to be to postulate a longhouse structure situated in the depression, which was abandoned during the occupation of the site, and subsequently partially covered over by refuse being thrown out from adjacent structures, notably to the north. Again, this indicates that there was very probably an additional structure between structure 2 and the long depression to the south.

Analysis of material from these test excavations has been delayed until more comprehensive excavations are undertaken; however, unconfirmed field impressions pointed to a ceramic composition of the midden material different from that being retrieved from structure 2. In addition to this, a unique copper bead was found in this midden fill. The bead was hammered and rolled, and represents the only piece of copper to be discovered at the Draper site thus far.

20–28 North/56–58 East: (Fig. 3)

Because of the flatness of the area immediately to the south of structure 2, because of the position of midden deposits on the western edge of this flat area, and because other Ontario Iroquois sites often have parallel, closely spaced longhouse structures, the area immediately south of structure 2 seemed an extremely likely location for another longhouse. For this reason, we extended the main excavation area in a test trench running south. No definite evidence of a wall was found in this test extension area. This, however, is probably not reliable negative data, since the walls of structure 2 in the adjacent squares were exceptionally poorly defined over a considerable length. Poor soil conditions, or the pulling of posts from the soft sand in this area for use elsewhere when the site was abandoned probably account for the absence of post traces. On the other hand, a very definite pattern of fire-reddened sand and hearths with undisturbed thick white ash accumulations was found. These areas were aligned on an axis almost exactly parallel to the long axis of structure 2, were surrounded by ash-filled pits and postholes, and appeared undisturbed. Given all these factors, as well as the distance of this central axis from the walls of structure 2 (ca. 7 metres), it appears extremely likely that these hearths represent the central axis of another longhouse.

Again, analysis of the artifacts from this test extension has been delayed until future decision are made to excavate more extensive areas of the probable structure.

Appendix A

Radiocarbon Dates from the Draper and White Sites

White:

880 A.D.	(S-858; NMC-618)	1070 ±	105 B.P.
1305	(S-857; NMC-619)	645 ±	105
1515	(S-792; NMC-617)	534 ±	85
1630	(S-791; NMC-616)	320 ±	70
1725	(S-859; NMC-620)	225 ±	90

Note: these dates are from various locations at the site and may represent more than one component. Certainly, the 300+ year interval between the earliest and next earliest dates appears anomalous, and may represent a very early Iroquoian occupation of the site. The mean of all dates is 1411 A.D. If the earliest date is excluded, the mean is 1544 A.D. If one further wishes to exclude the most recent date as definitely not due to aboriginal occupation, the mean becomes 1483 A.D. With the exception of the 880 A.D. date, any of these averaged results appears very compatible with the view that White was occupied contemporaneously with Draper.

Draper:

1360 A.D.	(S-818; NMC-621)	590 ±	75 B.P.
1380	(S-861; NMC-624)	570 ±	95
1455	(S-863; NMC-626)	495 ±	65
1520	(S-862; NMC-625)	430 ±	85
1545	(S-860; NMC-623)	405 ±	65
1740	(S-819; NMC-622)	210 ±	80

Note: all samples are from the interior of structure 2; the average of all samples is 1500 A.D., which accords very reasonably with age estimates based on ceramic analysis alone (i.e. 1450-1500±; Wright 1966:101). If the very recent date of 1740 A.D. is due to intrusive carbonized material, and is excluded from the series, the average date is 1452 A.D., which is also in close agreement with prior age estimates based on ceramics.

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The Ecology of the Draper Site

MIRIAM MULSTEIN
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The Draper site is located on the edge of the valley carved by the west branch of Duffin Creek as it flows from the heights of the Oak Ridges moraine to the north shore of Lake Ontario, a distance of some twenty miles. In terms of political boundaries, it is found within Pickering Tp., Ontario County; in terms of ecological boundaries it is found within an area of mixed deciduous and coniferous forest, of Grey-Brown Podsolic soils, and of a climate moderated by Lake Ontario. It is also an area which has been greatly altered – in appearance, in the distribution of the natural faunas and floras, in conditions of micro-climate – by the activities of settlers, especially since the start of the 19th century.

These changes have not extended to the macroclimate of the township. Macroclimate is largely uninfluenced by such small-scale activities, and it is as a result of the inter-play of broader atmospheric factors that the climate today closely resembles that of 500 years ago, or so it is thought.

Table 1 provides a summary of the climatic conditions in the vicinity of the Draper site. For comparative purposes, it provides similar data for historic Huronia, described as an area centring around latitude 44.5°W, extending 20 to 25 leagues east–west and 7 to 8 leagues north–south (Tooker 1968: 11–12). As can be seen, temperatures are higher and the growing season is longer in Pickering Tp., but precipitation is generally greater in Huronia – an advantage when one considers the preference of the Huron for light, sandy and thus droughty soils.

Table 1 Climatic comparison of Pickering Tp. and 'Huronia' (Weber & Hoffman N.D. 13–20)

	Pickering Tp.	Huronia
annual mean daily temp.	44–46°F	42–44°F
mean daily July temp.	68–70°F	64–68°F
mean annual growing degree days	3400–3600	2800–3200
start of growing season (av. temp. >42°F)	April 10–15	April 15–20
mean date of 1st fall occurrence of 32°F	Oct. 5–15	Sept. 20–Oct.10
mean annual precip.	32 in.	35–40 in.
mean May–Sept. precip.	14–15 in.	14–16 in.

The soils in both Huronia and Pickering Tp. belong largely to the Grey-Brown Podsolic Great Group. In the latter area, the parent materials are predominantly glacial tills derived from the soft calcarous bedrock: the black utica shale.

Converging in the immediate vicinity of the Draper site are three loamy soils, in addition to the alluvial bottom-lands of the creek (see Map p. 49). To the north and east is the Peel Clay Loam, a stone-free, imperfectly drained but fertile soil developed from lacustrine deposits over-lying clay till. It has been described as "one of the best agricultural soils in the county" (Olding et al, 1973: 45), but it is fairly heavy. Thus, employing basic horticultural technology, it is likely that the Huron would prefer to use the other two soils found in the area, which are also loams and which are both lighter than the Peel.

To the south and east is the Brighton Sandy Loam, derived from outwash sands and gravels. It is light and well-drained, tending to be droughty in summer – specifically the type of soil which the Huron were purported to prefer. This soil is, however, low in organic material and its fertility is rapidly exhausted, which would, in the case of Huronian agriculture, necessitate a shift to other soils in the area within a few years of initial clearage.

This shift would probably be to the third soil of extensive distribution – the Milliken Loam, a fertile, well-drained, somewhat heavy soil derived from calcareous till which lies to the west of the site. It is possible that this soil type was tilled from the time of initial settlement, or if not, that it subsequently was of prime importance to the Hurons of the Draper site, since the settlement is located on the west side of the creek adjacent to the area covered by this soil. Indeed, the White site is located on Milliken loam.

The long growing season in this part of Ontario would compensate for the tendency of this rather heavy soil to retain water and thus resist warming in the spring, a factor which can be crucial to maize agriculture.

The soils and climate support a natural vegetation classified by Braun (1950) as the Great Lakes section of the Hemlock-White Pine-Northern Hardwoods region, Great Lakes–St. Lawrence Division. This forest region extends from northern Minnesota and south-eastern Manitoba through the upper Great Lakes area and east into Newfoundland. It is comprised of a number of different communities, the exact composition of which depends upon edaphic and microclimatic conditions, but which contain species common to both the Beech-maple forests found to the south, and the more northern boreal forest.

A climax forest in the area of the Draper site would consist of broad-leaved species such as sugar maple, red maple, basswood, and white elm with lesser amounts of beech, oak, ash, hickory and butternut. Common conifers include eastern hemlock, and white cedar with some fir and white pine in some locations. The vegetation of the understory and ground layers would be diverse and abundant, much more so than under a canopy dominated by conifers.

The present vegetation cover in Pickering Township is not climactic in most areas. Agricultural and lumbering activities, and urban expansion have greatly reduced the area covered by the natural vegetation, which is in many locations confined to stream valleys and woodlots, and which is generally in a disturbed, successional state. Despite such modifications, and the spread of introduced and ruderal species, there have been no, or at least few, actual eliminations of plant species from Ontario.

Thus a survey of the species found on the Draper site consists largely of species present at the time of the prehistoric settlement. The species list reproduced in Appendix A: gives both Latin and common taxons, and occasionally Huron names of the plants found, describes the on-site location (i.e., bottomland, valley slope, or the terrace above the valley), the point of origin of the species, and indicates use, if any, by the Huron. This list is neither complete for the site – since many of the sedges and grasses, and some of the introduced species found were omitted – nor for the general area, since some species known to occur in nearby woods were not present on the site. Among these latter were Sanguinaria or bloodroot, Helianthus tuberosus (Jerusalem artichoke), and Mediola virginiana (Indian cucumber root), all of which were important to the Huron.

This does not necessarily reflect past distributions, and in any case it is probable that the Huron gathered foodstuffs over an area extending beyond the immediate boundaries of the site. They may have travelled almost as far south in their gathering as the north shore of Lake Ontario, where *Juglans nigra,* the black walnut, is found today.[1]

The wild foodstuffs available to the Draper settlement would have been determined by the successional status of the vegetation. If the site had supported a climax vegetation upon settlement, then useful tree species found in abundance would have included sugar maple, basswood, hemlock, and beech. In lesser quantities, and often confined to specialized habitats, such as the water's edge, White cedar, Willows, and Elders, Elm, Oak, Ash, Butternut, Hickory and cherry would have been found. The uses of such plants have been well documented elsewhere.

Occurring naturally in the understory would have been scattered clumps of plants the common names of which often refer to their status as food sources – may apples, strawberries, wild cucumber, Indian turnip, wild grapes and gooseberries, as well as bloodroot (prized as a dye), and the sensitive fern, *Onoclea sensibilis* (the tightly coiled fiddleheads of which are edible). Raspberries, blackberries and staghorn sumac would be found in natural clearings throughout the forest. Such distributions of the edible plants mean that much effort would be required to locate and gather the fruits, nuts, etc., and that care would have to be taken to ensure that known patches did not become exhausted. The uncultivated nature of these foodstuffs also suggests that the Huron would have to compete with the wildlife in their gathering.

If the settlement had been built in an area already somewhat disturbed, then the proportions and quantities of some of the useable species would have been somewhat different – the canopy containing somewhat more basswood and less sugar maple, and the understory perhaps containing more shrub-like cherry trees, raspberry and the like. The Huronian agricultural practice of clearing and subsequently abandoning fields would increase the area of disturbance and thus the habitat suitable for cherries (notably *Prunus virginiana*), hawthorns, staghorn sumac, raspberries and blackberries.

It is difficult to estimate actual amounts of gatherable foods available to the people of the Draper site. Although in terms of climate, pedology, and individual species found, the site at present differs little from the site at the time of prehistoric occupation, changes in the extent and nature of the vegetation cover, and in the relative abundances of the species make it unreasonable to assume that the present relative percentages of the species can be equated with those of the past. Relatively undisturbed and extensive woodlots elsewhere in the township may provide models for a reconstruction of the plant cover, but these remain to a large extent theoretical especially when the problem under consideration is as specific as the number of raspberry bushes in an acre.

Whatever the quantities, there would be some wild foods available throughout the year. Fruits and nuts generally ripen in summer or autumn. Young shoots and buds are most palatable in spring and early summer. Even in

[1] Wood charcoal of black walnut has been found at both Draper and White, which probably indicates a wider distribution of this species during Late Ontario Iroquois times – see King and Crawford, this volume.

winter, the tender inner bark of certain trees and the seed clusters of the staghorn sumac are available to supplement other food supplies.

The wildlife supported by this vegetation is diverse, though it is less varied and abundant than in the past. This is true not only of terrestrial but also riverine communities. In 1972, sampling carried out on the east branch of Duffin Creek turned up rainbow trout (introduced), white suckers, smallmouth bass, pumpkinseeds, assorted darters and minnows, dace, common shiners and creek chub. From a sampling site near the mouth, brown bullhead, yellow perch, largemouth bass, rock bass and one battered northern pike were also recovered. None of these specimens was very large, nor were the species other than minnows and darters very abundant. Yet within historical record this creek was rich in fish; salmonid species, including a variety of Atlantic salmon were abundant in Lake Ontario, and in the streams which flow into its north shore.

Widespread clearage of land leading to siltation, groundwater withdrawals leading to a drop in the water level, and the construction of sawmills on these creeks all contributed to the destruction of the spawning grounds. Subsequent activities further diminished the fauna of the creek itself, though many species have survived. Frogs, crayfish and freshwater clams, reported to have been eaten by the Huron in times of scarcity, are still found.

The terrestrial fauna have also been affected by the changes wrought upon the landscape. A list of all the animals and birds found within this area is beyond the scope and purpose of this paper. It is sufficient perhaps to mention that songbirds and gamebirds, raccoons, fox, woodchuck, hares, skunks and white tailed deer are presently relatively common, and that early reports describe an abundance of ermine, weasels, mink, black bears, beaver and porcupines, though these are now rarely seen.

Totally eliminated from the area within historical record have been lynx, cougar (disappearing circa 1860), moose, marten, fishers, timber-wolves, and wolverines, the latter disappearing circa 1900, though never very abundant (Peterson 1966). This suggests that the Draper Huron would have had a varied supply of game, and also suggests that extrapolating from present faunal populations and distributions to those of the past is even more difficult and unsatisfactory than in the case of the flora, unless one relies heavily on early records.

Not only have some species been eliminated altogether, but others have decreased or increased greatly in number since the first influx of European settlement. An example of this latter is the white-tailed deer, which is more widespread and probably more abundant at present.

This makes it difficult to estimate the size of deer populations once found in Pickering Tp. Even estimating present deer populations is difficult. Although the Ontario government has set up a system of land capability classifications for ungulates, the areas are classified according to potential though not actual carrying capacities — that is, their suitability if they were managed for ungulate production.

The classes range from 1, having no significant (natural) limitation to production and thus a high capability, to class 8, denoting urban areas. The Draper site is within a class 1 area, and surrounded by class 2 (slightly limited) lands. To the east are more class 1 areas (Fig. 1).

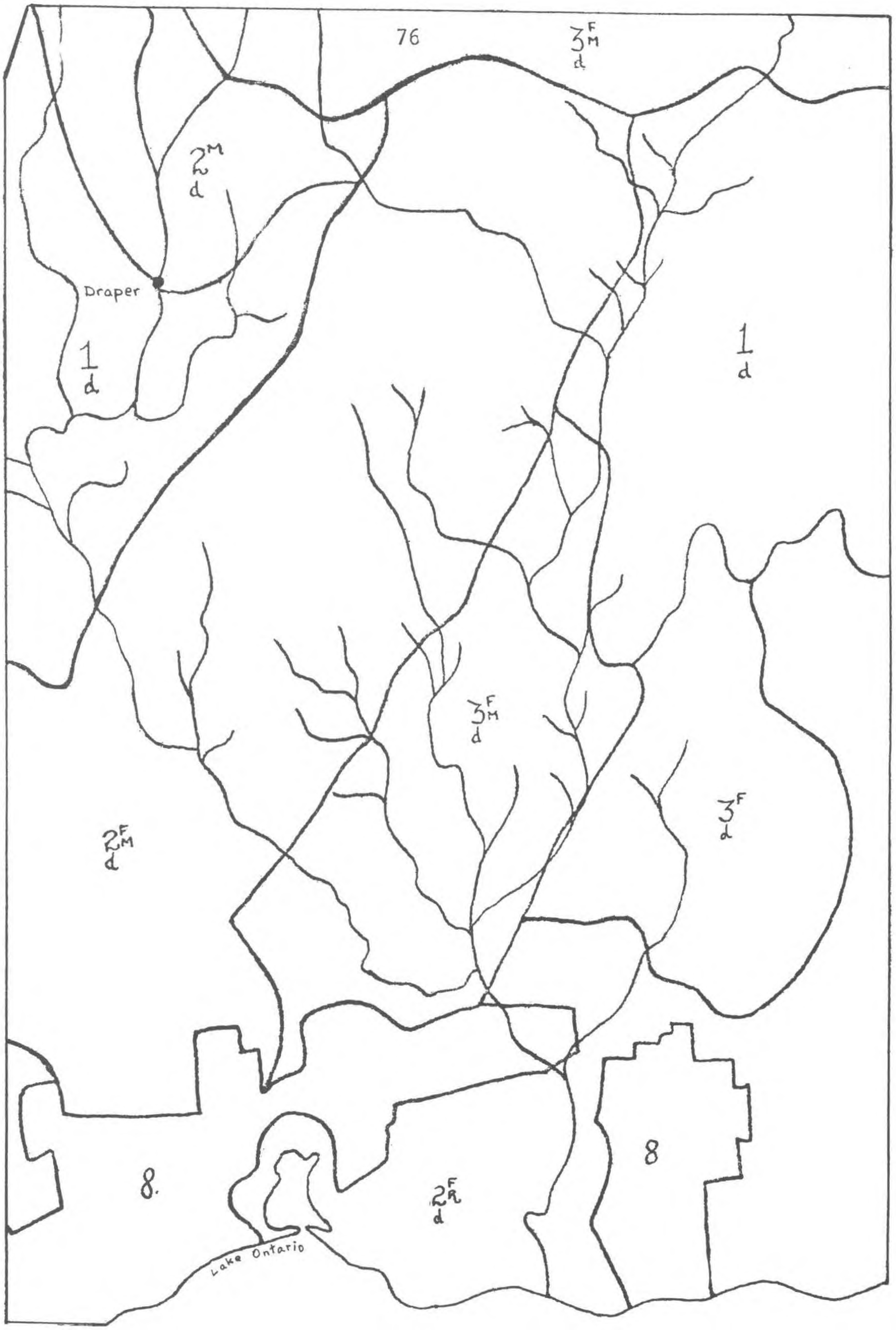
A similar system of classification in Saskatchewan suggested that classes 1 and 2 can support more than 20 ungulates per sq. mi. under optimal conditions, while class 3 could support 13 to 20 per sq. mile. Unfortunately, this survey was carried out in an area not wholly analogous to the Draper site — aspen grove vegetation within the boreal forest, interspersed with grassland, and includes species other than the white-tailed deer, which does not feed on grasses. "Optimal" conditions are not described.

Rather than attempt to estimate deer populations, it is wiser to state simply that while such populations undoubtedly vary from year to year, dependent upon conditions of climate, forage and predation, the Draper site is now and was, perhaps, in the past a favourable area for white-tailed deer. The natural vegetation, where it does occur, is of a type favored by the deer as browse, and stands of hemlock and cedar provide winter shelter — acting as shelterbelts, keeping the snow from the ground and thus allowing the animals to move freely.

In the past, brushy valley bottoms and clearings within deep woods were the preferred habitats, but the deer adapted rapidly to lightly settled areas where they were protected somewhat from wolves, and where fields would provide brush, when fallow, and the remains of crops as fodder. This change in habitat was noted as European settlement spread, but may have occurred on a smaller scale with the development and spread of Huronian agriculture. Land clearance followed by abandonment and shifting of village sites would have created areas of secondary growth, which in turn would favor an increase in deer populations. This increase would, of course, be limited by climatic conditions, and limited or even masked by hunting pressures.

In summation, the present ecology of the Draper site has been much modified by post-European settlement, while retaining points of similarity to the past. The climate, pedology, geology and basic structure of the area have remained much the same, and native species of plants and animals have found refuges in ravines and woodlots, suggesting that the potentials and capabilities of the land are very similar to the past.

From these points of similarity, one can infer a prehistoric vegetation cover very much like the climax forest which could be supported at present, but interrupted and



Class 1—no significant limitations to ungulate production
Class 2—very slight limitations to ungulate production
Class 3—slight limitations to ungulate production
Class 8—heavily urbanized areas

d— white-tailed deer
F—limitations due to lack of nutrients in the soil
M—soil moisture limiting—either excessive or deficient
R—limitation due to restriction of rooting zone by bedrock or other impervious layers

Fig. 1 Land Capability Classification for Ungulates returned to a successional state in the areas of Huronian settlement, as a result of their agricultural practices. Thus, as a "by-product" of their agricultural technology, they opened areas within the forest to secondary succession, which probably resulted in an increase in certain of their wild foods. In addition to these vegetable foods, the environment was probably rich in aquatic and terrestrial life – more so than could be deduced from the present fauna alone.

The site, therefore, was favorable in terms of soils, food and water supply, and climate (though precipitation might have sometimes been limiting in maize agriculture). All the same, it was not unique. The Huron would have found similar conditions in other areas along the north shore of Lake Ontario, and to the south and west.

APPENDIX A

SPECIES LIST – DRAPER SITE – AUGUST, 1973

* introduced species

\# species recorded as having been used by the Huron

EQUISETACEAE:

Equisetum hyemale L.–scouring rush, found on valley slope

Equisetum pratense Ehrh.–horsetail found on the bottomlands, valley slope and terrace

Equisetum sylvaticum L.–horsetail found on the bottomland

POLYPODIACEA

Adiantum pedatum L.–Maidenhair fern, found in the woodland on the valley slope

Athyrium filix-feminia (L.) Roth –Lady fern; valley slope

Cystopteris bulbifera (L.) Berh.–Bulbet bladder fern; valley slope and bottomland

Dryopteris austriaca var. spinulosa (Mull.) Fiori.–spinulose shield fern; valley slope

D. austriaca var. intermedia (Muhl.) Morton–Fancy-fern; valley slope

Matteucia Struthiopteris (L.) Todaro.–Ostrich fern; bottomland and slope

\# *Onoclea sensibilis L.*–Sensitive fern; bottomland

Polystichum acrostichiodes (Michx.) Schott.–Christmas fern; valley slope

PINACEAE:

Pinus banksiana Lamb.–Jack pine; above the river valley; species found naturally further to the north, introduced into this area

\# *Pinus strobus L.*–White pine; found above the river valley; the pitch from dead pines was mixed with bees wax and used as a sort of chewing gum, to quench thirst

\# *Tsuga canadensis (L.) Carr.*–eastern hemlock; bottomlands, valley slope and terrace above the valley; decoctions of hemlock bark and roots, and alder bark, used to color spoons and other wooden articles a deep red

CUPRESSACEAE:

\# *Thuja occidentalis L.*–White cedar; valley bottom, slope and top; called "asquata" by the Huron (Tooker, 1967), sheets of the bark were used as shields, and in the construction of dwellings.

TYPHACEAE:

\# *Typha latifolia L.*–Common or Broad-leaved cattail; found at the edge of the creek; the inner rootstalk of the young shoot is edible in spring and summer and can be used along with the pollen, to produce a type of flour

ALISMATACEAE:

\# *Sagittaria cuneata Sheldon*–Native arum-leaved arrowhead; found growing in the creek; the bulbs were used extensively throughout North America as a food staple

\# *S. latifolia Willd.*– Broad leaved arrowhead; found in the creek

POACEAE, formerly GRAMINEAE:

* *Agrostis tenuis Sibth.*–Rhode Island bent; bottomland

\# *Elymus virginicus L.*–Wild rye; found on the valley slope and bottomland; the rootstock of a related species, *E. canadensis L.*, was used by the Iroquois in the preparation of a special liquid in which corn kernels were soaked before planting

Festuca sp.–Fescue; valley slope

Glyceria granuds S. Wats.–Manna grass; bottomland

Glyceria striata (Lam.) Hitchc.–found in the bottomlands

Phalaris arundinacea L.–Reed canary grass; bottomland

* *Phleum pratense L.*–Timothy; bottomland and valley top

CYPERACEAE:

Carex bebbii Olney–sedge; bottomland

Carex retrorsa Schw.–sedge; bottomland

Carex spp.–sedges; valley slope

Scirpus atrovirens Willd.–Bullrush; bottomland and valley top

Scirpus rubrotinctus Fern.–found in the valley bottom

ARACEAE:

\# *Arisaema triphyllum L.*–Jack-in-the-pulpit, Indian turnip; bottomland and slope; called "ooxrat" by the Huron (Tooker, p. 85), the root was cooked and made into a snuff used to treat catarrh, to clear the complexion, and to purge phlegm in the elderly

LILIACEAE:

Maianthemum canadense Desf.—Wild lily of the valley; valley slope and top

Smilax herbacea L.—Carrionflower; found above the valley

Trillium grandiflorum (Michx.) Salisb.- Trillium; valley slope

ORCHIDACEAE:

* *Epipactis helleborine (L.) Cranz.* – Broad Helleborine; found in the valley bottom, slope and top

SALICACEAE:

Populus balsamifera L.—Balsam poplar; valley slope

Populus grandidentata Michx.—Largetooth aspen; valley slope

Populus tremuloides Michx.—Quaking aspen; valley slope and top

Salix sp.—Willow; found on the valley slope; the light, dry wood was preferred for fires, the bark could be eaten raw

BETULACEAE:

Ostrya virginiana (Mill.) Willd.—Hop-hornbeam, Ironwood, Deerwood; found above the valley

FAGACEAE:

Fagus grandifolia Ehrh.—beech; valley slope and top; the beech nuts were gathered and eaten

Quercus bicolor Willd.—Swamp white oak; valley slope; during times of shortage, the inner bark and acorns of *Quercus* spp. were used as food by the Huron (largely *Q. alba; Q. bicolor* is not known to have been used, but produces edible acorns)

ULMACEAE:

Ulmus americana L.—White or American elm; valley slope; the bark of this tree was used in the construction of dwellings

Ulmus rubra Muhl.—slippery or red elm; valley slope and top; elm bark from a number of species was used to seal the tops of above-ground storage bins, after being seasoned over the summer, and was used for making planting baskets

URTICACEAE:

Boehmeria cylindrica (L.) Sw.—False nettle; bottomland

* *Urtica dioica L.*— Stinging or Great nettle; valley slope and bottom

ARISTOLOCHIACEAE:

Asarum canadense L.—Wild ginger; valley slope

POLYGONACEAE:

Polygonum hydropiperoides Michx. Smartweed; valley bottom

* *Rumex crispus L.*—Sour Dock; valley slope and top; recorded as having been used as a food in historic times

* *Rumex obtusifolius L.*—Bitter Dock; valley slope and bottom

RANUNCULACEAE:

Actaea alba (L.) Mill.—Doll's Eyes, White-fruited baneberry; valley slope and top

Actaea rubra (Ait.) Willd.—Red-fruited baneberry; valley slope and top

Anemone canadensis L.—Anemone, Windflower; valley bottom, slope and top

Anemone virginiana L.—found on the valley slope

Caltha palustris L.—Marsh marigold; bottomland

Clematis virginiana L.—Virginia Virgin's Bower; bottomland

Hepatica acutiloba D.C.—Hepatica; valley slope

* *Ranunculus acris L.* Tall or Meadow buttercup; valley bottom and top

Ranunculus septentrionalis Poir.—Swamp or Marsh buttercup; bottomland

Thalictrum dioicum L.—Meadow rue; valley slope and top

Thalictrum revolutum D.C.—Waxy meadow rue; valley bottom

BERBERIDACEAE:

Caulophyllum thalictroides (L.) Michx.—Blue Gohosh; valley bottom, slope and top

Podophyllum peltatum L.—May apple; valley slope and top; the fruit was eaten, and was also used by the Onondages to produce a decoction in which corn seeds were soaked to ensure good growth. It is not known if any herbs were added to this decoction

CRUCIFERAE:

* *Barbarea vulgaris R.*—Yellow rocket or Cress; valley bottom

SAXIFRAGACEAE:

Ribes cynosbati L. – Dogberry, Wild gooseberry; valley bottom and slope; the fruit is edible

Ribes hudsonianum Richards—Wild black currant; valley bottom; the fruit is edible

Tiarella cordifolia L.—Foam Flower; bottomland and valley slope

ROSACEAE:

Agrimonia gryposepala Willd.—Agrimony; valley bottom and slope

Crataegus spp.—Hawthorns; found on the valley slope and top; those found on the site may be introduced species, but *Crataegus* species are also native to the area; the haws are edible

Fragaria virginiana Duchesne—Wild strawberry; valley slope, bottom and top; the fruit was dried for winter use in cornbread and sagamite

Geum canadense Jacq.—Avens; valley bottom, slope and top

Physocarpus opulifolius (L.) Maxim.—Ninebark, a shrub; found in the valley bottom

* *Potentilla recta L.*—Cinquefoil; valley bottom, slope and top

Prunus nigra Ait.—Canada plum; valley bottom; the fruit is edible

Prunus serotina Ehrh.—Wild cherry; valley slope and top; the cherries were eaten. The bark of *Prunus* combined with that of the ash, spruce and hemlock trees was boiled to produce a liquid with which the body was washed to end epidemics

Prunus virginiana L.—Chokecherry; valley bottom, slope and top

Rubus allegheniensis Porter—Common Blackberry; found above the valley; the fruit was often dried for use

Rubus occidentalis L.—Black Raspberry; valley slope and top; the fruit was dried for use in cornbread, sagamite, etc., and was also eaten to quench thirst

ROSACEAE (cont'd)

Rubus strigosus Michx.—Red Raspberry; valley bottom, slope and top

FABACEAE:

Amphicarpa bracteata (L.) Fern.—Hog peanut; found above the valley

* *Medicago lupulina L.*—Black or Hop Medick; valley top

* *Trifolium hybridum L.* — Alsike or Alsatian Clover; bottomland

Trifolium sp.—possibly *T. Dubium Sibth.*, Least Hop-clover or Hop-Trefoil, introduced from Europe; found in the valley bottom

OXALIDACEAE:

Oxalis europaea Jord.—*O. stricta L.*, *Xanthoxalis stricta L.*, commonly wood-sorrel or sheep sorrel, probably native; valley slope

Oaxlus sp.—found on the valley slope

GERANIACEAE:

* *Geranium robertianum L.* —Herb-Robert; bottomland

Geranium sp.— found on the valley slope

ANACARDIACEAE:

Rhus radicans L.—Poison ivy; valley bottom and slope

Rhus typhina L.—Staghorn Sumac; valley top; the seed clusters were collected in autumn and winter, and boiled to produce a beverage

ACERACEAE:

Acer sp. hybrid—Maple tree; found on valley slope

Acer negundo L. — Boxelder, a native tree species but one which is generally not found in this area — a single immature specimen was found on the bottomland

Acer rubrum L.—Red or Soft Maple; valley slope and top; the burls were used to make bowls, and the bark could be dried and crushed to make a type of bread

Acer saccharum Marsh.—Sugar Maple; valley bottom, slope, and top; the bark was sometimes used to make a type of bread, and maple sugar was used to sweeten bread, the parched corn flour that was eaten while travelling, and soups

BALSAMINACEAE:

Impatiens biflora Willd.—Touch-me-not, Jewel-weed; valley bottom and slope

RHAMNACEAE:

* *Rhamnus catharticus L.*—Buckthorn, a small tree or shrub; valley slope

VITACEAE:

Parthenocissus quinquefolia (L.) Planch.—Virginia creeper; valley bottom, slope and top

Vitis riparia Michx.—Riverside of Sweet-scented grape; valley bottom and slope; the young shoots were eaten, unpeeled

TILIACEAE:

Tilia americana L.—Basswood, Linden; valley bottom, slope and top; the wood of this tree was favoured for making spoons. The leaves were used to line pans in which corn and pumpkin bread were baked, and to wrap squash which were then baked. The bark was boiled to produce hemp, used as rope, bandages, and thread in place of moose sinew, and the buds and inner bark were chewed to quench thirst and as a form of chewing gum

HYPERICACEAE:

* *Hypericum perforatum L.*—St. John's Wort; valley slope

VIOLACEAE:

Viola canadensis L.—Canada violet; valley slope

Viola septentrionalis Greene.—violet; valley slope

Viola spp.—found on the valley bottom, slope and top

ONAGRACEAE:

Circaea alpina L.—Enchanter's nightshade; valley slope

Circaea lutetiana L.—or *C. quadrisulcata (Maxim.) French & Sav.*, commonly Enchanter's nightshade; valley bottom, slope and top

Epilobium ciliatum Raf.—Willow-herb; bottomland

* *Epilobium hirsutum L.*—Great Hairy Willow-herb; bottomland

AMMIACEAE, formerly UMBELLIFERAE:

* *Deucus carota L.*—Wild carrot; found in disturbed portions of the bottomland and above the valley

Hydrocotyle americana L.—American Marsh-pennywort; bottomland

CORNACEAE:

Cornus alternifolia L.f.—Alternate-leaved Dogwood; a shrub found on the valley bottom and slope

Cornus stolonifera Michx.—Red Osier, Cornel or Dogwood; valley bottom and top

PRIMULACEAE:

* *Lysimachia nummularia L.* — Moneypenny; valley slope and bottom

Steironema ciliatum (L.) Raf.—or *Lysimachia ciliatum L.*, commonly Loosestrife; found above the valley

OLEACEAE:

Fraxinus americana L.—White ash; valley slope; the wood of this tree was used for making spoons

Fraxinus pennsylvanica Marsh.—Red, Green, Blue or Black ash; valley slope; a favorite Iroquois basketry material

APOCYNACEAE:

Apocynum androsaemilfolium L.—Dogbane; bottomland; this, and the related species *A. Cannabinum L.* and *A. sibiricum Jacq.*, were used for hemp

ASCLEPIADACEAE:

Asclepias purpurascens L.—Milkweed; bottomland

Asclepias syriaca L.—Common Milkweed; valley bottom, slope, and top

* *Cyanchum nigrum (L.) Pers.*—Black Swallow-wort; valley top

HYDROPHYLLACEAE:

Hydrophyllum virginianum L.—Waterleaf; valley slope and top

BORAGINACEAE:

* *Cynoglossum officinale L.*—Hound's Tongue; above the valley

* *Lithospermum officinale L.*—Cromwell; valley bottom, slope and top

Lithospermum sp.— found above the valley

Myosotis laxa Lehm.—Forget-me-not; bottomland

* *Symphytum asperum Lepechin*—Comfrey; found in the valley bottom

VERBENACEAE:

Verbena hastata L.—Vervain; bottomland and valley top

Verbena urticifolia L.—nettle-leaved Vervain; valley bottom and slope

LAMIACEAE, formerly LABIATAE:

Lycopus americanus Muhl.—Water-Horehound; bottomland

Mentha arvensis L.—mint; bottomland; it was not determined if this was the native var. glabrata (benth.) Fern. or the introduced var. arvensis

Prunella vulgaris L.—Selfheal, Dragonhead; found on the valley slope, top, and bottom; a circumboreal species

SOLANACEAE:

* *Solanum dulcamara L.* — Bittersweet, a shrubby perennial; valley bottomland, slope and top

* *Solanum nigrum L.*—Black, Deadly or Garden Nightshade; valley top

SCROPHULARIACEAE:

* *Verbascum thapsus L.* — Mullein; found at the top of the valley

PLANTAGINACEAE:

* *Plantago major L.*—Plantain; bottomland and valley slope; may be native to certain parts of North America

Plantago Rugelii Decne.—Plantain; valley slope

RUBIACEAE:

Galium spp.—Bedstraw, Cleavers; found in the valley bottom

CAPRIFOLIACEAE:

\# *Sambucus canadensis L.*—Common Elder; valley bottomland; dried elderberries were incorporated into cornbread. Elderberries were an ingredient along with may apples in the decoction used by the Onondaga to ensure the good growth of the seed corn (see *Podophyllum*, the may apple, above)

CAPRIFOLIACEAE: (cont'd)

\# *Sambucus pubens Michx.*—Red-berried Elder, a shrub; bottomland

\# *Viburnum lentago L.*—Sweet Viburnum, Sheepberry, Nannyberry; terrace above the valley; the fruit of this tall shrub is edible

\# *Viburnum opulus var. americanum Ait.* —Nannyberry; bottomland; the fruit is edible

CUCURBITACEAE:

\# *Echinocystus lobata (Michx.) T. & G.*—Balsam apple, Wild cucumber; bottomland and valley slope

ASTERACEA:

Achillea millefolium L.— Yarrow; valley bottom, slope and top; probably native since the introduced variety is rare

* *Arctium minus Schk.*—Common Burdock; valley bottom slope, top

Aster ericoides L.—aster; found above the valley

Aster novae-angliae L.—New England Aster; above the valley

Aster novi-belgii L.—aster; found above the valley

Bidens vulgata Greene.—Beggar's ticks; bottomland

* *Carduus crispus L.*—curly-leaved thistle; above the river valley

* *Chrysanthemum leucanthemum L.* —Ox-eye Daisy; bottomland

* *Cichorium intybus L.*—Chicory; above the valley

* *Cirsium arvens (L.)* Scop.—Creeping thistle; above the valley

Cirsium discolor (Muhl.) Spreng. —found on the valley bottom

* *Cirsium vulgare (Savi) Tenore.*—Bull thistle; bottomland

Erigeron philadelphicus L.—Daisy, Fleabane; bottomland

Eupatorium maculatum L.—Spotted Joe-Pye weed; valley bottom and top

Eupatorium perfoliatum L.—Boneset; bottomland

Eupatorium purpurem L.—Joe-Pye weed; bottomland

Eupatorium sp.—Joe-Pye weed; valley slope

Hieracium spp.—Hawkweeds; valley slope and top

* *Inula helenium L.* — Elecampane; bottomland and above the valley

Solidago altissima L.—formerly *S. Canadensis var. scabra (Muhl.) T. & G.*, commonly Tall or Double Goldenrod; valley top

Solidago caesia L.—Goldenrod; found in the bottomland area

Solidago canadensis L.—Canada Goldenrod; valley bottom, slope and top

Solidago flexicaulis L.—Zig-Zag Goldenrod; valley slope

Solidago rugosa Mill.—Wrinkle-leaved Goldenrod; bottomland

* *Sonchus arvensis L.*—Sow-thistle; above the valley

* *Taraxacum officinale Weber*—Common Dandelion; found on the valley bottom, slope, and top

* *Tragopogon pratensis L.*—Goat's beard; found above the valley

* *Tragopogon* sp.—Goat's beard; valley slope and top

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Palynological Analysis of Materials from the Draper and White Sites

MIRIAM MULSTEIN

Introduction

A total of 14 sub-surface samples from two Huronian prehistoric sites, White and Draper, were submitted for palynological analysis (Table 1). These samples had been collected independently by archaeologists working at the two sites. In addition, four surface samples consisting of the upper 2" of the soil, were taken at the Draper location. Of these, all four surface and seven of the subsurface samples were analyzed for pollen content.

There were no priorities, but there was a request for certain data. It was asked whether the local palaeoecology could be inferred from the pollen assemblages found in archaeological horizons, and whether any distinct advantages of the site locations for human occupation could be deduced from these assemblages. Evidence of agricultural activity (i.e., the presence of maize pollen) was sought, particularly from the White site.

The surface samples were analyzed as a means of comparison with midden material. Such samples are useful in determining the representation of local species, in terms of under- or over-representation, and the degree to which the pollen assemblage reflects the present vegetation.

Methods and Materials

To varying amounts of the sample material chosen for analysis (see Table 1), two exotic *Lycopodium* pills were added, each pill containing 12,500±500 distinctive and unmistakeable grains. These are generally added to determine rates of pollen influx per unit area, using a ratio of exotic to fossil grains. However, it was suspected that the preservation of the pollen would be poor and that therefore no accurate picture of the volume of the pollen influx could be determined. Thus the *Lycopodium* was introduced largely as a means of gauging the effect of processing on the fossil pollen, and of examining an equivalent amount of each sample (i.e., by counting the number of fossil grains per 100 exotic grains).

To this material 100 mL of 10% KOH were added and the samples were heated and "swirled", to dissolve extraneous material and any remaining cytoplasm. They were then sieved, using a series of mesh sizes. Initially, a series of 150, 90 and 30 micron mesh sieves were used, with all materials greater than 30 microns and less than 90 microns in size being retained for further preparation. Later, a series of 150, 120 and 30 microns was used to reduce the possibility of loss of the larger grains. Some of the smaller grains (those smaller than 30 microns) were unavoidably lost in this process, but it was necessary to remove as much of the matrix as possible and thus concentrate the preserved pollen.

The sieved samples were washed into centrifuge tubes using distilled water, centrifuged and decanted. Hydrofluoric acid was added to remove silicates from the samples, which were then heated in a boiling water bath, centrifuged and decanted. Preparatory slides indicated the presence of some potassium silicate precipitate, but the particles were sufficiently dispersed and the grains sufficiently identifiable as to preclude the necessity of adding silver nitrate.

This preparation was followed by acetolysis, as described by Faegri and Iverson (1964: 71), to remove cellulose and the like from the samples. A drop of saffranine dye was added to stain the material, which was finally washed into a vial with Tertiary butyl alcohol. Two drops of silicon oil (the mounting medium) were added and slides made.

Four of the fossil samples were prepared using zinc chloride floatation to separate the organic from the inorganic fraction. After heating in 10% KOH, the materials were washed into 50 mL centrifuge tubes with distilled water, then centrifuged with alcohol to remove all traces of the water, and decanted. The samples were then acidified with 10% HCl, to prevent the precipitation of $Zn(OH)_2$.

A zinc chloride solution of specific gravity of about 1.96, as suggested by Kummel and Raup (1965), was added and the material was centrifuged for about half an hour. The floating portion was carefully decanted into another centrifuge tube and centrifuged with alcohol to remove the heavy liquid. ZnCl was used because it is stable, easy to

TABLE I.

Sample #	Square		Site	level	amount used	analysis
1.	42–44N	5– 7E	White	18 21 cm	4.68cc = 6.57 g	floatation
2.	22–24N	38–40E	Draper	A horizon under midden, 15 cm	4.68cc = 6.49 g	floatation
3.	42–44N	E42–44	Draper	39–42 cm	1.8 cc = 2.73 g	floatation
4.	22–24N	E38–40	Draper	58 cm	1.8 cc = 2.6975 g	floatation
5.			Draper	surface	11.0 cc = 15.05 g	KOH, HF, acetolysis
6.			Draper	surface	11.0 cc = 21.153 g	KOH, HF, acetolysis
7.			Draper	surface	11.0 cc = 17.578 g	KOH, HF, acetolysis
8.			Draper	surface	11.0 cc = 15.97 g	KOH, HF, acetolysis
9.	22–24N	E38–40	Draper	29 cm	2.7 cc	KOH, HF, acetolysis
10.	32–34N	40–42E	Draper	A, of paleosol	2.7 cc	KOH, HF, acetolysis
11.	41–44N	5–7E	White	9–15 cm	2.7 cc	KOH, HF, acetolysis

prepare, relatively inexpensive and it does not oxidize organic matter. This latter characteristic means that in addition to the pollen, some charcoal will also be recovered from the samples, though the process was successful in isolating the lightest organic fraction. Sieving, to remove large and very fine fragments of organic material, was followed by acetolysis, staining and the addition of the mounting medium.

The slides so prepared were scanned at 25X magnification, using high powers in the case of a difficult identification. Grains were keyed out using the *Key to the Quarternary Pollen and Spores of the Great Lakes Region* (McAndrews, Berti & Norris, 1973). Relative frequencies were produced for each sample; pollen concentrations per unit sediment reflective of influx were worked out for the surface samples only. Interpretation of the results was attempted.

Results

The surface samples (sample numbers 5 through 8) were taken along a transect at the Draper site, running from the top of a hill just west of Duffin Creek, through the stream valley to the opposite bank. In general, the area lies within the deciduous hardwood – evergreen mixed forest region, though there has been much clearage of the land for agriculture. Portions of the river valley in the vicinity of the Draper site have undergone a secondary succession, and now support a young maple-beech forest interspersed with some hemlock, basswood and associated species. The areas surrounding the ravine have been greatly disturbed and support a number of introduced tree and ruderal species.

There were major differences in both soil material and in vegetation cover along the transect. The differences in soil type (i.e., alluvium in the bottomland, loams above the valley) presumably influenced the preservation and thus the quantity of pollen recovered, as well as the nature of the cover.

Although the four surface sites were fairly close together – the whole transect covering perhaps 300' – significant differences in vegetation cover were observed, and these differences were reflected in the composition of the pollen assemblages. Sample #5, taken from a disturbed hilltop supporting an open vegetation cover, contained a high percentage of non-arboreal pollen, largely grasses, sedges and composites. In sample #6, a thick cover of ferns in the ground layer was reflected in the high relative frequency of Polypodiaceae spores. Both samples 6 and 7, taken from heavily forested areas, indicate their origin by their high arboreal pollen counts. Sample #8, from an area forested largely with cedar and supporting little ground cover, nonetheless contained a large proportion of non-arboreal pollen, probably due to the poor preservation of the weak cedar pollen and the influx of herbaceous pollen

TABLE 2.

Sample #	exotic Lycopodium	Total fossil pollen	Fossil concentration (#/g sediment)	AP #	AP %	NAP #	NAP %	unknown (% of total)	indeterminable (%)
1.	167.5	35 5	807	16.5	46.5	13	36.6	5.6	11.3
2	197 5	25.5	497	14.5	56.8	6	23.5	–	21.6
3.	226	1	41	1	100	–		–	–
4.	202	2	92	–		–		–	100
5.	92	491	8868	334.5	68.1	132.5	26.9	1.1	3.8
6.	98	150	1809	108	72	38	25.4	–	2.7
7.	112	131.5	1670	101.5	77.2	23	17.4	2.3	3.0
8.	110	68.5	975	40	58.4	22	32.1	5.8	3.7
9.	149.5	12	–	6.5	54.1	3	25	–	20.8
10.	172.5	17.5	–	7.5	42.9	7	40	–	17.1
11.	297	27.5	–	22.5	81.8	3	10.9	–	7.3

types from nearby disturbed areas.

In general, the pollen of herbaceous species tends to diffuse only a few metres (Anderson 1970: 41), and thus the assemblages will reflect local variations in this flora. Also reflected are certain regional trends, such as a general over-representation of pine, as a result of long distance transport of the grains.

Concentrations per unit sediment in the surface samples were much higher than those in the fossil samples (consisting of 2 samples from the White site and 5 from the Draper site). Preservation was on the whole poor in these latter (see Tables 2–3), and two of the samples – numbers 3 and 4, both from the Draper site – were sterile. The good recovery of exotic *Lycopodium* indicated that this was not a result of the method of processing, but of the general absence of fossil pollen from the soil, and the small amounts of material processed. The data suggests that preservation decreased with depth, which is in keeping with the findings of authors such as Vehik (1971).

Relative frequencies were derived and diagrammed for all samples from which pollen was recovered. The samples are isolated by site, and placed in order of increasing depth.

Conclusions

Considering the limited nature of the data, it is difficult to make a meaningful interpretation of the fossil assemblages. Preservation was poor, probably due to the nature of the substrates. Alluvium and calcareous materials tend to have low pollen contents; thus the need to process large amounts of soil and effect concentration of the palynomorphs to the greatest extent possible, was stressed in this study. However, even with good concentration problems of identification remain, since the fossil pollen was not only dispersed but often ghosted, crushed and broken as well.

Some contamination of the samples was possible, both in the field and in the laboratory. However, assuming that the assemblages are indeed fossilized and not the products of contamination, then certain conclusions can be drawn. It can be suggested that the vegetation at the Draper site was in the past at least similar to that of the present. Sample #2, from the A_1 horizon of a paleosol, contains somewhat less pine and more hemlock and basswood than present assemblages, and might possibly represent an undisturbed forest situation, predating the settlement although the non-arboreal pollen of this same sample seems to indicate some disturbance (see Fig. 2). These interpretations of the arboreal and nonarboreal pollen counts do not necessarily conflict, since the NAP tends to reflect quite local conditions and may indicate a natural clearing. Identification of the actual species found would improve the accuracy of the interpretation, but identifications even to the genus level were often impossible.

In other Draper site samples, the high occurrence of pine

TABLE 3.

AP

Sample #	Pinus (Pine) #	Pinus (Pine) %	Abies (Fir) #	Abies (Fir) %	Picea (Spruce) #	Picea (Spruce) %	Tsuga (Hemlock) #	Tsuga (Hemlock) %	Cupress (Cedar) #	Cupress (Cedar) %	Acer (Maple) #	Acer (Maple) %	Ulmus (Elm) #	Ulmus (Elm) %	Quercus (Oak) #	Quercus (Oak) %	Fagus (Beech) #	Fagus (Beech) %	Tilia (Basswood) #	Tilia (Basswood) %	Populus (Aspen) #	Populus (Aspen) %	Betula (Birch) #	Betula (Birch) %	Fraxinus nigra (Ash) #	Fraxinus nigra (Ash) %	Alnus (Alder) #	Alnus (Alder) %	Ostrya/Carpinus Ironwood #	Ostrya/Carpinus Ironwood %
1.	12½	75.8					2	12.1																					2	12.1
2.	6½	44.8					2	13.8											5	34.5									1	6.9
3.	1	100																												
4.																														
5.	263½	78.8	7½	2.2	11½	3.4	7	2.1	6	1.8	12	3.6	2	0.6	4	1.2	5	1.5	5	1.5	6	1.8	3	0.9	1	0.3	1	0.3		
6.	93	86.1	½	0.5	3	2.8	7½	6.9			2	1.8	1	0.9	1	0.9														
7	74	72.9	2½	2.5	9	8.2	11	10.8	2	1.9			1	1.0			2	1.9												
8.	27½	68.8					6½	16.2	3	7.5	1	2.5							2	5.0										
9.	6½	100																												
10.	7½	100																												
11.	20½	91.2	1	4.4															1	4.4										

TABLE 3 (Continued)

NAP

Sample	Gramineae (grass family) #	Gramineae (grass family) %	Cyperaceae (sedge family) #	Cyperaceae (sedge family) %	Tubuliflorae #	Tubuliflorae %	Liguliflorae #	Liguliflorae %	Ambrosia (Ragweed) #	Ambrosia (Ragweed) %	Chenopodiaceae (goosefoot family) #	Chenopodiaceae (goosefoot family) %	Polypodiaceae (fern family) #	Polypodiaceae (fern family) %	Ericaceae (Heath family) #	Ericaceae (Heath family) %	Caryophyllaceae (Pink family) #	Caryophyllaceae (Pink family) %	Typha latifolia (cattail) #	Typha latifolia (cattail) %	Epilobium latifolium (Willow herb) #	Epilobium latifolium (Willow herb) %	Cornus canadensis (Dogwood) #	Cornus canadensis (Dogwood) %
1.	2	15.4	3	23.1	3	23.1					1	7.7	3	23.1										
2.	2	33.3	1	16.7							3	50.0												
3.																								
4.																								
5.	20½	15.5	28	21.1	6½	4.9	46	34.7	14½	10.2	1	0.75	11	8.4	4	3.0	1	0.75						
6.	1	2.7	7	18.4	1	2.7	2	5.3					21	57.9					4	10.5	1	2.7		
7.	2	8.7	10	43.5			2	8.7	1	4.4			4	17.4	4	17.4								
8.	5	22.7	7			1.8	2	9.1					3	13.6					4	18.1			1	4.5
9.	1	33.3	1	33.3	1	33.3																		
10.	1	14.3									2	28.6			4	57.1								
11.	1	33.3					2	66.7																

FIG. 1

SURFACE SAMPLES

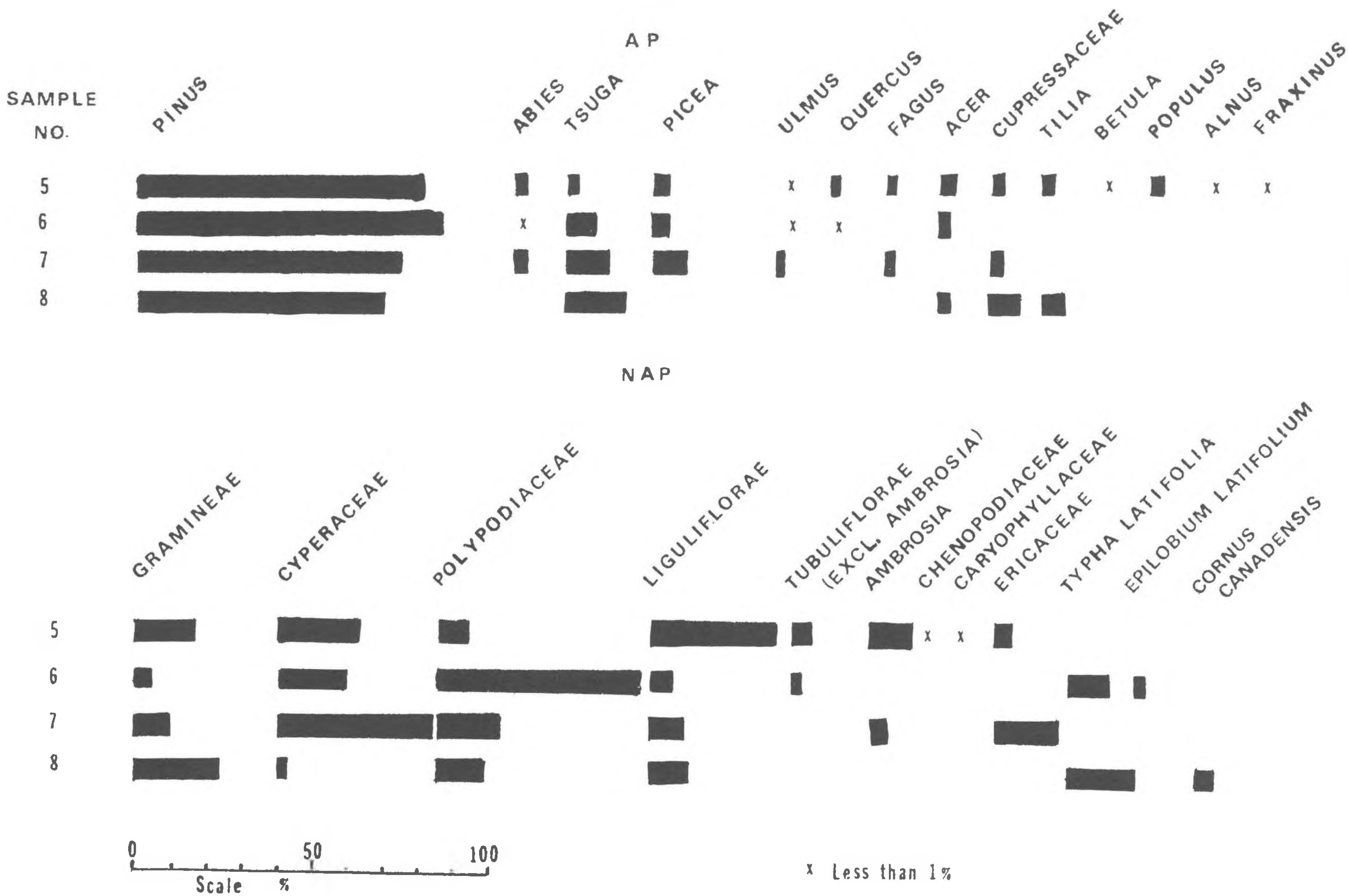
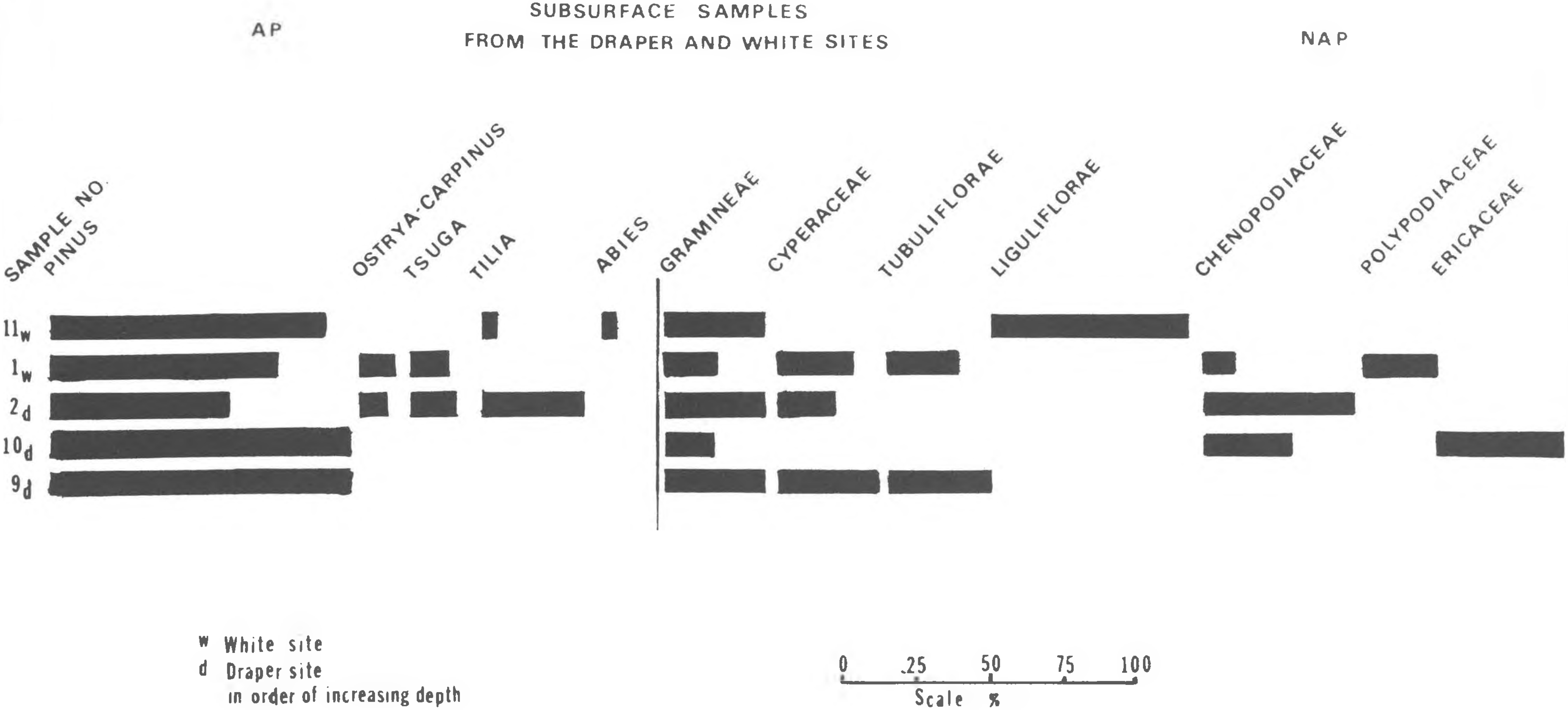


FIG. 2

SUBSURFACE SAMPLES
FROM THE DRAPER AND WHITE SITES



pollen (though over-represented, undoubtedly) and the composition of the herbaceous flora are suggestive of disturbed habitats.

In the two samples from the White site, preservation was somewhat better. The deeper sample (sample #1, at a depth of 18–21 cm) yielded an assemblage seemingly representative of a relatively undisturbed habitat, though perhaps near an area of disturbance. The percentage of pine resembles closely that in the surface samples from the forested areas at Draper, and the presence of fern spores suggests a vegetation similar to that on the valley wall at the Draper site (Fig. 1). The upper sample, with its higher percent of pine and the presence of Liguliflorae (generally a rare pollen type) strongly suggests disturbance. A more careful sampling of the White site midden at finer intervals might indicate more precisely a pattern of clearage and abandonment although drawing conclusions from the impoverished and undated assemblages found is not wholly valid.

The generally poor recovery from the archaeological deposits could be traceable to the calcareous nature of the subtrates, which are neutral to alkaline in reaction, perhaps increased by leaching of charred bone fragments in the midden samples (though pH values for the middens were unfortunately not determined). Biotic activity destructive to fossil exines occurs more readily in slightly alkaline soils than in acid soils. Preservation was better in the paleosols, the buried soils (samples 10 and 2), perhaps due to the alteration of conditions of oxidation and the like following the rapid deposition of overlying materials.

Thus the conclusions that can be drawn are fairly limited – the species found in the past appear to be the same as though found at present, although European settlement has led to the widespread removal of forests and introduction of some ruderal species. There is some evidence of disturbance related to the Huronian occupation, particularly in the upper sample from the White site. The Draper material is less useful, with the exception of the paleosol material, which suggests a less disturbed habitat containing perhaps more *Tilia* (basswood) and *Tsuga* (hemlock) than are found at present.

No direct palynological evidence of agriculture was found. The few grass pollen grains recovered were generally less than 45 microns in size, indicating that they represent wild grasses. Two grains greater than 45 microns were found (in samples 2 and 5), but neither of these was recognizable as a cultivated species. The absence of *Zea mays* pollen is meaningless — not only because of the absence of maize pollen in surface samples though maize is grown in the area, but because there is other firm evidence of Huronian agriculture at the Draper site. The only possible agriculturally significant find was an echinate tricholpate grain in sample #9, which was tentatively identified as *Helianthus* (sunflower).

Other techniques, such as seed analysis, were more effective in reconstructing the ecology and cultivation of this site at the time of habitation. The very poor preservation of the pollen, both quantitatively and qualitatively, results in small sample sizes and reduces the validity of interpretation, especially when possibilities of contamination and errors in identification are considered. Thus, while pollen analysis has proved useful in some archaeological applications, in this case it would seem that such analysis has little to add to the understanding of the Draper and White sites.

ACKNOWLEDGEMENTS

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The Draper Site: Historical Accounts of Vegetation in Pickering and Markham Townships With Special Reference to the Significance of a Large, Even-aged Stand Adjacent to the Site

IRENE BOWMAN

Introduction

The area in which the Draper site is located has changed considerably in the five hundred years that have passed since it was inhabited by late prehistoric Iroquoians. Most of this change has, understandably, taken place since the early 1800's when lumber companies and settlers became established. If we are to attempt to reconstruct the environment in which these people existed, data from archaeological remains and present biological surveys will have to be supplemented with information from the diaries of early missionaries, surveyors and settlers who recorded something of its original state.

The most detailed descriptions of vegetation patterns for this area are to be found in the records of early surveyors who were required to make notes on the soil, timber and water resources in each lot. Where complete records have been preserved, as in Markham Township, it has been possible to reconstruct the maple-beech climax forest almost exactly as it was before European settlers left their imprint. In Pickering, detailed records exist only for the southeastern quarter of the township.[1] The Draper site is in the northwestern quarter. The only information on vegetation in this part of the township which appears to have survived is found in a document concerning white pine masting reserved for the Royal Navy which indicates the past existence of a vast, even-aged pine stand situated immediately to the west of the Draper site. Smaller stands were located in other areas of the township. The processes of succession can result in distinctive vegetation patterns in areas where natural or human disturbances have taken place. The late prehistoric Iroquoian agriculturalists would most certainly have disturbed their environment in clearing and burning enough land to produce maize, the most important item in their diet. As has previously been indicated, the late eighteenth century report on pine masting has indeed indicated the occurrence of a striking vegetation pattern in the immediate vicinity of the site. The possibility that the large, even-aged pine stand adjacent to the Draper site represents a stage in the recolonization of the abandoned maize fields of the last prehistoric Iroquoians will be examined.

Physiography and Climate

The habitation area of the Draper site is located on a tract of relatively infertile sandy loam overlying calcareous parent material (clay till) at the top of a stream valley through which runs West Duffin Creek. These soils are part of the Brighton series and are developed from coarse textured outwash sands and gravels which are low in organic matter (Olding, Wicklund and Richards, 1950: 36–38). To the east and northeast, on the opposite side of the creek, are the very fertile clay loam soils of the Peel series which are developed from lacustrine deposits overlying a clay till. To the west and northwest are the fertile, loamy, imperfectly drained limestone and sandstone derived tills

[1] Additional research might uncover more information on pre-settlement vegetation in other areas of Pickering Township.

of the Milliken series (Olding, Wicklund and Richards, 1950: 34). All of the above series are in the Grey-Brown Podzolic Great Soil Group, and all have a neutral surface reaction. This is important since "podzols tend to be slightly too acidic especially in the upper horizons" for maize growing (Heidenreich, 1970: 268).

Of the three soil series, Milliken loam and Peel clay loam are at present rated as good for the growing of ensilage corn. Brighton sandy loams are rated as fair. Thus, two large areas of fertile soils suitable for maize growing existed in close proximity to the Draper site. The soils of the Milliken series would have been lighter and more easily worked with respect to late prehistoric Iroquoian maize growing techniques than would the heavier clay loams of the Peel series. Brighton sandy loams, while rating as only fair cropland, would also have been light and easy to cultivate. Soils of the Brighton and Milliken series share the advantage of warming earlier in the spring than soils having a high clay content. This is important since maize "is one of the few annual crops that uses the full frost-free period [135 days in the South Slopes region] to complete its life cycle . . ." (Brown, McKay and Chapman, 1968: 29). Finally, these two soil types were more accessible to the village inhabitants who dwelt on the same side of the creek and to whom protection of field workers against Iroquois attacks was probably a matter of concern. Evidence from soil data, therefore, would seem to point to the area of Milliken loams as being most favorable in all respects for late prehistoric Iroquoian agriculture. Not only were these soils fertile, but they would also have been easy to cultivate and easily accessible to the village inhabitants who worked in the fields (see Figure 1).

The importance of a long growing season for maize has already been discussed with respect to the capacities of different soil types to warm in spring. The growing season of southern Ontario as a whole is at present favorable for the growth of corn which is one of the major field crops. In those areas where climate is moderated by proximity to the Great Lakes, the autumn growing season is extended. The climate of southern Ontario, and therefore the length of the growing season, is probably much the same today as it was at the time of occupation of the Draper site, five hundred years ago. In fact, the present climate is probably more like the climate of five hundred years ago than that of the period which intervened. Ladurie (1971: 225) noted that in other areas of the world "a multisecular phase of glacial expansion . . . was in full force from 1590 and did not end, in the Alps, until after 1850." This climatic deterioration is known as the "Little Ice Age" and may have had some influence on the climate of southern Ontario. Thus the climate as well as the soils of the area in which the Draper site is situated was favorable for the cultivation of maize.

Problems in Reconstructing Vegetation

The floral and faunal composition of the north Pickering area in which the Draper site is situated has changed considerably in the one hundred and eighty years following European settlement.[2] The lumber industry, which was responsible for most of the initial changes, began its operations in the early 1800's with the cutting of white pine masting for the Royal Navy. It was followed by the square timber trade and later by sawmilling which catered to the needs of settlers. After 1880 the total yearly output of pine lumber in Ontario County began to decline rapidly — an indication that the large stands were disappearing (R.D.H.P., 1956: III, 6). The destruction of the forest by the lumber industry was completed by settlers, who in clearing their land left only an occasional woodlot as a reminder of what once had been.

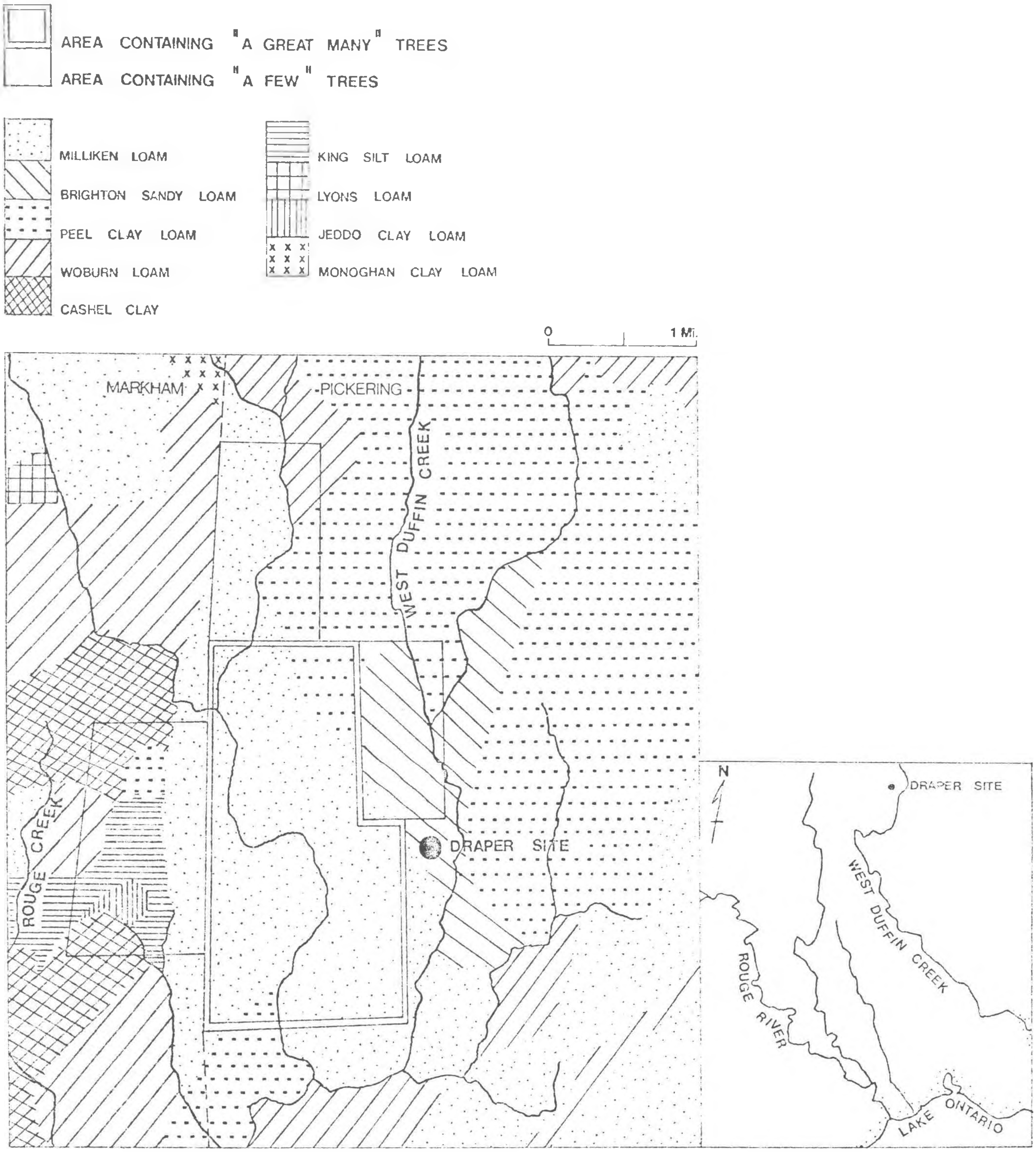
It is obvious from the above summary that in attempting to reconstruct vegetation on the basis of historical accounts, only those records which date from pre-logging and pre-settlement times will be of use. If inferences about still earlier time periods (i.e. the period during which the site was occupied) are to be drawn from this material, it must be remembered that climatic change and the activities of the inhabitants of the village themselves would have influenced the vegetation trends of the centuries which followed. Thus, the forests described by surveyors in the 1790's would not necessarily have been identical to the forests existing at the time the Draper site was occupied.

For more specific information on vegetation existing at the time of village occupation, we can look to fossil pollen analysis. Unfortunately, the sandy soils (Brighton sandy loams) of the Draper site are unsuitable for such studies because of the very poor conditions for preservation of pollen grains. However, the results of studies performed on the varved sediments of Lake Ontario and Crawford Lake by Dr. J.H. McAndrews and M. Boyko are pertinent to this discussion. Fossil maize pollen, which is not common in lake sediments, is present in Crawford Lake sediments for the interval 1290–1610 A.D. with the greatest concentration occurring from 1370–1480 A.D. (Boyko, 1973:12). The presence of maize is thought to represent Indian agriculture in the vicinity of the lake over a period of three centuries. Cultivation of maize ". . . implies forest clearance and tree percentages do drop a little during the Indian period (Dr. McAndrews)." (Boyko, 1973: 12). Pollen cores taken from Lake Ontario have shown that ". . . the age of the pine rise is 300 to 400 B.P." (McAndrews 1971: 226), and a re-examination of Crawford Lake data has pushed this date back to 500 B.P. (Mc-

[2] See Appendixes I and II.

Figure 1.

SOIL MAP OF DRAPER SITE VICINITY SHOWING LOCATION OF PINE STAND



Andrews, personal communication). These dates coincide roughly with the period of climatic deterioration (although the date of 500 B.P. given for the invasion of pine around Crawford Lake precedes the onset of glacial expansion in the Alps by about one hundred years) and also with the approximate time period during which the stand of white pine adjacent to the Draper site colonized. Thus, an increase in pine pollen follows the disappearance of maize in the Crawford Lake sediments.

It seems unlikely that white pine, which is normally found scattered '. . . throughout a large part of its geographical range . . . not in pure stands but in varying admixtures with hemlock and hardwoods" would have been able to colonize on a large scale without some catastrophe having first removed the maple-beech climax forest which predominates in undisturbed areas in the vicinity of the site at present, and which probably predominated at the time of late prehistoric Iroquoian occupation (Nichols, 1935:410). Studies by Lutz (1930) on an even-aged eastern white pine forest in Pennsylvania, and Huberman (1935) on western white pine succession in northern Idaho have borne out the conclusion that in these areas white pine is able to colonize on a large scale only in the early stages of succession. Once the forest canopy has closed over, the young pine growth ". . . is unable to endure the conditions . . . and dies out after reaching a height of less than one foot . . ." (Lutz, 1930: 16).

The fossil pollen record for Crawford Lake and Lake Ontario indicates that three centuries of maize growing during the "Indian period" were followed by a rise in pine. In deciding which agency was responsible for this rise, it seems obvious that the clearing of land for agriculture created open areas which once abandoned were colonized by pine. If we attempt to explain this phenomenon through other agencies such as climatic change, problems arise. Presumably any climatic change drastic enough to have destroyed large areas of the maple-beech forest would also have destroyed white pine. A drier climate would have favored the growth of pine, but would not have been sufficiently catastrophic to have allowed widespread invasion. Although pollen analysis has not been possible for the Draper site, historical accounts of large pine stands may allow us to make similar inferences about late prehistoric Iroquoian agriculture. It is in this area of investigation that the early descriptions have proved useful in determining the location of the pine.

ACCOUNTS OF MISSIONARIES AND SURVEYORS

François de Salignac-Fénélon, a Sulpician missionary, was one of the first white men to record his impressions of the vegetation of the Lake Ontario region. In a memoir attributed to him dated 1670 he noted that ". . . the lands which surround her and which are not covered with prairie, are covered with very beautiful and very large trees, but those which one finds the most of are pine and oak." (Yon, 1970: 152).

It is unfortunate that he was not more specific. Nevertheless, surveyors' descriptions of a century later in Pickering and Markham Townships (and elsewhere) have indicated the location of pine stands occurring within the maple-beech forest. Perhaps the large numbers of pine trees which Fénélon observed were in truth stands such as these.[3]

The descriptions by early surveyors of the forests of Pickering and Markham Townships have permitted a partial reconstruction of the area before logging and settlement. The records of Abraham Iredall (1794) and another unknown surveyor (1801) indicate that the original forest of Markham Township was dominated by maple and beech on good land with associated species of basswood, elm, ash, hemlock and some pine. In low, sometimes swampy areas cedar and ash were found.

Gibson, surveying in Markham in 1827, mentions black ash, basswood and some hickory on low ground that is wet in spring and fall (R.D.H.P., 1956: III, 1).

The surviving records for the southeastern quarter of Pickering Township are very detailed and the particular associations of tree species occurring on certain types of soil have been noted. The report and field notes of Augustus Jones (1791) of the First Concession and Broken Front, and the field notes of William Hambly (1793) from a survey of Major Smith's Land in the southeast corner of Pickering, have been very useful in distinguishing some of these associations which included the following: maple, beech, black oak, basswood, elm and birch on deep, rich soil; oak, pine and maple on loose, good soil pine and hemlock on loose, sandy soil; hemlock on stoney soil; cedar on low swampy ground; spruce and tamarack on low, swampy ground; and ash on low, wet ground.

The Historical Evidence for Pine Stands Occurring in Pickering Township

Perhaps the most interesting information on the pre-logging and pre-settlement vegetation of Pickering Township is found in a document entitled *Report of Mastings and other Timber fit for the Use of the Royal Navy, In the Township of Pickering,* signed by Augustus Jones, Deputy

[3] Fénélon's purpose in writing his *Memoire* was to paint a picture of Canada that would encourage French involvement. In listing the "advantages" to be found, he may have exaggerated to achieve this end. "All kinds of good woods" would have been advantageous for "the sea industry . . . construction and (for the development of) . . . a useful trading business . . . " (Yon, 1970:182).

Surveyor, on the sixth of December, 1797. This report describes the girth at breast height, apparent height and relative abundance of pine on a lot by lot basis. Although the species of pine is not stated, it is evident that the trees were eastern white pine (*Pinus strobus L.*). White pine is the only eastern conifer attaining the heights described by Jones. It was also favored for masting timber because of the long clean shafts of trees grown in closed stands. By plotting out the areas heavily timbered with pine on a county map showing lots and concessions, it has been possible to determine the exact location of these great stands of pine (see Figure 2).

In preparing this paper I have made the assumption that all large white pine trees in Pickering Township were reserved for the Crown, and were therefore recorded in Jones' *Report.* I have based this assumption on information from several sources which indicates the concern shown by the British Government over the protection of its masting timber. In a letter dated October 8th, 1795, Acting Surveyor General S.W. Smith instructed Abraham Iredall that:

> . . . certain individuals have an intent of subverting the Bounty of Government in the Grants of the Waste Lands of the Crown, which have been solely and expressly intended for the purposes of Husbandry, and . . . employ themselves in the Lumber Trade . . . and thereby commit considerable waste of the White Pine, which is generally reserved.
> (Maps and Survey Records, Letters Written No. 4:1052-54)

In New England, where exploitation of the white pine had begun in the early 1600's, the Crown attempted to discourage settlers from cutting and wasting (or selling) these enormous trees. In a strongly worded decree dated 1761 the royal governor was instructed to insure the inclusion in all future land grants of a clause that would:

> reserve all white or other Sort of Pine Trees fit for Masts, of the growth of 24 Inches Diameter and upwards at 12 inches from the Earth, to Us our Heirs and Successors, for the Masting of our Royal Navy, and that no such Trees shall be cut – without our Licence – on Penalty of the Forfeiture of such Grant, and of the Land so granted reverting to the Crown; and all other Pains and Penalties as are or shall be enjoined or inflicted by any Act or Acts of Parliament passed in the Kingdom of Great Britain (Peattie, 1948:52).

Augustus Jones unknowingly left us a means of estimating the age of the Pickering stands when he recorded the heights of the trees. Although his height estimates were probably not totally accurate, when describing the apparent heights of trees on different lots and concessions, he was sufficiently thorough as to distinguish between trees 140, 150 or 160 feet tall (or higher). The age of the stand immediately to the west and northwest of the Draper site is of particular interest. The site itself occupies parts of Lots 29 and 30, Concession VII in Pickering Township. Jones recorded that the area immediately to the west of the site, Lot numbers 31 through 35, Concession VII, contained "a great many" trees having an apparent height of 140 feet. In addition, to the northwest of the site, Lots 32 through 35 of Concession VIII were covered with "a great many trees" having apparent heights ranging from 140 to 160 feet. "A few trees" of this description were recorded on Lots 30 and 31 of Concession VIII, and Lots 33 and 34 of Concession IX. Another surveyor, whose name remains unknown, working in Markham Township on the nineteenth of July, 1801, recorded a few pine growing on Lots 21 through 26 of Concession X. These lots abut against the timbered lots in Concessions VII and VIII, Pickering Township. The heights of these trees were not recorded. The total acreage represented consists of 1,800 acres containing "a great many" trees and about 2,000 acres containing "a few trees."

It is clear from these records that the central portion of the stand was heavily timbered while its perimeters, except in the vicinity of the site, were sparsely timbered with pine. Beyond the perimeters of the stand, forest growth dominated by maple and beech was described in Markham. No records for Pickering appear to have survived for the higher concessions, i.e. those concessions distant from the lake, but it is clear from descriptions of adjacent Markham Township that the maple-beech forest was unbroken.

The trees of this stand and others in the vicinity were removed with no attempts having been made to determine age. Yet if we compare their heights with the heights of pines from stands for which age estimates have been made, we can assign them an approximate age. Spalding, in 1899, compiled a Table of Measurements of white pine grown under similar conditions, grouped in age classes for averaging. One group of trees studied by him in Michigan from "a two-roof grove, (with an) upper roof formed of White Pine, (and an) under roof of Beech, Maple, Fire, and occasionally White Birch and Hemlock. . ." had attained an average height of 141 feet when growing on brown, loamy, moderately loose sand (Spalding, 1899:92). These trees were found to have an average age of 258 years. If we assign an approximate age of 250 years to the stand of 140 foot trees discovered to the west of the Draper site in 1797, it follows that the stand began its growth in approximately 1550. Some of the trees to the northwest of the site had attained heights of 160 feet, according to Jones. Again, records from a late nineteenth century white pine stand in Michigan indicate an average age of 446 years for a "moderately dense grove of White Pine intermixed with hardwoods and Hemlock, with occasional Norway Pine, (growing on) brown loamy sand, medium fine grain(ed) . . . loose, very deep, (and) well drained . . . " (Spalding, 1899:92). The average height of the white pine in this stand was 157 feet. Perhaps the taller (160 foot) trees to the northwest of the Draper site were older than the 140 foot trees to the west of the site. If Jones' height estimates were correct and if the ages of these trees are comparable to the ages of trees of the same height from nineteenth century Michigan pine stands, the 160 foot trees may have begun their growth as early as 1350.

It is also possible that differences in the composition of the forest understory contributed to height differences in the Pickering stands.

> The height development of White Pine seems to progress more rapidly when it grows mixed with other species (such as Norway pine).
>
> (This effect depends) . . . upon the capacity of the associated species to grow in height as well as upon the time when the associated species are either introduced among the pine or received by it under their shelter (Spalding, 1899:32)

Since Jones left no record of the associated tree species found in the stands, it is impossible to come to any definite conclusions on this matter. It seems unlikely, however, that this factor alone would have resulted in a height difference of 20 feet between the 140 and the 160 foot trees.

It is true that locality influences the height growth of white pine through variation in climate, soil and shade features. Spalding was able to measure differences in the height growth of trees from Pennsylvania, Maine, Wisconsin and Michigan resulting from environmental influences. The Pennsylvania trees " . . . started at a lower rate than those in all other localities, but after the twentieth to the twenty-fifth year they surpass(ed) all others." (Spalding, 1899.33). This was attributed to early growth of the trees in mixture with hemlock. The retarded growth of Maine and Wisconsin trees (compared with Michigan trees) between the eightieth and ninetieth year was attributed to poor soil and the effect of winds respectively. However, the trees grown in Michigan " . . .with its tempered lake climate present . . . a most regular and persistent height curve, coming nearest to the average of all locations." (Spalding, 1899:33).

The age estimates for the Pickering pine stands have been based upon height comparisons with nineteenth century Michigan trees for which age determinations were made. The available evidence suggests the validity of such a comparison on the basis of similar climate and soil features. Both the Pickering and Michigan pine stands were within the sphere of influence of the Great Lakes where white pine makes its best growth. The soils which supported the Michigan trees were described as brown, loamy, loose sands, while the Pickering trees were found on Milliken loam which has a " . . . fine crumb structure . . ." (Olding, Wicklund and Richards, 1950.35). While the lack of detailed evidence in Jones' *Report* makes error inevitable in this type of comparison, the general growth curve followed by white pine makes it unlikely that this will be serious enough to affect the arguments presented here.

SIGNIFICANCE OF THE PINE STANDS

Large, even-aged stands of white pine are not a normal element of the maple-beech climax vegetation of southern Ontario. It has already been established that young pine are not able to colonize on a large scale under the heavy canopy which exists in this type of climax forest. The prerequisite for a large, even-aged stand in an area where white pine normally plays only a minor role, therefore, would appear to be fire, or some other major disturbance likely to have exposed a large area of land surface for colonization. Studies of large, even-aged stands of *Pinus strobus* L. by Lutz (1930) and of *Pinus monticola* Dougl. by Huberman (1935) have revealed evidence of fires from examinations of fire scars on the annual rings of the trees themselves, and from information found in early diaries of fires set by the indians "to facilitate hunting . . . to encourage new growth of grass" or to cause certain species of plants used for food to "renew themselves and yield further crops." (Lutz, 1930.18). Cooper (1961:150) also states that the American Indians "often . . . burned intentionally – to drive game in hunting, as an offensive or defensive measure in warfare, or merely to keep the forest open to travel."

In addition to eastern and western white pine, other species of conifers whose seedlings have high light requirements are able to colonize burnt over areas. Douglas-firs, for example, are found in pure, even-aged stands only where forest fires have "arrest(ed) the succession by creating openings in the forest into which the light, winged seeds of Douglas-firs can fly from adjacent stands." As the old fir trees die, shade tolerant cedars and hemlocks come in to fill the gaps and in this way the climax vegetation of the region is restored (Cooper 1961:151).

Historical records of the area to the west and northwest of the Draper site at the time of its colonization by pine are nonexistent, and the pine trees themselves have long since disappeared. It is only possible to speculate on the type of disturbance which might have resulted in large scale colonization by pine. It seems reasonable that this large, even-aged pine stand might represent an early stage of succession occurring on the abandoned maize fields of the late prehistoric Iroquoian agriculturalists who inhabited the adjacent village. This hypothesis is supported by the fact that the time period during which the pine growth to the west of the site began (c.1550) coincides roughly with the time of abandonment of the village in the late fifteenth or early sixteenth century. Jones' records also indicated that taller, and possibly older trees were found growing to the northwest of the site along with trees of the same height (140 feet) as those to the west of the Draper site. It is impossible to tell whether these trees, which had attained heights of 160 feet, were intermixed with the shorter trees, or whether, as seems more likely, they represented a separate, older stand. If this is the case, an older maize field and perhaps another site might have existed to the northwest of the Draper site. Another possibility is that the Draper site experienced an earlier occupation (Donald MacLeod, personal communication).

Additional support for the hypothesis that the pine stand adjacent to the Draper site represents the area once occupied by maize fields comes from soil data. The greatest concentration of pine trees occurred in exactly that area to the west and northwest of the site which is characterized by Milliken loams (Fig. 1). These soils, as described previously, are good for the growing of ensilage corn, and because of their loose texture would have been more suited to late prehistoric Iroquoian agricultural techniques than would the heavy clay loams of the Peel series. White pine also makes its best growth on fertile, loamy soils such as those found in the Milliken series, but the occurrence of a large stand is somewhat unusual since "the more tolerant species, particularly hardwoods, generally crowd out the pines on richer soils" (Bedell and Horton, 1960:50). The above information increases the likelihood that large scale colonization by pine in this location came about as a result of the abandonment of maize fields by the inhabitants of the nearby village.

Another interesting feature regarding the pine stand adjacent to the Draper site is the area of land that it occupied. The stand stretched approximately one and one-half miles to the west of the site and about two miles to the northwest. Heidenreich, in his calculation of the size of the maize fields of the largest villages of Huronia – Cahiague, Ossossane and Teanaustaye – has surmised "that the Hurons did not wish to cultivate fields that were more than about one and one half miles from their village.' (Heidenreich, 1970:322). He reasons that by that time the nearest field would have become exhausted, and the protection of workers in the far fields would have become a problem (Heidenreich, 1970:323). Thus, the area represented by the pine stand corresponds closely with Heidenreich's estimate of the maximum size of a field practical for agriculture. However, despite general agreement on the large size of the Draper site (6 to 10 acres), it will not be possible to estimate village maize requirements until further excavations of longhouses allow some kind of population estimate to be made. It is interesting to note here that the White site, which to date has yielded no evidence of any kind of structures, lies within the boundaries of the area once occupied by the pine stand on parts of Lot 33, Concession VII. Perhaps it was used as a maize husking station by women and children working in the fields.

The above information takes on even more meaning in view of the existence of other large, even-aged pine stands in Pickering Township to the south and southwest of the Draper site. These stands, some of which appear to have been older (ca. 1300–1350 and 1450 A.D. according to height estimates) than the stand adjacent to the Draper site, were located in an area dotted with other late prehistoric village sites. The correspondence between the location of some of the pine stands and village sites is remarkable. (See Figure 2.)

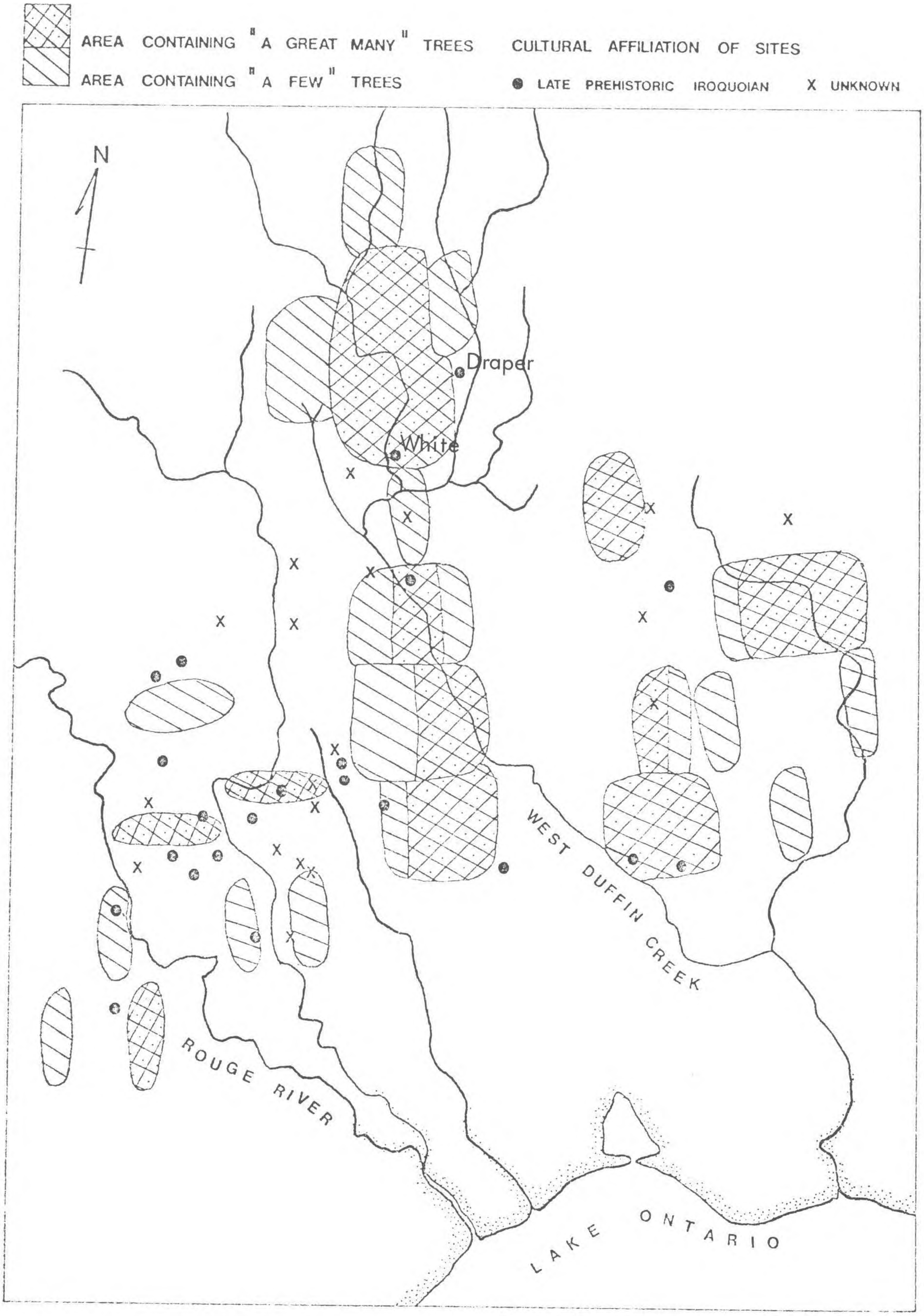
Perhaps when the cultural affiliations of sites discovered in the vicinity during the summer of 1973 (Konrad and Ross: in press) are better known, the location and ages of these pine stands might be useful in rounding out our picture of agricultural activity in the area. The possibility also exists that some of these areas were exposed by natural or Indian generated forest fires, but this cannot be determined without further studies.

Summary

The data which have been presented to support the hypothesis that the pine stand to the west and northwest of the Draper site represents the area once covered by late prehistoric Iroquoian maize fields may be summarized as follows:

1) Large, even-aged stands of white pine are not a normal element of the maple-beech climax vegetation of the region.
2) The even-aged character of the trees (250 years) as determined by height estimates made in 1797 indicates that the stand began its growth in approximately 1550. This is the approximate time period following site abandonment in the late fifteenth or early sixteenth century during which large scale colonization by pine could have taken place.
3) The abandoned maize fields of the late prehistoric Iroquoians would have satisfied the light requirements of white pine seedlings which otherwise die out quickly under the canopy of a maple-beech climax forest.
4) Fossil pollen analysis on the sediments of Lake Ontario and Crawford indicates a pine rise dating from 300 to 400 years before the present.
5) The soils which supported the greatest number of pine are at present rated as good for the growing of ensilage corn. Their loose, loamy nature would have been within the limits of late prehistoric Iroquoian agricultural techniques, unlike the heavy clay soils to the east and northeast of the site.
6) The area of land occupied by the pine stand corresponds roughly with Heidenreich's estimates of agriculture land requirements for some of the larger villages in Huronia.

Figure 2. LOCATION OF PINE STANDS IN RELATION TO ARCHAEOLOGICAL SITES



Appendix I

EARLY SETTLEMENT OF THE SITE LOCALITY

The specific location of the Draper site is on parts of Lots 29 and 30, Concession VII, Pickering Township. These two lots were first settled in 1799 by Mary Ann Fleming and passed through several ownerships until the 1840's when Lot 29 was settled by Adam Spears, a native of Scotland. He "established a sawmill on the stream running through the farm. Large quantities of lumber were teamed from here to be shipped at Frenchman's Bay." (Wood, 1911.295). Later, in 1859, Lots 39 and 31 of the same concession were settled by William H. Burk, who came from Markham to Pickering. He too built a sawmill on West Duffin Creek (Wood, 1911.228). It is evident that the site locality experienced many changes in the first fifty years following settlement alone.

Appendix II

EFFECTS OF ENVIRONMENTAL DETERIORATION ON NATIVE FAUNA

Large scale land clearing operations cannot help but affect other aspects of the environment. Logging removes the natural habitats of mammals and birds, thereby reducing their numbers. In addition, the removal of timber affects stream life by increasing erosion and by lowering the water table through increased evaporation from exposed land surfaces. In 1911, William R. Wood commented that ". . . with the deforestation of the country the streams have dwindled, and lake salmon come to Whitevale tables [on West Duffin Creek] only by way of the canning factory." In the 1800's, the same species had been recorded "as far as the fifth concession . . . in Pickering Township. . ." during the spawning season (Wood 1911:202-203).

Erosion has undesirable consequences for stream life in areas where a marginal strip of streamside vegetation has not been left to prevent overland runoff from increasing sedimentation within the stream. In the case of Duffin Creek, once known for its spectacular salmon runs which earned it the French name of Rivière au Saumon,[4] increased sedimentation from logging and clearing operations may have been one of the factors resulting in the disappearance of the lake salmon. Heavy silting buries fish eggs and reduces the amount of oxygen available to the developing embryos, thus causing increased mortality. It reduces the number of food organisms and also the occurrence of habitats required by both trout and salmon for spawning (James, 1956:43; Burns, 1970:7-8).

In addition to man's activities, natural agencies (which can wreak more devastating effects *because of* man's activities) have also acted in changing the character of the streams of the area. After Hurricane Hazel, sections of the Rouge River, Highland Creek and parts of Duffin Creek "which were (formerly) listed as silted or slow-flowing may now be riffles and rapids; other sections which were rapids are now turned into pools . . . .Bank erosion was very greatly accelerated." (R. D. H. P., 1956:V, 17).

Thus, the native fauna of the forests and streams in the vicinity of the Draper site have been as much obscured by lumbering, settlement and natural events as have the forests themselves. Once again, it is necessary to look to historical records for information.

Historical Accounts of Fishing

Perhaps the most interesting description of fishing on Duffin Creek and surrounding area comes from the Journal of Wing Rogers.

> And when but a youth and up to manhood, and the early part of my days, we cought hundreds and

[4]This name appears on a map drawn by Pierre Boucher de la Broquerie in 1757 (RDHP, 1956:I, 11). The earlier, Indian name of Sin qua trik di qui ock meaning Pine wood along side — is cited by Augustus Jones in a document entitled Names of Places, dated July 4, 1790.

thousands of Salmon in Duffinses Creek, that ran through my fathers farm on the which we built a sawmill and grist mill, and also they were cought in all the cricks and streams on the north side of Lake Ontario that was large enough. But as the fishermen increased, and the country became cleared up, the mildams built, which prevented them from growing up to spawn, besides all that nets and seins, and the increase of navigation, on those waters (where 60 or 80 years before there was not a white man to be sean) – doubtless this is the reason why they faled; and also all kinds that had to spawn in the running waters the salmon trout whitefish sturgeon herin pike and pickerell – and many more kinds live in the great water, the mullets and suckers the beautiful little speckle trout and Eals run up the Creeks and also, men contrive schemes and plans even to draw them out of deep waters, and the poor fish, like the Natives of Aboregines, are fast diminishing, for which I sorrowe (McKay, no date:183-195).

LaRochefault-Liancourt, in an earlier description of fishing dating from 1795, mentions ". . . the vast quantities of fish with which the lakes abound, and especially of sturgeons in Lake Ontario . . ." (Fraser, 1916:31-32). In an account of a fishing expedition in the vicinity of the Niagara River and Lake, he recounts that: . . .

Upwards of five hundred fish were caught, among which were about twenty-eight or thirty sturgeons, small pikes, whitings, rock-fish, sun-fish, herring, a sort of carp, . . . salmon-trouts, in short all the fish was of a tolerable size. Middle sized fish are easily caught by anglers on the banks both of the river and the lake, they frequently catch more than their families can consume in several days.

Historical Accounts of Game

In 1911, William Wood noted that "In the earliest quarter of the nineteenth century wolves were to be met with and on into the middle years bears were often seen." (Wood, 1911:202). In 1882 an anonymous writer for Picturesque Canada described a portage route that had once led up from the Whitby shore "through a famous deer park . . .(and on to) the bass fishing on Lakes Scugog and Simcoe . . .[5]" (Pict. Can., 1882: Vol. II, 624). Earlier still, in 1687, Count Denonville gave the following description of a feast given for him at Ganatsekwyagon, Seneca village on the north shore of Lake Ontario at Frenchman's Bay, after his flotilla returned from burning Iroquois villages of unbelievers on the south shore of the lake.

. . . we . . . arrived at a place (Gatsekwyagon) . . . We found them with two hundred deer they had killed, a good share of which they gave to our army, that thus profited by this fortunate chase (Robinson, 1965:56).

Finally, Fénélon, in his *Memoire* of 1670, left us with the following description of the lands around the St. Lawrence River in the vicinity of the Kente Mission on the Bay of Quinte.

The river is very abundant in fish and the lands which surrounds her farther on are very fertile, and they are still all covered in moose, stags, deer, bear, beavers et. (Yon, 1970 152).

The above descriptions indicate that plentiful game was available at the time of European contact. However, in attempting to draw inferences about the distribution of fauna at the time of site occupation, the same problems as those encountered in reconstructing vegetation present themselves. The clearing of forest for agriculture by the late prehistoric Iroquoians would have destroyed the habitats and reduced the numbers of many species. The abundance of these species would presumably have increased after agricultural activity in the area ceased, and after forest succession created new habitats. Deer, on the other hand, would have benefitted from land clearing, which in creating new areas for pasture would have contributed to an increase in the population of this species. The re-establishment of the climax forest on land once used for agriculture would have reduced their numbers. Thus, depending on the type of forest cover at the time of contact, early European accounts of wildlife may or may not be representative of the faunal composition of the general area during the period of its occupation by late prehistoric Iroquoians. Fortunately, preserved bone material from the sites themselves provides a more complete record of the animal species used for game.

[5] Another Indian path "probably led northwards up Duffin's Creek (R.D.H.P., 1956:I, 54)."

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Magnetic Survey at the Draper Site

Pickering Township, Ontario

R.M. FARQUHAR

Magnetic surveying of archaeological sites has been utilized for about fifteen years as a tool for locating lateral magnetic contrasts which may result from human occupation. The technique has been applied mainly to study European sites of a wide range of ages and degrees of occupation, and has proven extremely successful in the detection and outlining of certain kinds of buried structures. The most common of these are pits which have been filled with organic rich debris and top soil. These materials generally have higher magnetic susceptibilities than the surrounding, undisturbed sub soil, the contrast being sufficient to produce peak anomalies of up to 50 gammas (1 gamma = 10^{-5} oersted, or about 1/50000 of the earth's main magnetic field).

It seemed possible that similar anomalies might be observed over sites occupied by North American Indians. Indian long-house floors were certainly marked by numerous hearths and pits. On the other hand occupation conditions were different from those at European sites, and the magnetic state of the top soil at Indian sites was unknown.

In the spring of 1973 additional excavations at the Draper Site, on concession 8, Pickering Twp. were begun under the direction of Mr. Brian Hayden of the University of Toronto (Department of Anthropology). Mr. Hayden invited the author to participate, and an exploratory program of magnetic surveying was planned. Earlier excavation of a longhouse at the Draper site had been carried out, and that work, and the nature of the site itself suggested that most of the area of possible habitation (about 7 acres) had not been disturbed by cultivation (i.e. ploughing) since aboriginal occupation.

Magnetic Survey

In order to delineate small magnetic anomalies of a few gammas magnitude on a fine grid, in a reasonable time, it was essential to use a magnetometer of the proton precession type with a sensitivity of at least ± one gamma. Through the courtesy of McPhar Geophysics Co. Ltd., a GP-70 proton magnetometer was obtained and over a period of three days, 750 total magnetic field readings at spacings of one metre were recorded in an area suggested by Mr. Hayden as a possible long-house site. Diurnal variations were monitored by reoccupying a base station at intervals of 4 to 5 minutes after making ten successive readings. Linear interpolation of the diurnal drift curve was used to correct the field station readings. This appeared to be a satisfactory procedure for two of the three days on which readings were taken. On June 2, changes in successive base station readings, in some cases, were as large as 10 gammas, and data taken on that day may have biases as a result of the linear interpolation corrections applied. Data for all stations were the average of three to five individual readings. The sensing head was at a height of about 60 cm above ground level.

The data was mapped and subsequently contoured, as shown in Figure 1. In areas in which no large anomalies were observed there were gradients of about one gamma per metre, which probably reflect the sensitivity limits of the instrument. Positive and negative anomalies were observed, having peak magnitude of about 15 to 20 gammas above and below the local background.

Discussion of anomalies

Several of the observed anomalies have maximum gradients of the order of 15 to 20 gammas per metre, but the breadth of the positive anomalies are generally of the order of three to six metres. The half width of anomaly A (Fig. 1) along profile AA' is about 1.5 metres, suggesting that the object causing the anomaly is centred about 3 metres below the sensing head, a depth which seemed too great to be attributed to the effects of the aboriginal occupation. These were known from previous excavations on the site to extend from depths of about 20 cm to perhaps 60 cm below the ground surface (i.e. 80 to 120 cm below the sensing head).

As a check, spot core samples of several of the positive anomalies were taken, but no indications of filled pits or hearths were observed. Subsequently, total excavation was commenced toward the eastern end of the block surveyed, where magnetic anomalies seemed more prevalent, and there, hearths, pits, traces of posts and artifacts were encountered. The hearths and pits were relatively small in diameter and depth (less than one metre) and were not directly related to any of the rather broad anomalies charted by the magnetic survey. At the sensing head height/ station spacing / instrument sensitivity used in this particular survey, undisturbed pits and hearths of this presumably typical Huron long-house are not detectable.

To define the survey parameters more accurately, a series of soil magnetic susceptibility measurements were made on cores from various points in the survey area, and from the hearths and pits revealed during excavation. The sample locations are indicated in Figure 1. The hand corer used provided a series of soil samples each about 25 cm in length to depths of 1.5 to 2 metres. Samples of each 25 cm length were dried, either by evacuation, or in air, before magnetic susceptibility measurements were made. The material from the individual cores was not homogenous, but duplicate measurements indicated that the results were reasonably representative for a given 25 cm core except where a sudden change in soil type (e.g. sand to clay) occurred part way through a core.

The magnetic susceptibilities were measured in a null balancing A.C. bridge, calibrating in e.m.u. with a set of synthetic standards. The results are given in Table I. The three cores east of the excavated area consisted of sand interbedded with thin 1 clay layers. The sand fractions have fairly uniform susceptibilities ranging from 120 to 190 x 10^{-6} e.m.u. The area in which the hearths, pits and abundant artifacts occur is overlain by a layer of sandy black soil, having a low susceptibility of 70 to 85 x 10^{-6} e.m.u. and a lower density than the top layers to the west. The thin layer of ash immediately above the burnt red sand of the hearths also had a low susceptibility, similar to that of the overlying top soil. The red sand of the hearths had much higher susceptibilities, roughly in the range of the susceptibilities of sands in the more westerly cores but in each of the two hearths sampled, the red sand susceptibility was about 25 x 10^{-6} e.m.u. less than the underlying sub soil. This difference may reflect a small ash component in the sand or perhaps a conversion of magnetite (Fe_3O_4) to hematite (Fe_2O_3) as a result of the local heating of the soil.

In any case there appears to be a small negative magnetic susceptibility contrast between the heated sand of the hearths and the soil below them. If the susceptibility of the soil surrounding the hearths is similar to that of the sand below them, then a small lateral magnetic susceptibility contrast might exist between hearths and adjoining soil. The anomaly resulting from this contrast, if it exists at all, is almost an order of magnitude below the detection level of the magnetometer. If the hearth is approximated by a horizontal circular plate (diameter 1 metre, thickness 6 cm, depth below detector 1 metre, susceptibility contrast -25 x 10^{-6} e.m.u.), the peak anomaly, assuming a vertical magnetizing field, is only about -0.1 gamma, i.e. below the sensitivity of even a differential proton magnetometer.

Table I (Mag susceptibilities in units of 10^{-6} e m.u.

Normal Cores

Depth (cm)	60N 13E	57N 12E	46N 24E	41N 42E
sand	150	130	120	(humic sand) 70
25				
sand	170	134	150	(sand clay) 100
50				
sand	180	170	144	(clay) 60
75				
sand	140	150	(clay) 50 / 140	
100				
sand	160	170	190	
125				
sand	150			
150				

Hearth I		Hearth II		Pit	
humic soil	84				
ash 5 cm layer	74			Top layer of exposed pit	140
red sand 8 cm layer	150	red sand 8 cm layer	107		
normal sand below	173	normal sand below	130		

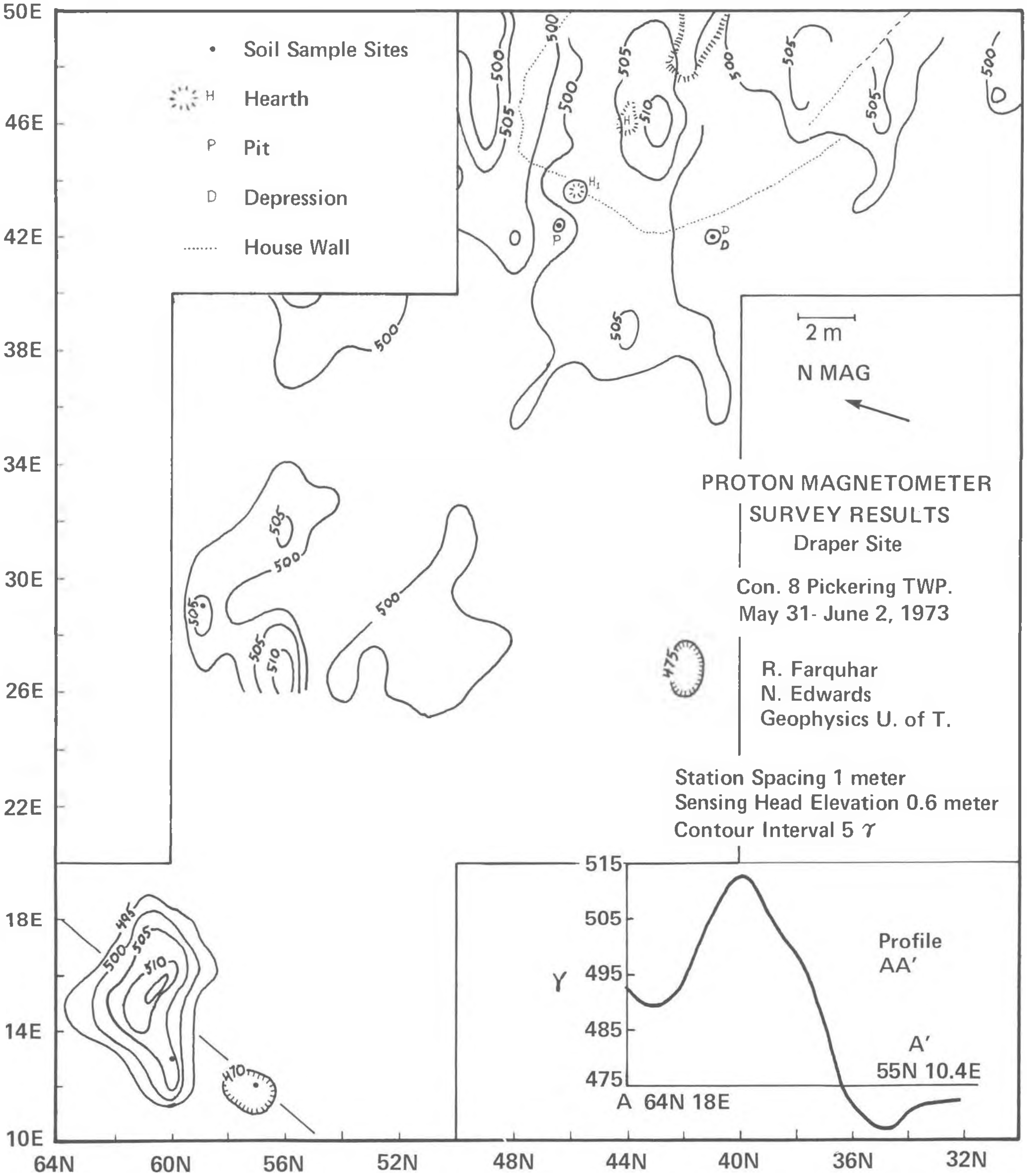

Soil Sample Sites
Hearth
Pit
Depression
House Wall
2 m
N MAG
PROTON MAGNETOMETER
SURVEY RESULTS
Draper Site
Con. 8 Pickering TWP.
May 31- June 2, 1973
R. Farquhar
N. Edwards
Geophysics U. of T.
Station Spacing 1 meter
Sensing Head Elevation 0.6 meter
Contour Interval 5 γ
Profile
AA'
A'
55N 10.4E
A 64N 18E
Y
515
505
495
485
475
50E
46E
42E
38E
34E
30E
26E
22E
18E
14E
10E
64N
60N
56N
52N
48N
44N
40N
36N
32N

Fig. 1.

Conclusions

The soil magnetic susceptibility data suggests that any lateral contrasts associated with hearths, and probably also pits, are too small to be detected using a ± one gamma sensitivity magnetometer. A 0.1 gamma differential proton magnetometer might indicate anomalies, if the detecting head height was reduced to less than 25 cm above ground level. However the susceptibility contrasts being sought are probably not much different from the normal fluctuations present in the soil resulting from changes in composition, and the scale of the latter is not known. If the sizes of the hearths are typically 1 metre or less in diameter, the station spacings on the search grid would have to be 0.5 metres or less, which would increase the time spent covering a given area by a factor of 4 or more.

If the occurrence of the low density, low magnetic susceptibility dark soil, is closely related to the position of the long-houses, and presents a sharp contrast to top soil in unoccupied areas, it might be possible to detect the presence of this boundary, using a ± 1 gamma magnetometer close to the ground. Once the edges of this boundary were located, the boundary could be followed using a relatively small number of measurements, unless the gradients were obscured by the superimposed anomalies due to deep seated objects. These exist in the area, and are easily detected. They are probably due to glacial boulders buried several metres below the surficial sands and clays.

Draper Site Ceramic Analysis
Structure 2

DAVID ARTHURS

Introduction

The longhouse was the primary focus of domestic activity in the Huron village. Within each house, the hearth was the area of most household activity and social interaction. At the hearthside, where the people gathered, pots were made, used, and broken, fires kindled, meals prepared, and storage pits dug and filled. Projectile points were manufactured, adzes ground, and awls and needles cut from bone, nets were mended, clothing sewn from dressed hides, drying racks and sweat lodges were put up and pulled down, and refuse accumulated and was swept away. In addition to the activities of the daily routine, special events of an integrative nature, feasts, dance ceremonies, healing rituals, funerals, and the occasional torture, were also held in the longhouse. People moved in and out, and additions and repairs were made to the structure (c.f. Tooker 1967; Trigger 1969).

All of these activities, whether repeated day to day or unique events, left some trace of their occurrence on the longhouse floor, in the associations of certain artifacts and features with one another. An intact occupation floor can, then, be considered a complex artifact in itself, and it should be possible, with proper techniques and caution, to derive from it not only information concerning the activities and the areas in which they took place, but perhaps also the patterns of residence and social interaction they infer (A.E. Tyyska, personal communication).

The ceramic analysis of Structure 2 is a preliminary attempt to define areas of ceramic related activity, and, if possible, to relate these to theoretical models of social and residential structure, both within the house, and within the broader framework of the Draper village community. Although similar studies have been carried out elsewhere (e.g. Longacre 1964; Deetz 1965; 1968; Brose 1970), the 1973 excavations at Draper are the first in Ontario which have provided sufficiently detailed information concerning the associations of ceramics on the living floor of a virtually undisturbed longhouse to allow this type of analysis to be undertaken.

There are, unfortunately, some limitations on the interpretations; the house could not be completely excavated, and the central area and east end of the structure present serious (though not overwhelming) gaps in the interpretations. The project was originally conceived as a computerized spatial analysis; however given the resources and time available it was not possible to develop a program which would meet the requirements of the research design. The approach taken, which involved the statistical comparison of artifact clusters on the floor as opposed to the associations among individual artifacts, was simpler, but quite effective nonetheless. Perhaps the most serious limitation was the lack of comparative data from other houses at Draper and from other sites, without which it was difficult to make any but the most basic interpretations of the relationships observed. It is, however, a beginning, hopefully to be corroborated by future research.

The study is divided into four parts. The first consists of the formal typological analysis of rims, castellations, and pottery pipes, the presentation of the basic data upon which the rest of the work is based. Section two consists of a detailed distributional analysis of the ceramics, and interpretations of the patterns of residence and behaviour inferred from the relationships of the potsherds on the living floor. In the third section the material from House 2 is compared with that from past excavations on the site, and an effort is made to place it in the temporal and social context of the village. The results of the analysis are summarized in the fourth section.

Typological Analysis

The first stage of analysis of the material from the 1973 excavations consisted of the formal analysis of pottery types, castellations, and clay pipes found in House 2, and in the middens adjacent to its west end. To facilitate the handling of the ceramic material, each of the 308 rims and 49 castellations in the sample was sketched on an index card and pertinent data regarding its location, descriptive, metric, and technological attributes recorded. The artifacts were then grouped into types using the criteria for defining Iroquoian ceramic types (Table I) established by MacNeish (1952), and refined by Emerson (1968) and Ramsden (1968).

Table IA Pottery Types

LO	Lawson Opposed
LI	Lawson Incised
PN	Pound Necked
NC	Niagara Collared
WC	Warminster Crossed
SN	Sidey Notched
HI	Huron Incised
WH	Warminster Horizontal
SI	Seed Incised
SC	Sidey Crossed
BN	Black Necked
OT	Onondaga Triangular
DU	Durfee Underlined
RL	Roebuck Low Collar
RD	Rice Diagonal
MS	Miscellaneous (includes Draper Group)
LH	Lalonde High Collar
SY	Syracuse Incised
RP	Ripley Plain
WI	Wagoner Incised
MO	Middleport Oblique
OH	Ontario Horizontal

Table 1B Castellation Types

SL	Scalloped-lip
RR	Rolled Rim
RC	Round
DR	Developed Round
PC	Pointed
DP	Developed Pointed
TC	Turret
NC	Nubbin
NH	Notched
N&G	Notched & Grooved

Table 1C Pipe Types

CR	Collared Ring
CL	Conical Ring
ER	Elongated Ring
IR	Iroquois Ring
PT	Plain Trumpet
DT	Decorated Trumpet
TT	Tapered Trumpet
CT	Coronet
VS	Vasiform
BP	Bulbous Plain
EF	Effigy
HE	Human Effigy
MP	Miscellaneous

After the artifacts had been typed, the data was recorded in accordance with a format developed by Ramsden (see Appendix A) and punch cards prepared for each artifact to allow computerized processing of the material After an evaluation of a number of programs available through the computer centre at the University of Toronto, the Statistical Package for the Social Sciences (Nie Bent & Hull 1970) was selected as best suited to the requirements of this phase of the analysis This easy-to-use fortran language procedure consists of a number of subroutines for various statistical analyses, including percentage frequency and multivariant regression analysis. Its one drawback is that it is difficult to integrate it with other procedures It was quite adequate for the requirements of this study, however.

The frequency of each of the 15 types and miscellaneous rimsherds found in Structure 2 is presented in Table II.

Table II Pottery Type Frequencies

type	House 2		West Area		East Area	
	f	%	f	%	f	%
LO	2	0 7	2	0.7	0	0.0
LI	19	6.2	17	5.5	2	0.7
PN	33	10.7	20	6.5	13	4.2
NC	6	2.0	4	1.3	2	0.7
WC	26	8.4	23	7.7	3	1.0
SN	12	3.9	6	2.0	6	2.0
HI	30	9.7	24	7.8	6	2.0
WH	1	0.3	1	0.3	0	0.0
SI	1	0.3	1	0.3	0	0.0
SC	5	1.6	3	1.0	2	0.7
BN	120	39.0	95	30.8	25	8.1
OT	7	2.3	3	1.0	4	1.3
DU	2	0.7	1	0.3	1	0.3
RL	7	2.3	3	1.0	4	1.3
RD	3	1.0	3	1.0	4	1.3
MS	34	11.0	29	9.4	5	1.6
totals	308	100.1%	235	76.6%	73	23.9%

The most frequently occurring type in the house was Black Necked (39.0%). Miscellaneous rims (unidentifiable under the MacNeish classification, and in most instances represented only by one or two sherds), accounted for 11.0% of the total. Third were Pound Necked rims (10.7%), and fourth Huron Incised rims (9.7%).

Of the 49 castellated sherds analyzed, 7 types were recognized (Table III). Of these, the most prevalent was the scalloped lip type, accounting for 44.9% of the sample. Second was the pointed variety (12.2%), and third the turret, round, and developed round forms (10.2% each). The developed pointed castellation accounted for only 8.2% of the sample, and rolled rim only 4.1%.

Nineteen bowl and 36 stem and mouthpiece fragments of pottery pipes were recovered from Structure 2. The Elongated Ring type constituted 26.3% of the sample of

Table III Castellation Type Frequencies

type	House 2		West Area		East Area	
	f	%	f	%	f	%
SL	22	44.9	15	30.6	7	14.3
RR	2	4.1	0	0.0	2	4.1
TC	5	10.2	4	8.2	1	2.0
PC	6	12.2	4	8.2	2	4.1
DP	4	8.2	3	6.1	1	2.0
DR	5	10.2	4	8.2	1	2.0
RC	5	10.2	4	8.2	1	2.0
totals	49	100.0%	34	69.5%	15	30.5%

bowls. Of second importance was Conical Ring (15.8%). Collared Ring, Plain Trumpet, and Cornet were 10.5% each, while Bulbous Plain, Decorated Vasiform, Decorated Trumpet, Effigy, and miscellaneous forms accounted for 5.3% apiece (Table IV).

Table IV Pottery Pipe Type Frequencies

type	House 2		West Area		East Area	
	f	%	f	%	f	%
CR	2	10.5	2	10.5	0	0.0
CL	3	15.8	2	10.5	1	5.3
ER	5	26.3	2	10.5	3	15.8
PT	2	10.5	1	5.3	1	5.3
DT	1	5.3	1	5.3	0	0.0
CT	2	10.5	1	5.3	1	5.3
VS	1	5.3	1	5.3	0	0.0
BP	1	5.3	1	5.3	0	0.0
EF	1	5.3	1	5.3	0	0.0
MP	1	5.3	1	5.3	0	0.0
totals	19	100.0%	34	68.6%	6	31.7%

It is interesting to note at the outset that the frequencies of pot types and pipe types differ considerably in many respects from those of previous analyses of material from random and midden tests, and from excavations at the north end of the site. Black Necked enjoys a greater, and Huron Incised a lesser, frequency in House 2 than elsewhere on the site, and the high frequency of Elongated Ring pipe bowls in the house is also significant. The implications of these marked differences will be discussed later.

Distributional Analysis

The second part of the ceramic analysis involved the detailed distributional analysis of the rims, castellations, and pipes on the floor of Structure 2. The primary aims of this study were to attempt to delineate ceramic related activity areas such as hearth areas and middens, and to determine whether or not there were any similarities or differences in the distribution of the various types which could infer social or residential structure within the longhouse. In conjunction with this, a study was made of the incidence of carbon incrustation on the rim interiors to see if there could have been differential utilization of particular types for storage or cooking.

On the assumption that different ceramic motifs relate to specific family groups, and that these stylistic complexes were passed on from mother to daughter, two theoretical models of possible residential structure were postulated (see Hayden: this volume). The first suggested that if ceramic motif complexes showed minimal variation from hearth to hearth within the house, yet considerable variation compared to the assemblage of the site, a matrilocal pattern of residence could be inferred. On the other hand, the presence of distinguishable complexes of motifs in association with the different hearths would suggest that different women had been brought in or that different families had come together to form the household. In this case a more random and homogeneous spread of types across the site would be expected. A third alternative, which should be entertained, is that the production of ceramic types is governed by processes other than those which determine familial residence patterns, and that conclusions concerning patterns of residence drawn from them may be invalid.

The original research design called for a computerized nearest neighbour analysis of the data, to define artifact clusters and provide a statistical measure of the relationships among them (see Whallon 1974). As no suitable program could be developed or adapted to handle the data without considerable modification this format was abandoned in favour of a less sophisticated form of analysis, which, it is hoped, though preliminary, will provide some insight into the internal composition of a Huron longhouse.

The first step in this phase of study was to plot the distribution of the rims on the floor of the structure. The ceramics were seen to fall into two distinct groupings on either side of a line projected across the house through Units N32-E58 and N34-E60. Seventy-six and six-tenths per cent of the pottery occurred in the west end of the structure, designated Area A – three times the amount recovered from Area B, toward the eastern end of the longhouse. In the partially excavated central area rimsherds were virtually absent (Fig. 1).

Within each area, micro-patterns of ceramic distribution were noted. To delineate these, a map was prepared of the distribution of rims on the floor in class intervals of 3 (Fig. 2). Two clustering patterns emerged; the first represented by concentrations of rims within roughly a two-metre radius of each of the house's axial hearths; the second by high density concentrations in restricted areas

Fig. 1

Rim Frequency per Unit

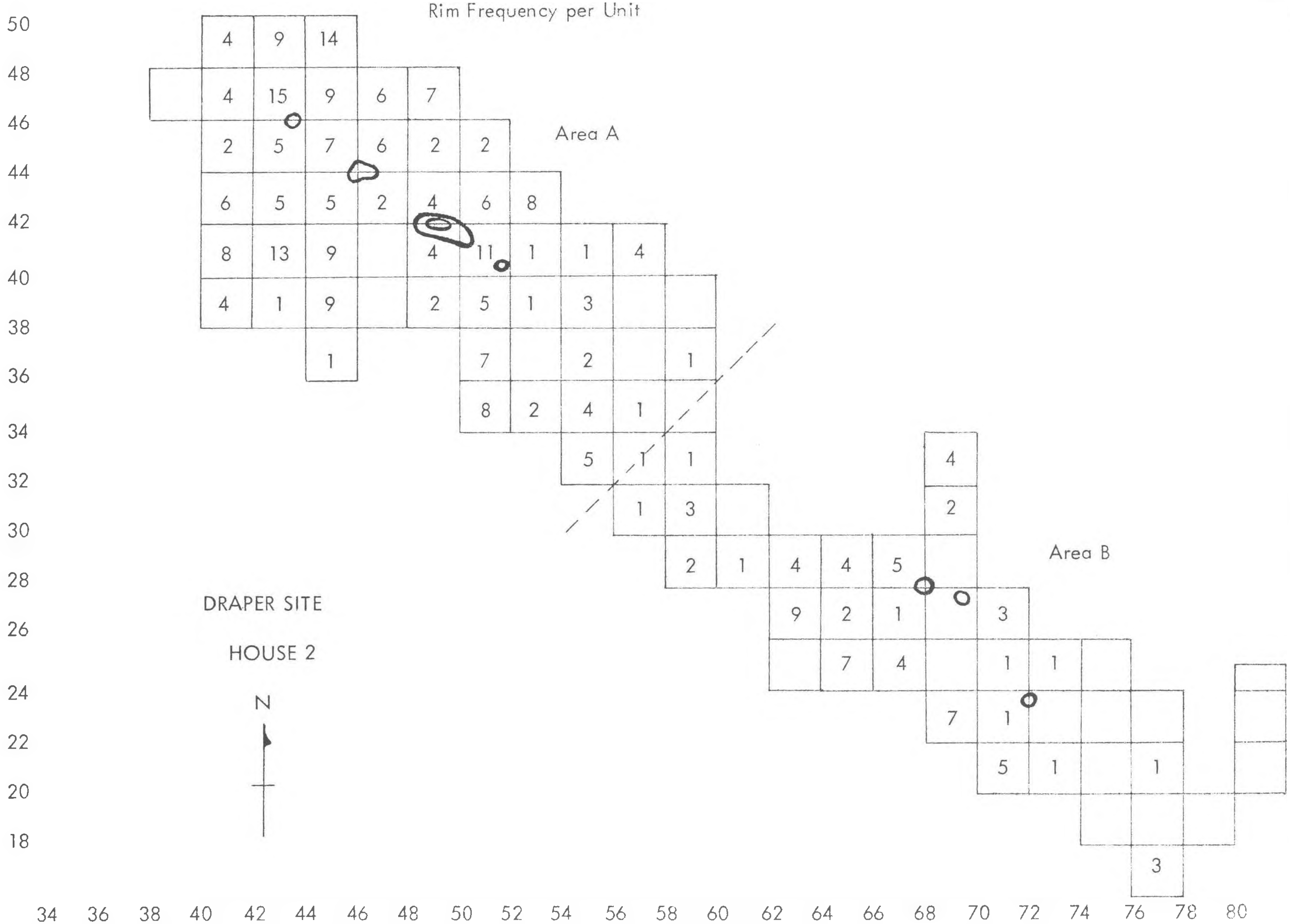
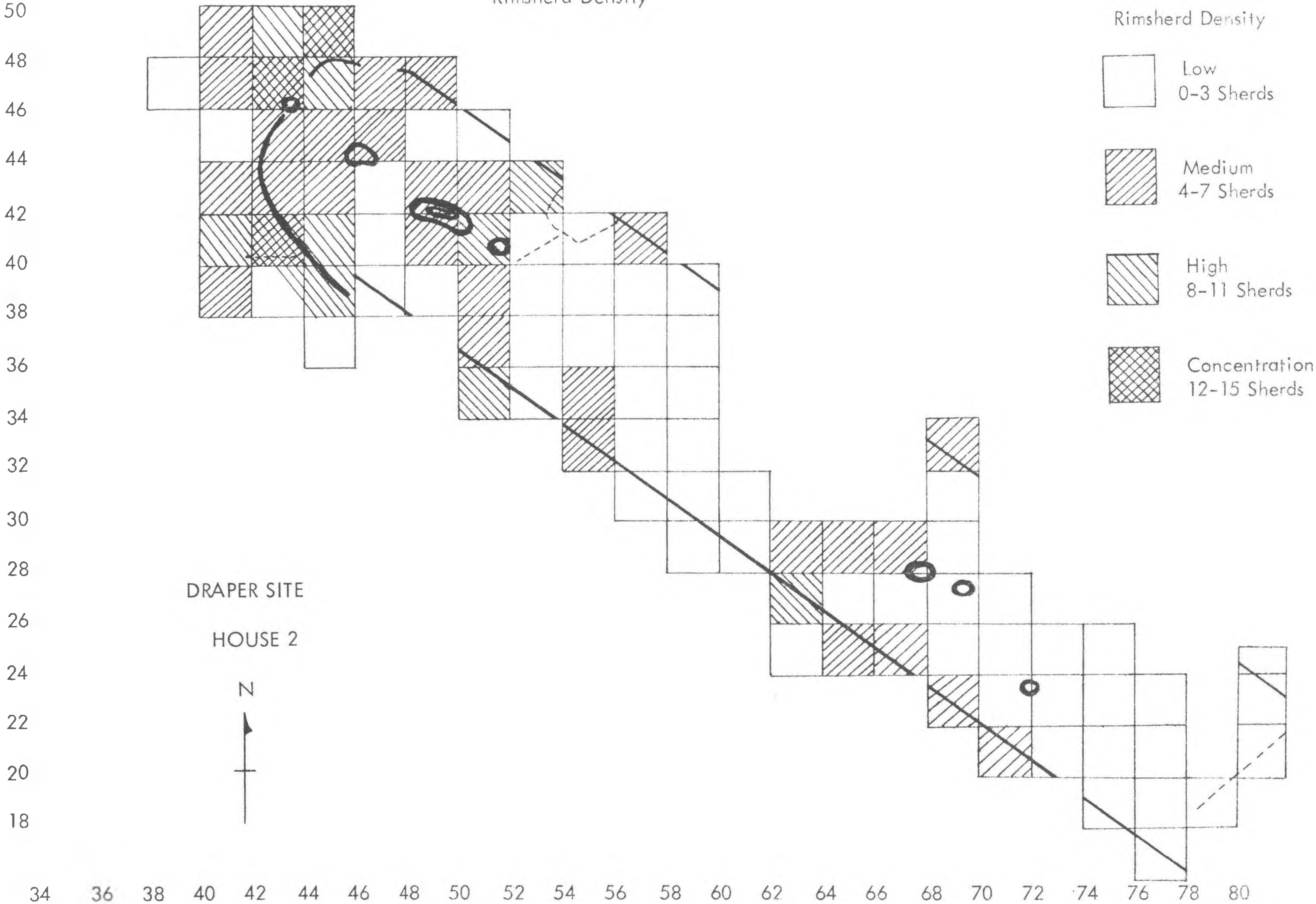


Fig. 2

Rimsherd Density



along the interior of the house wall, interpreted as sweeping middens. These middens were roughly 3 metres apart, and extended the length of the house on either side of each of the central hearths. This bilateral symmetry suggested that there were non-random processes in operation, governing the patterning of refuse disposal in the house, which might aid in the delineation of family activity areas around each hearth, and their relationships.

Ceramic concentrations were also present outside the house, in a large midden to the north of a possible doorway in the west end wall, and in what has been interpreted as a latrine pit behind a partition against the south wall (see Hayden: this vol.). Similar middens probably exist at the far end of the house as well, but these have yet to be excavated.

Due to the great disparity of ceramic concentration in the two areas (which was only in part due to the presence of the two middens outside the west end of the house), the frequency of each pottery type in each area was compared (Table V). With the exception of a few types of low

Table V Comparative Frequencies of Pottery Types Area A—Area B

type	Area A		Area B	
	f	%	f	%
LO	2	0.9	0	0.0
LI	17	7.2	2	2.7
PN	20	8.5	13	17.8
NC	4	1.7	2	2.7
WC	23	9.8	3	4.1
SN	6	2.6	6	8.2
HI	24	10.2	6	8.2
WH	1	0.4	0	0.0
SI	1	0.4	0	0.0
SC	3	1.3	2	2.7
BN	95	40.4	25	34.2
OT	3	1.3	4	5.5
DU	1	0.4	1	1.4
RL	3	1.3	4	5.5
RD	3	1.3	0	0.0
MS	29	12.3	5	6.8
totals	235	100.0%	73	99.8%

frequency restricted to Area A, (Lawson Opposed, Warminster Horizontal, Seed Incised, and Rice Diagonal), all types were represented in both areas. In terms of percentage frequency, Black Necked was by far the most prevalent type in both areas, accounting for 40.4% of the pottery in Area A, and 34.2% of the Area B material. A comparison of the other types, however, shows some interesting differences. In Area A, miscellaneous types were of second preference (12.3%), followed by Huron Incised (10.2%), and Warminster Crossed (9.8%). In Area B, the second most popular type was Pound Necked (17.8%), followed by Huron Incised and Sidey Notched (8.2% each). Miscellaneous types accounted for only a small part of the total in this area, compared to Area A (6.8%). Although there were no gross differences apparent, the differential distribution of many types suggested that certain types or groups of types might be related to particular hearths and/or middens. On the basis of these results, however, it was anticipated that the associations would be in terms of relative frequencies rather than presence or absence of specific pottery types in the hearth and midden areas.

In an attempt to quantify these relationships, the occurrence and frequency of each pottery type was determined for each midden and for an area within approximately a 2 metre radius of each hearth (the area of concentration was approximated by a 4 metre square, except in the case of linear hearth C, and was sufficiently accurate for the purposes of this analysis). It was anticipated that as the middens displayed bilateral symmetry with respect to individual hearths, there would be distinct clusters of sherds on either side of each hearth, reflecting two-family occupancy, as in the historic period (Tooker 1967:40). However, the distribution of material plotted around the hearths showed that it was concentrated at each end, with the central area on either side swept clear (Fig. 5). Though attesting to 2-family occupancy, this also indicated that as the sherds from each area had been mixed together, the comparison of hearths would yield only basic information concerning possible social affiliations among families. This was necessary to the analysis, however, in order to determine the relationships between the hearths and the wall middens. Middens could be expected to reflect the ceramic makeup of the individual living areas from which they were derived. To illustrate activity relationships between wall middens and hearths, a flow diagram was prepared in which trends toward increasing sherd density were represented by arrows. The diagram (Fig. 3) showed that 'pathways' of higher rim density linked middens with the hearths between middens.

The total rim frequency and number of types present around each hearth decreased steadily down the length of the house from west to east (Table VIa). Although the distribution of rimsherds through the excavation levels indicated that only a single occupation zone was present in House 2 (Fig. 6), this evidence suggested that the hearths at the east end of the structure (E-G), may have been utilized for only a brief period(s) of time. Alternately, the low rim density at the east end of the house may have represented continual utilization throughout the house's occupation by only a few people, perhaps for specialized purposes, or perhaps only during the winter months when the people returned from the summer out-camps. The small size of the middens in the east end indicates that the paucity of rims does not relate to greater house-cleaning efficiency. A plot of the distribution of sherds around each

Fig. 3
Rim Density Flow Diagram

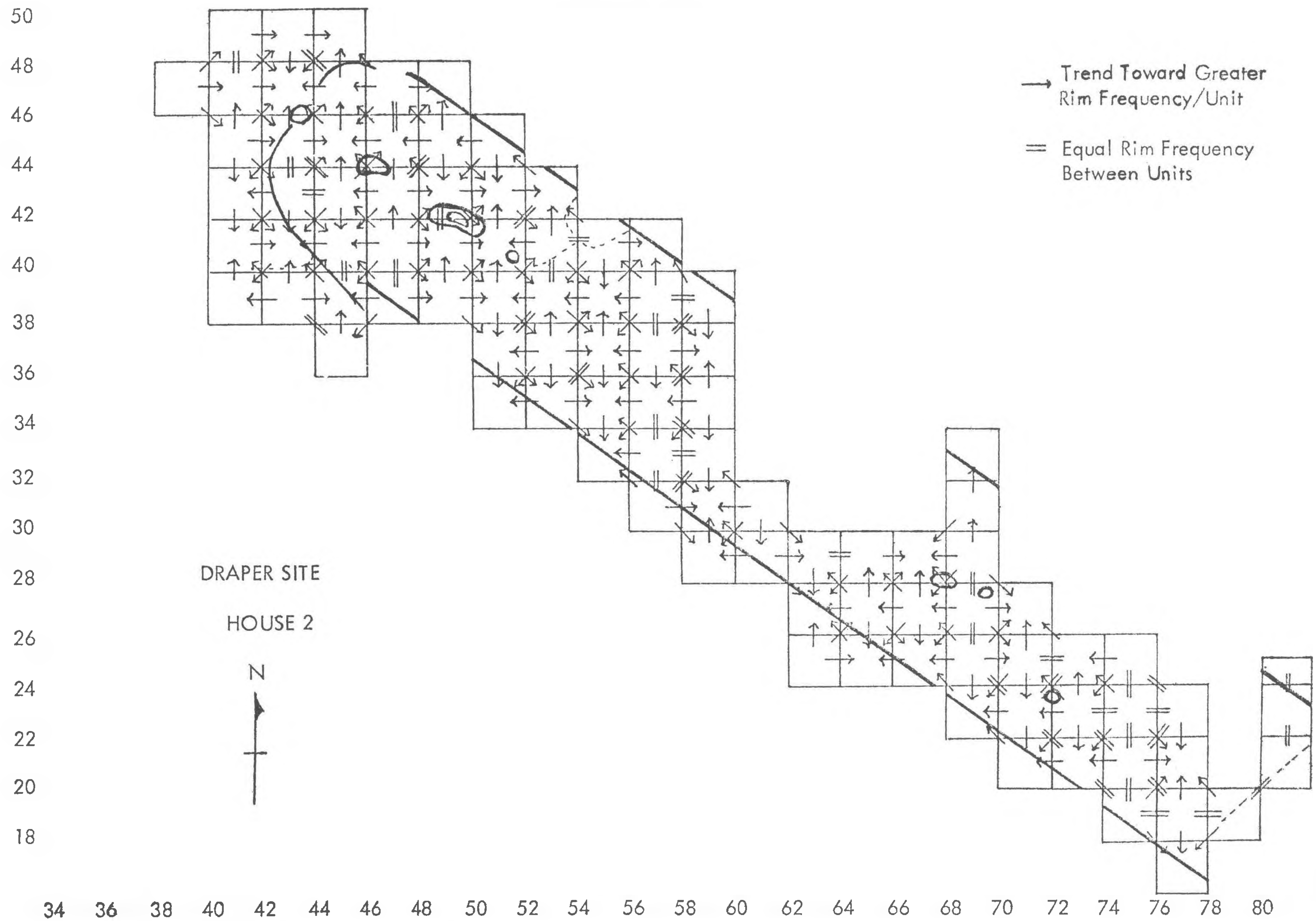


Table VIa Pottery Type — Hearth Associations

type	hearth A f	%	B f	%	C f	%	D f	%	E f	%	F f	%	G f	%
LO	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
LI	3	9.4	2	10.0	2	7.7	1	5.6	0	0.0	0	0.0	0	0.0
PN	0	0.0	2	10.0	4	15.4	1	5.6	1	16.7	0	0.0	0	0.0
NC	1	3.1	0	0.0	0	0.0	0	0.0	0	0.0	1	33.3	0	0.0
WC	3	9.4	2	10.0	1	3.8	0	0.0	0	0.0	0	0.0	0	0.0
SN	0	0.0	0	0.0	1	3.8	2	11.1	0	0.0	0	0.0	0	0.0
HI	7	21.9	1	5.0	2	7.7	2	11.1	1	16.7	0	0.0	0	0.0
WH	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SI	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SC	1	3.1	1	5.0	0	0.0	0	0.0	1	16.7	0	0.0	0	0.0
BN	10	31.3	6	30.0	11	55.6	10	55.6	2	33.3	2	66.7	1	50.0
OT	1	3.1	1	5.0	0	0.0	0	0.0	1	16.7	0	0.0	0	0.0
DU	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
RL	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
RD	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
MS	6	18.8	5	25.0	5	19.2	2	11.1	0	0.0	0	0.0	1	50.0
totals	32	100.8%	20	100.0%	26	99.8%	18	100.1%	6	100.1%	3	100.0%	2	100.0%

Table VIb Pottery Type — Midden Associations

type	SM midden 1 f	%	2 f	%	3 f	%	4 f	%	5 f	%	6 f	%	7 f	%
LO	2	9.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
LI	1	4.5	1	5.6	2	13.3	2	22.2	0	0.0	0	0.0	1	9.1
PN	1	4.5	3	16.7	1	6.7	2	22.2	4	23.5	4	40.0	2	18.2
NC	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
WC	0	0.0	2	11.1	0	0.0	0	0.0	2	11.8	0	0.0	1	9.1
SN	0	0.0	0	0.0	0	0.0	0	0.0	3	17.6	0	0.0	1	9.1
HI	1	4.5	1	5.6	1	6.7	0	0.0	1	5.9	1	10.0	0	0.0
WH	0	0 0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SI	1	4.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SC	1	4.5	0	0.0	0	0.0	0	0.0	0	0.0	1	10.0	0	0.0
BN	10	45.5	8	44.4	10	66.7	4	44.4	6	35.3	3	30.0	5	45.5
OT	1	4.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
DU	0	0 0	0	0.0	0	0.0	0	0.0	1	5.9	0	0.0	0	0.0
RL	0	0.0	0	0.0	1	6.7	0	0.0	0	0.0	0	0.0	1	9.1
RD	2	9.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
MS	2	9.1	3	16.7	0	0.0	1	11.1	0	0.0	1	10.0	0	0.0
totals	22	99.8%	18	100.1%	15	100.1%	9	99.9%	17	100.0%	10	100.0%	11	100.1%

type	NM midden 1 f	%	2 f	%	3 f	%	4 f	%	5 f	%
LO	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
LI	4	8.7	0	0.0	0	0.0	0	0.0	1	25.0
PN	2	4.3	0	0.0	3	37.5	0	0.0	0	0.0
NC	2	4.3	0	0.0	0	0.0	0	0.0	0	0.0
WC	11	23.9	1	7.7	1	12.5	0	0.0	0	0.0
SN	3	6.5	0	0.0	0	0.0	0	0.0	0	0.0
HI	6	13.0	2	15.4	1	12.5	3	60.0	0	0.0
WH	0	0.0	0	0.0	0	0.0	1	20.0	0	0.0
SI	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
SC	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
BN	11	23.9	7	53.8	3	37.5	1	20.0	2	50.0
OT	0	0.0	1	7.7	0	0.0	0	0.0	0	0.0
DU	0	0.0	1	7.7	0	0.0	0	0.0	0	0.0
RL	0	0.0	0	0.0	0	0.0	0	0.0	1	25.0
RD	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0
MS	6	13.0	1	7.7	0	0.0	0	0.0	0	0.0
totals	46	99.8%	13	100.0%	8	100.0%	5	100.0%	4	100.0%

hearth through the excavation levels showed hearths B, C, and D to be contemporaneous in their occupation. Hearth E appears to have been established at about the same time as those in Area A, but was abandoned long before the others, for reasons unknown. The occupation of hearth F overlaps that of E. After it fell into disuse, hearth G was built, and used for a very short period of time prior to the termination of occupation of the longhouse. Hearth A, a well developed feature, through which the end wall-trench of the house had been dug, obviously belongs to an earlier structure lying beneath House 2. That it appears to be largely contemporaneous with hearth B results from the mixing of material from the midden above it (NM1) with its upper levels (Fig. 7a-b).

It may appear from the graph that there is a hiatus in the occupation at about levels 7 8; however the ceramic material from the lower levels came from garbage filled pits dug in the floor, and displacement of material through foot traffic and natural processes.

An examination of the distribution of the various types upwards through the excavation levels showed some interesting trends which may be indicative of stylistic change in ceramics through the period of occupancy of Structure 2 (Fig. 6). As can be seen from the graph, Black Necked and Pound Necked material tended to concentrate toward the lower levels as did Sidey Notched and Sidey Crossed, while Huron Incised, Lawson Incised, and the miscellaneous types increased in frequency closer to the surface. This is of interest in light of Wright's observation that the decrease in popularity through time of Black Necked type was accompanied by an increase in Huron Incised (Wright 1966:71). Warminster Crossed on the other hand, had a relatively uniform distribution throughout the excavation levels.

Considerable differences in the percentage frequencies of the various pottery types present around the hearths were noted. Although Black Necked was present in the highest frequency in all but one of the six hearth areas, the less common types showed variations in occurrence and frequency which suggest that there may have been compplexes of preferred types related with specific residence locations. These could not be determined from the mixed samples of the hearth areas but might be determined through a study of the related midden deposits.

In an attempt to determine the strength of relationship among the hearths, middens, and combinations thereof, statistical tests of association were applied to the data. The main technique employed was the coefficient of similarity (c.f. Robinson 1951; Brainerd 1951). Although this procedure has long been recognized for its usefulness in the seriation of Ontario Iroquois sites (c.f. Emerson 1968), it has not preveiously been employed in this area to determine the spatial relationships among ceramic assemblages, or at a level other than that of inter-site comparison (though a similar study of lithic assemblages was performed in the southern United States – see Johnson 1967). The rationale for its use in spatial analysis is that in House 2, where the effect of temporal change on the ceramics can for all intents and purposes be considered nonexistent, and where a well defined areal distribution is demonstrable, all differences expressed by the coefficients will be expressions of spatial association (A.E. Tyyska personal communication). Though not allowing as detailed comparisons to be made as other methods such as nearest neighbour analysis (Whallon 1974), which would have to have been computerized in order to handle the large quantity of data, it is considered sufficient for the purposes of this preliminary analysis.

The coefficients of similarity for the hearths are presented in Table VIIa. When ordered by the double link clustering technique (Renfrew and Streud 1969), the hearths were found to bear relatively strong linear relationships, indicative of their over-all basic affinity. However, two clusters of hearths could be distinguished, one consisting of hearths C and D (coefficient of similarity 130), the other of B and A (included to demonstrate the degree of continuity between House 2 and the one beneath it) with a coefficient of 120.7. The A–B cluster was relatively closely related to the C–D cluster at a third order of magnitude, and F with D at the fourth. Hearths E and G were less closely related to the main clusters, E with C, and G with B. It is interesting to note the very low indices of correlation among the three hearths at the east end of the structure (Fig. 8).

Table VIIa Coefficients of Similarity – Hearths

	A	B	C	D	E	F	G
A	–	120.7	101.7	96.7	112.1	69.5	20.7
B	120.7	–	114.0	93.2	109.4	60.8	67.5
C	101.7	114.0	–	130.0	112.8	104.6	32.0
D	96.7	93.2	130.0	–	100.0	111.2	33.3
E	112.1	109.4	112.8	100.0	–	71.6	35.0
F	69.5	60.8	104.6	111.2	71.6	–	0.0
G	20.7	67.5	32.0	33.3	35.0	0.0	–

While groups of seemingly related hearths could be roughly defined, little information was to be gained concerning possible residential affiliations of the ceramics, due to the degree of mixing of material from the living areas around the hearths. This mixing was reflected in the overall low correlations among hearths.

The wall middens, however, showed more significant correlations with one another, both positive and negative (Table VIIb). As mentioned above, their symmetrical

Fig. 4
Location of Hearth and Midden Areas

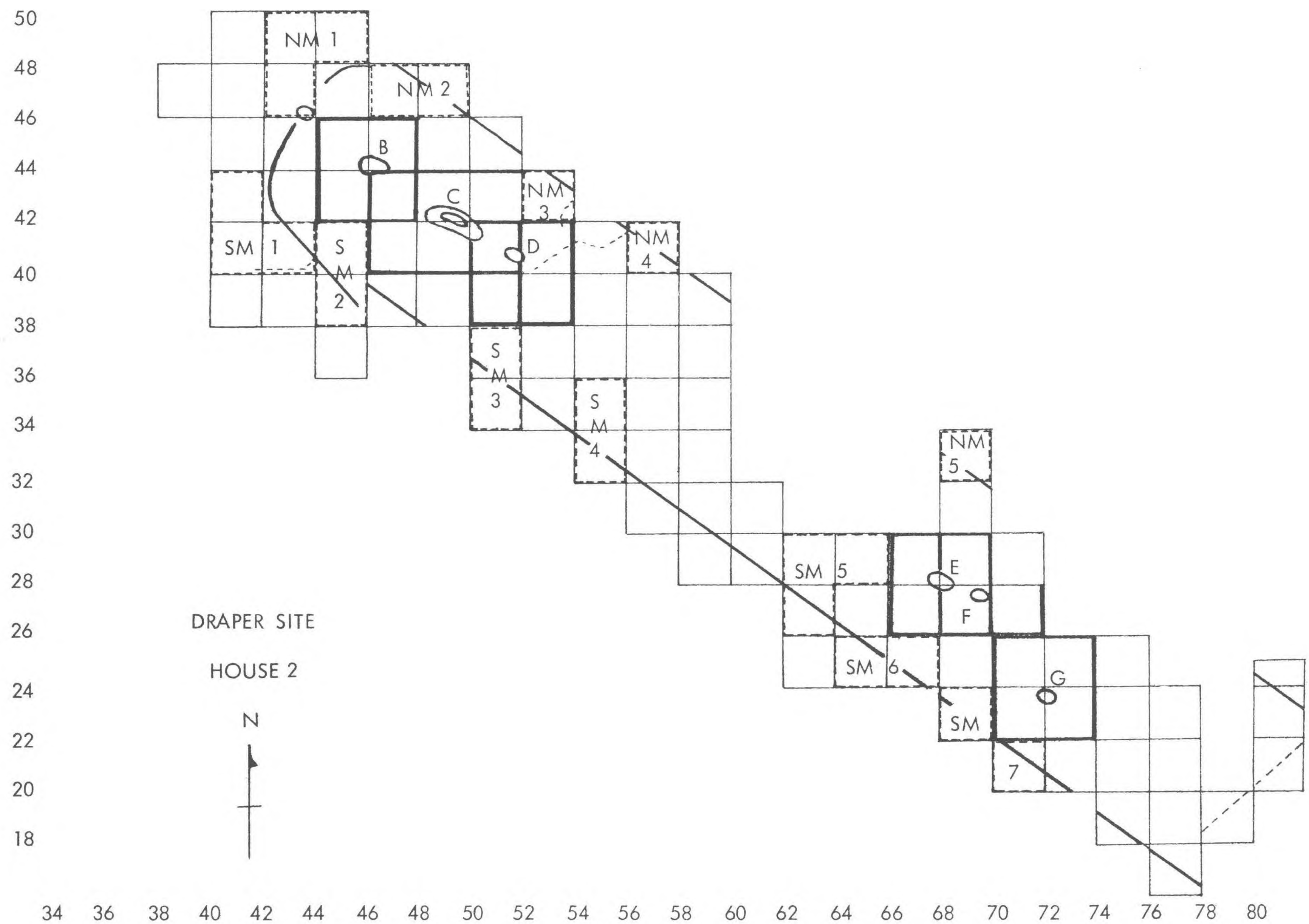


Fig. 5

Distribution of Pottery in Hearth Areas

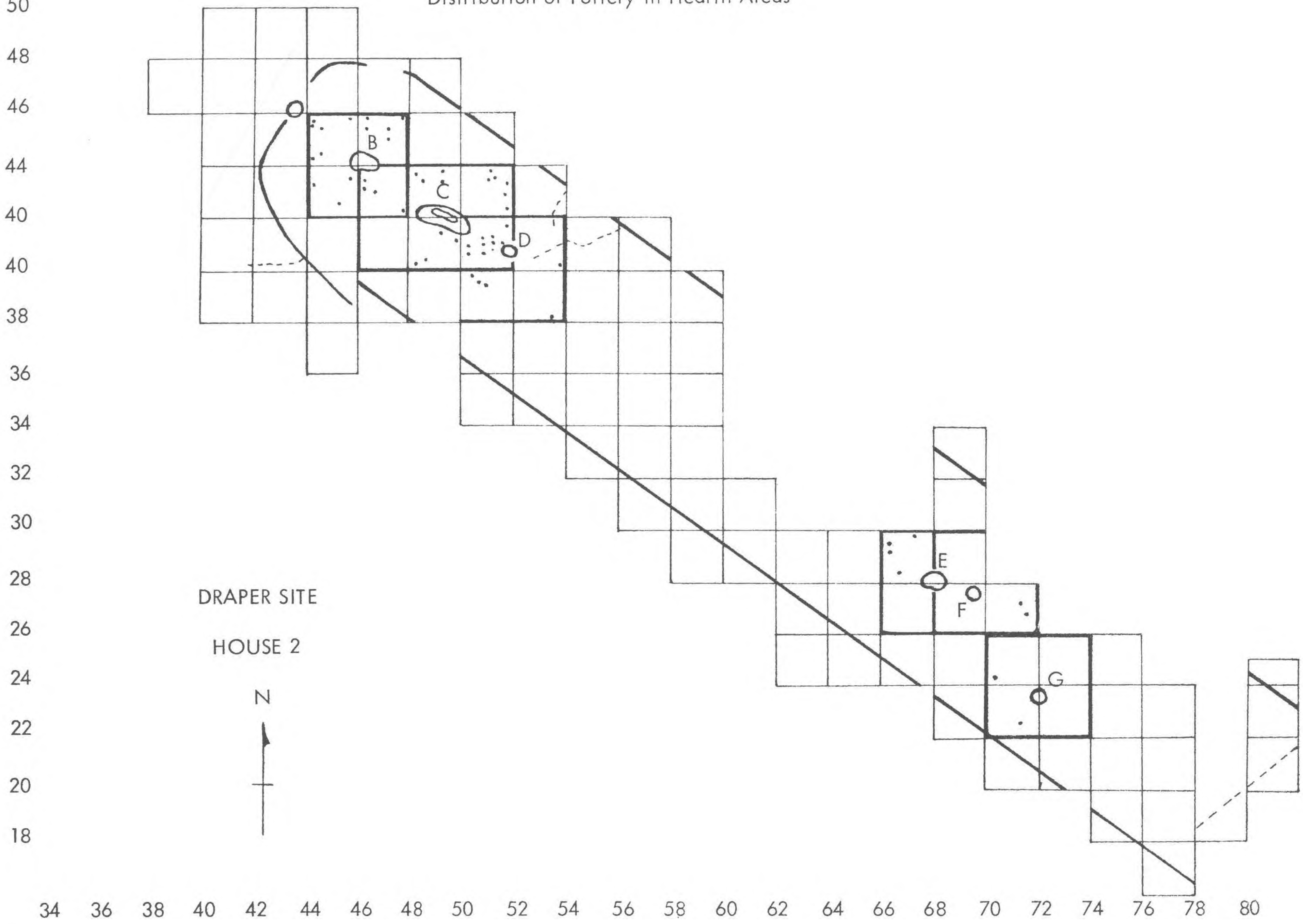


Fig. 6
Distribution of Pottery Types Through Excavation Levels

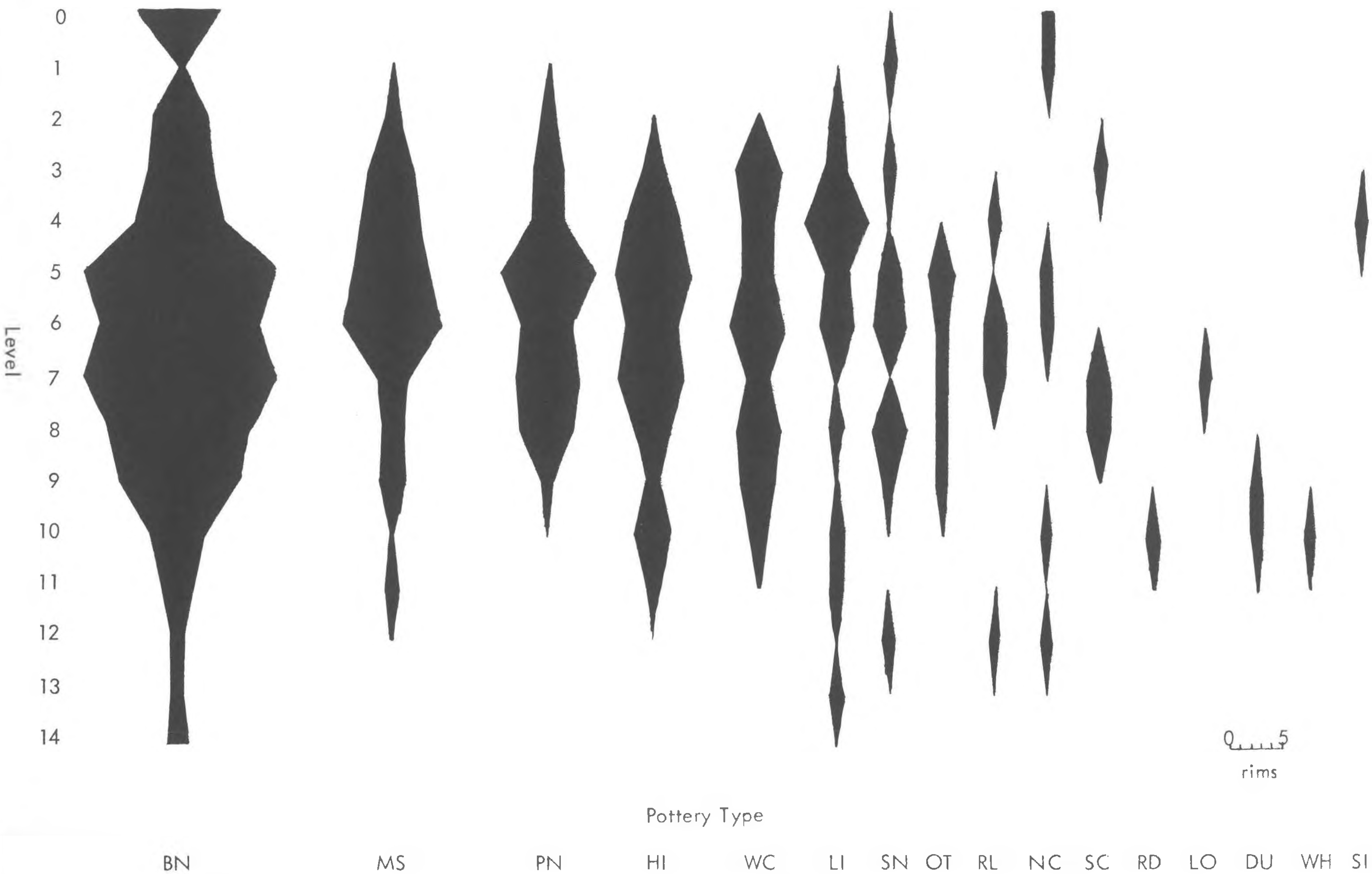


Fig. 7A

Distribution of Ceramics in Each Hearth Area Through Excavation Levels

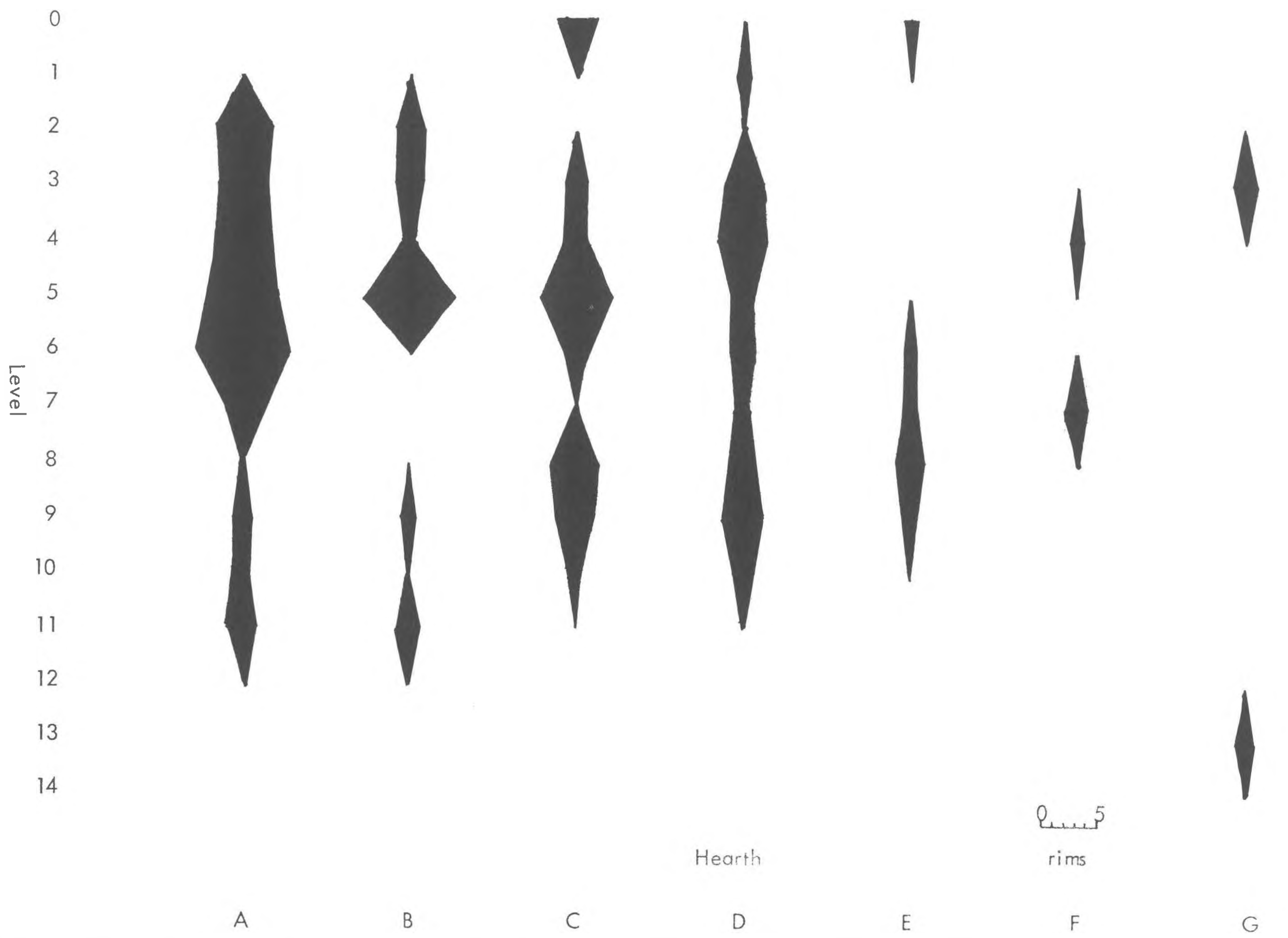
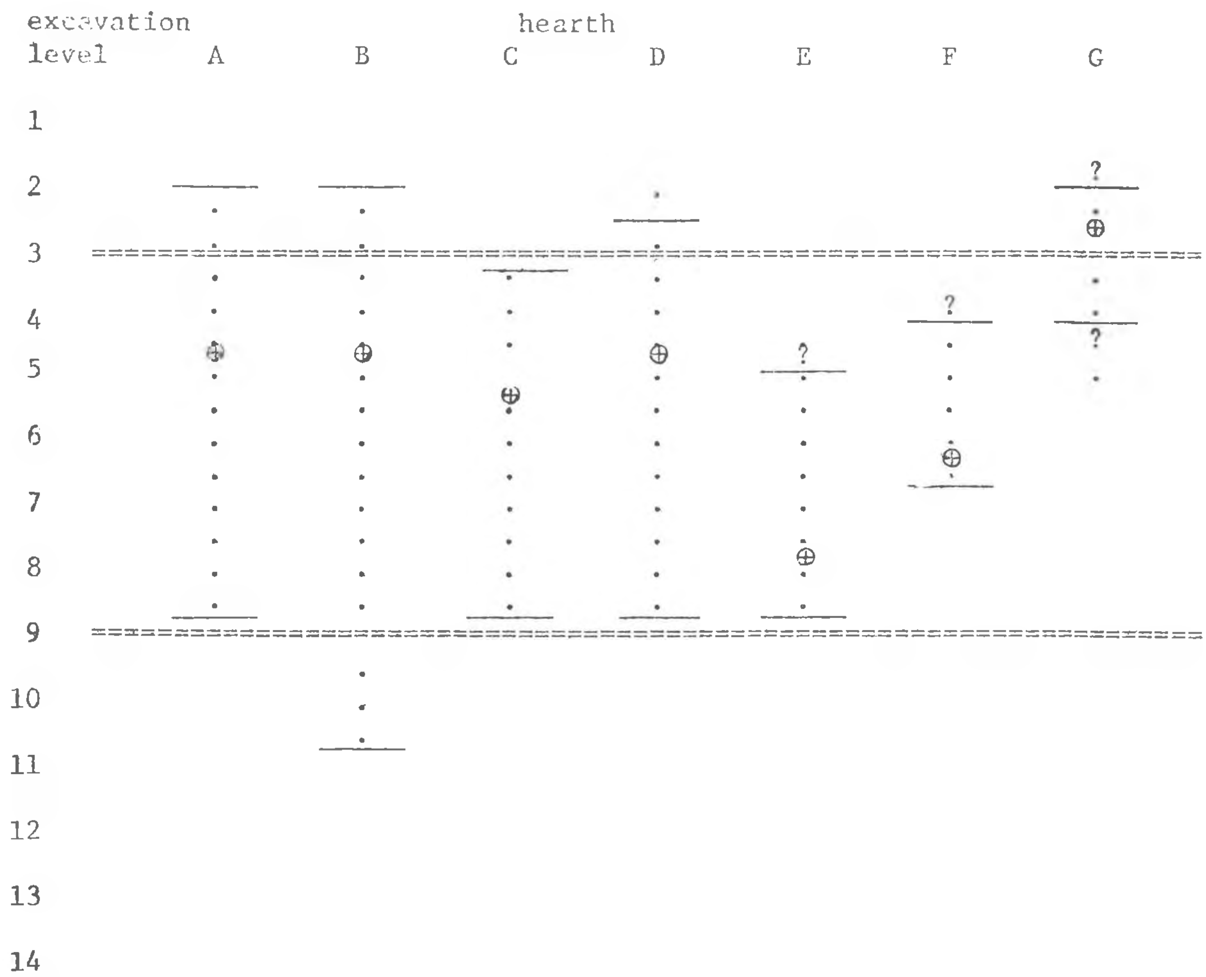


FIGURE 7B - SCHEMATIC DIAGRAM OF HEARTH OCCUPATION LEVELS



==== upper and lower limits of occupation level in House 2 (10 & 90% of total ceramic assemblage)

____ approximate upper and lower limits of hearth occupation levels (10 & 90% of each hearth complement,excluding surface material)

⊗ 50% cumulative of ceramics around each hearth

Table VIIb Coefficients of Similarity — Middens

	NM 1	2	3	4	5
NM1	—	89.2	100.5	82.2	78.8
2	89.2	—	110.6	70.8	100.0
3	100.5	110.6	—	52.5	87.5
4	82.2	70.8	52.5	—	40.0
5	81.4	100.0	87.5	40.0	—
SM1	78.8	109.0	96.5	49.0	100.0
2	101.0	115.4	141.8	51.2	116.3
3	87.2	121.0	120.2	53.0	140.0
4	73.8	88.8	131.9	40.0	133.2
5	104.8	106.0	153.2	51.8	70.6
6	76.4	105.4	157.5	70.0	87.0
7	112.0	106.4	142.1	40.0	127.5

	SM 1	2	3	4	5	6	7
NM1	78.8	101.0	87.2	73.8	104.8	76.4	112.0
2	109.0	115.4	121.0	88.8	106.0	105.4	106.4
3	96.5	141.8	120.2	131.9	153.2	157.5	142.1
4	49.0	51.2	53.4	40.0	51.8	70.0	40.0
5	100.0	116.3	40.0	133.2	70.6	70.0	127.5
SM1	—	115.8	118.0	106.8	88.6	87.0	109.0
2	115.8	—	124.6	134.5	137.4	104.6	151.6
3	118.0	124.6	—	128.8	95.8	73.4	136.0
4	106.8	134.5	128.8	—	115.0	104.4	143.4
5	88.6	137.4	95.8	115.0	—	118.8	143.4
6	87.0	104.6	73.4	104.4	118.8	—	96.4
7	109.0	151.6	136.0	143.4	143.4	96.4	—

Table VIIc Coefficients of Similarity — Hearths/Middens

				hearths			
	A	B	C	D	E	F	G
NM1	116.9	103.8	96.7	102.7	82.4	57.5	13.0
2	111.5	86.4	107.6	129.8	112.8	107.6	0.0
3	112.9	110.0	125.9	108.4	125.0	75.0	0.0
4	103.4	60.0	75.4	62.4	73.4	40.0	0.0
5	91.0	80.0	100.0	111.2	66.6	100.0	0.0
SM1	93.7	115.0	111.6	136.2	102.6	95.5	0.0
2	104.5	131.2	145.4	122.4	111.2	88.8	0.0
3	95.6	120.8	126.6	147.0	93.3	133.4	49.9
4	82.1	50.0	130.8	158.1	116.7	88.8	0.0
5	93.9	110.0	128.4	122.3	89.6	70.6	50.0
6	86.9	100.0	116.2	112.3	111.2	70.0	0.0
7	108.8	130.5	149.0	133.6	96.0	100.1	0.0

arrangement down the length of the house showed that they were related to specific hearth living areas, and had accumulated during house cleaning activities. The relationships were invariably clear, however, especially in the east area, where three high density concentrations merged together along the south wall, and the north wall had only been partially exposed. In order to qualify the relationships, the coefficients of similarity were calculated for each hearth and midden combination (Table VIIc). This did not clarify the problem, however, but emphasized the inherent similarity of ceramic distribution across the floor, and each coefficient had to be divided by a proximity factor (the distance between the hearth and midden being compared—(see Table VIIIb)[1] in order to compensate for this. The resultant proximity index for each hearth and midden is presented in Table VIIIa. As anticipated, most of the middens have close associations with the hearth living areas adjacent to them (Fig. 9). In the rare instances where one midden appears to have been utilized by two groups, as in the case of NM3 and SM2, very close affiliation between the two is inferred. The associations of hearths and middens in Area B is still not clear, though it appears that concentration SM6 is most closely related to hearth E, and NM5

Table VIIIa Index of Association — Hearths & Middens

	A	B	C	D	E	F	G
NM1	58.5	23.6	12.1	8.9	2.6	1.7	0.4
2	25.3	19.7	18.6	14.4	4.0	3.6	0.0
3	11.3	14.9	27.4	28.5	5.8	3.3	0.0
4	7.3	5.3	9.4	15.6	3.4	1.7	0.0
5	3.2	3.1	4.5	6.0	14.5	21.7	0.0
SM1	18.7	27.4	17.7	14.8	3.6	3.1	0.0
2	16.3	31.2	31.6	18.8	4.3	3.2	0.0
3	7.4	11.8	17.3	33.4	5.1	6.6	2.1
4	4.8	3.5	12.2	21.4	8.3	5.6	0.0
5	3.5	4.5	6.2	7.2	17.9	10.4	5.3
6	2.9	3.7	5.0	5.7	30.9	14.0	0.0
7	3.2	4.2	5.4	5.5	19.2	20.0	0.0

Table VIIIb Feature — Feature Distance (Metres)

				hearths			
	A	B	C	D	E	F	G
NM1	2.0	4.4	8.0	11.5	31.6	33.2	36.2
2	4.4	4.4	5.8	9.0	28.4	30.0	34.4
3	10.0	7.4	4.6	3.8	21.4	22.8	27.2
4	14.2	11.4	8.0	4.0	21.4	23.0	22.8
5	28.4	25.8	22.0	18.4	4.6	4.6	9.2
SM1	5.0	4.2	6.3	9.2	28.4	30.4	33.8
2	6.4	4.2	4.6	6.5	25.6	27.4	31.2
3	13.0	10.2	7.0	4.4	18.2	20.2	23.6
4	17.0	14.2	10.7	7.4	14.0	15.8	19.2
5	27.2	24.2	20.6	17.0	5.0	6.8	9.4
6	30.0	27.0	23.4	19.8	3.6	5.0	6.6
7	34.2	31.4	27.8	24.2	5.0	5.0	3.0

[1]The proximity factor converts the coefficients of similarity from an independent variable to one dependent on the distances between hearths and middens. It was developed to aid in determining the differential relationships of hearths and middens when the variable of distance (or proximity) was introduced.

and SM7 with the north and south living areas of hearth F respectively. The relationships of hearth G remain unclear.

The contents of the middens were compared with one another, revealing statistical associations which could be inferred to represent relationships among the living areas from which they were derived. From the contents of the wall middens, 12 groups (i.e. 'families' or 'women') could be recognized, living on the north and south sides of hearths A, B, C, D, F, and a probable but unrecognized hearth located in the central area of the house, either in the unexcavated area (see Hayden: this volume), or among the ash-filled pits and post-molds on the edge of this area (which from the midden locations would seem more probable). Hearth E appears to have had only a single resident family, apparently on the south side near the midden, though this is unclear from the distribution of sherds around the fireplace (Fig. 10).

Two groups of most similar families were identified: family 3, on the north side of hearth C, and family 9 of hearth E; and families 4 and 11, on the south sides of hearths C and F respectively. These each have coefficients of over 150 (75% similarity). Families 3 and 4 relate with one another at the 140 coefficient level (70% similarity), and 8 is associated with 11 but not with 4. Families 3 and 5 (the latter north of hearth D), and 4 and 2 (south of B) appear to have shared middens NM3 and SM2 respectively, suggesting close familiar relationships between them.

Families 6 and 10 have second order (140 level) relationships with each other, but appear unrelated to the others. Families 1, 12, and 7 (the latter occupying with family 8 the 'hearth' in the central area) all have low coefficients of similarity with each other and the other family groups.

If coefficients of similarity above the 150 level are assumed to represent samples derived from the same population (see Emerson 1968•81; Ramsden n.d.), eight family groups can be postulated: 1; 3, 5 & 9; 2, 4 & 11; 6; 7; 8; 10; and 12. The high correlation between the 3–5–9 group and the 2–4–11 group (about 140), is probably indicative of second order familiar relationship. The same applies for families 11 and 8 and 6 and 10, resulting in a reduction in the number of separate lineages to five.[2]

The patterning of ceramics in the 3–5–9 and 2–4–11 groups appears to represent matrilocal residence groups, assuming that coefficients of similarity greater than 150 represent shared learning experience between the two females, i.e. that they are sisters, and that coefficients between, say, 140 and 150, represent the motif complex of a daughter, which could be expected to differ slightly from that of her mother due to the influences of stylistic change (c.f. Deetz 1965).

Table IX Pottery types Associated with Living Areas (in order of preference)

Living Area	type	Living Area	type
1	BN HI WC,OT,DU,MS	7	HI BN,WH
2 estimated	BN PN,MS WC LI,HI	8	BN LI,PN MS
3	BN,PN WC,HI	9	PN BN HI,SC,MS
4	BN PN,MS WC LI,HI	10	BN LI,RL
5 estimated	BN,PN WC,HI	11	BN PN LI,WC,SN,RL
6	BN LI PN,HI,RL	12	?

[2] Although inferences extracted from the data beyond these tentative conjectures are even more fraught with uncertainty and logical gymnastics, it is tempting to try for a further extension of the interpretation. Interpreting the data as above, Women at locations 9 and 3, (and probably 5 as well, though the relationship is not clear) could be considered sisters of the first generation, and 4, 11, and probably 2, daughters of Woman 3. Woman 8, related to 11 but not to 4, may be the daughter of that woman, in a third generation.

It is interesting to note that hearth E was occupied as early as but not before hearths B,C, and D, and abandoned early for some reason (hence the interpretation that Woman 9 is of the eldest generation), and that hearth F, where 11 resided, was slightly later than E. It is possible that Woman 9 and 3 are one and the same, and that she moved to the west end of the house to occupy hearth C with her daughter. A slight stylistic-temporal difference could explain why 3 and 11 are closely related, yet 9 and 11 are not. This could be extended into the third generation as well (see Fig. 11b). The fact that in each instance the members of the elder generation of this family resided north of the hearth, and those of the younger generation to the south, is perhaps pertinent, for it would tend to indicate a culturally controlled behaviour pattern, possibly based on age or status, governing residence. This could hold true for families 6 and 10 as well, though the evidence is somewhat tenuous.

Some evidence of possible stylistic elaboration is present, in the number of types present in the two generations of family 3–4. In the former, only four types, Black Necked, Pound Necked, Warminster Crossed, and Huron Incised, were present. In the latter, this same basic core group was retained, but Lawson Incised and miscellaneous types were added (Table IX). A similar situation held true for families 10 and 6; the former had only three types, Black Necked, Lawson Incised, and Roebuck Low Collar, whereas in 6 the complement had been increased to five with the addition of Pound Necked and Huron Incised. This suggests that 10 may have been ancestral to family 6, the younger generation being characterized by a slightly greater diversity of pottery types.

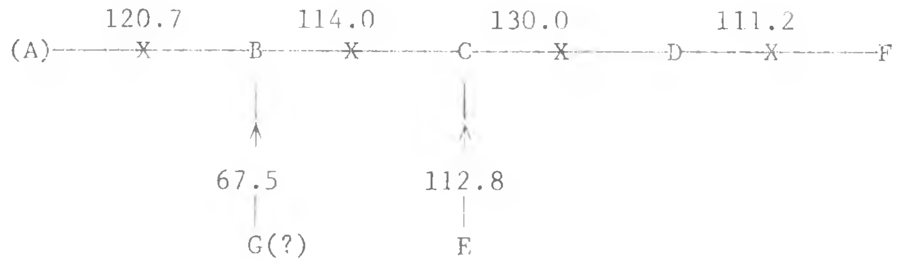


Fig. 8 Schematic diagram of hearth relationships.

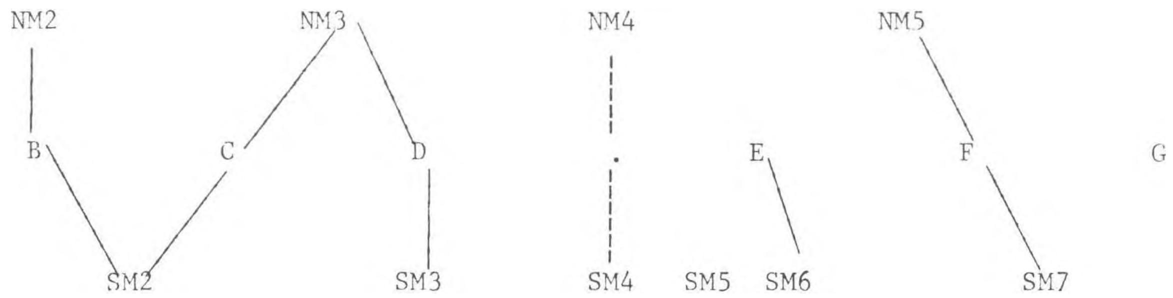


Fig. 9 Schematic diagram of hearth–midden relationships (based on indicies of association).

Most of the hearth residential areas, with the exception of family 7, are related with one another above the 50% level. This indicates all shared the same basic repertoire of types, which would suggest the possibility that the household was composed of members of a supra-family group such as a clan. Basic groups of types ran through the families (the Black Necked, Pound Necked, Huron Incised group in the 9–3–4 family group, the expanded repertoire of 4–11 of Black Necked, Pound Necked. Warminster Crossed and Lawson Incised, and the Black Necked, Lawson Incised, Roebuck Low Collar combination of 6 and 10), and were not exclusive to any one lineage. There were, however, differences in frequency of occurrence, emphasizing once again the basic relationships of the families to one another.

The two large dump areas outside the west end of the structure had only low correlations (few over 50%) with the wall middens, indicating that mixing was taking place. It appears that these were communal repositories, used, unlike the small sweeping middens, by more than one family, suggesting that two patterns of garbage disposal, one restricted to the sweeping away of material from the family living area, the other involving active transport of material outside of the house into designated areas, were present. Thus there were two optimally efficient solutions (one large scale and one small scale) in dealing with problems of garbage disposal.

The spatial distribution of the castellations was of interest, although with such a small sample it was difficult to draw any concrete conclusions from it. There is a definite tendency for the castellations to cluster; 81.6% were associated with the hearths and middens, and only 18.4% were found on the floor. Of the former, 22.4% were within the hearth areas, and 59.2% were found in middens. The distribution of the castellations, too, indicates a non-random pattern of garbage disposal (Table III, Fig. 12).

There are some interesting associations of castellation types with hearths which undoubtedly relate to the distribution of pottery types. The Round castellation was associated exclusively with hearth A, the Developed Pointed type with hearth B, the Pointed type with C, and Developed Rounded with hearth D. The Scalloped lip

Fig. 10

Family Living Areas

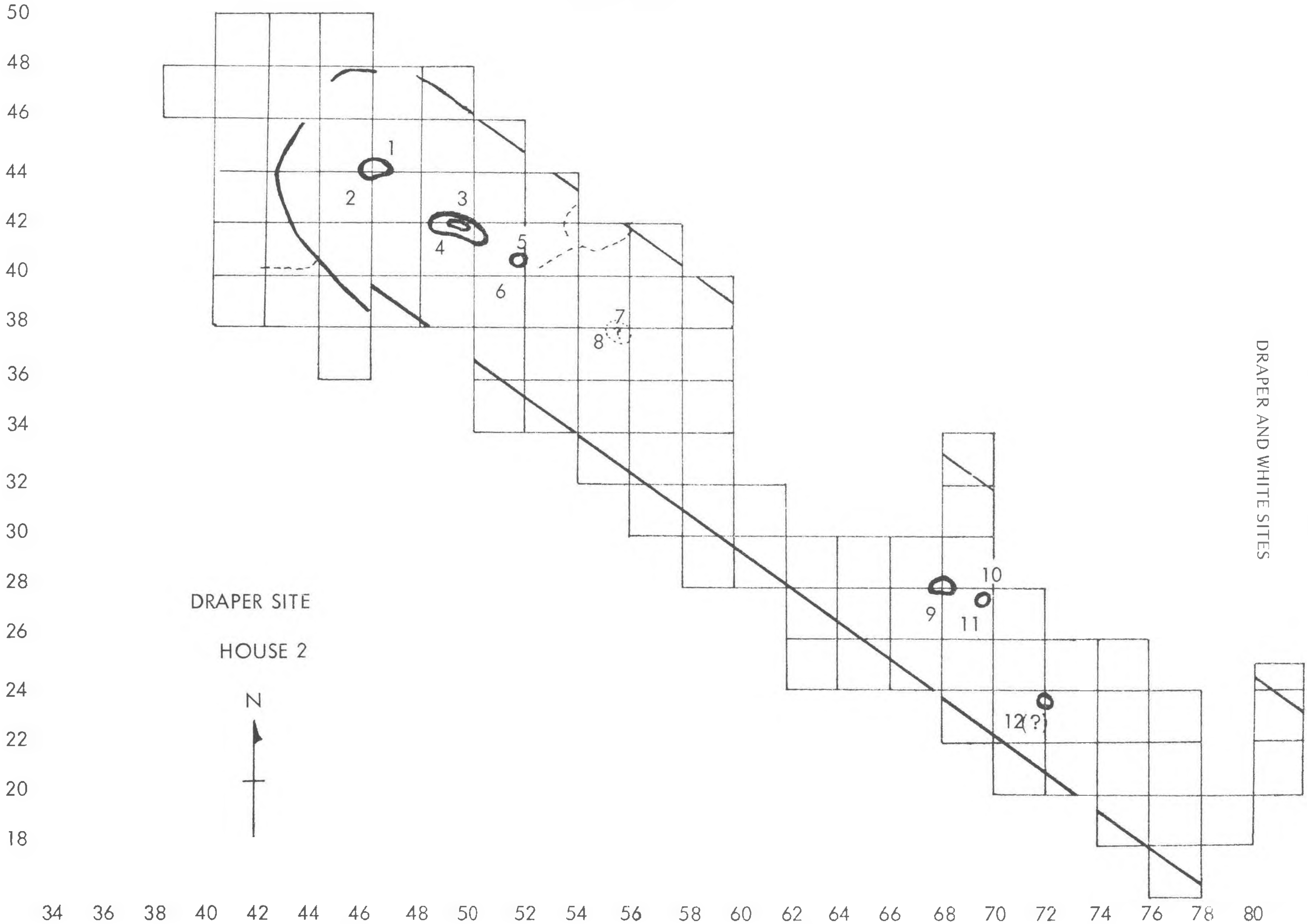


FIGURE 11A - SCHEMATIC DIAGRAM OF MIDDEN RELATIONSHIPS

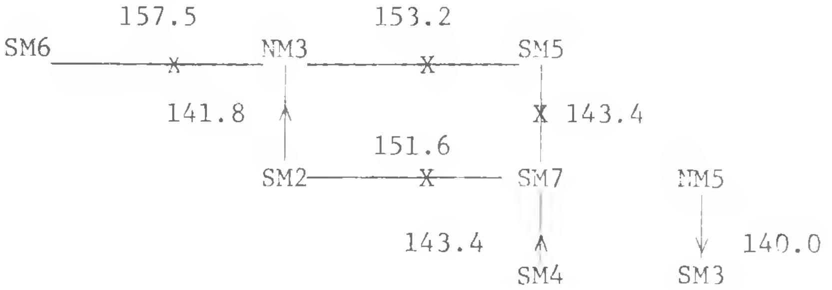
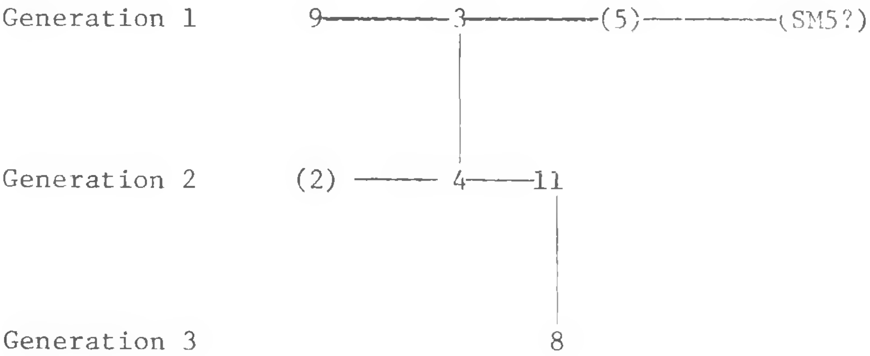


FIGURE 11B - SCHEMATIC DIAGRAM OF LINEAGE RELATIONSHIPS



(12)	7	1	10–6

Fig. 12

Distribution of Castellations

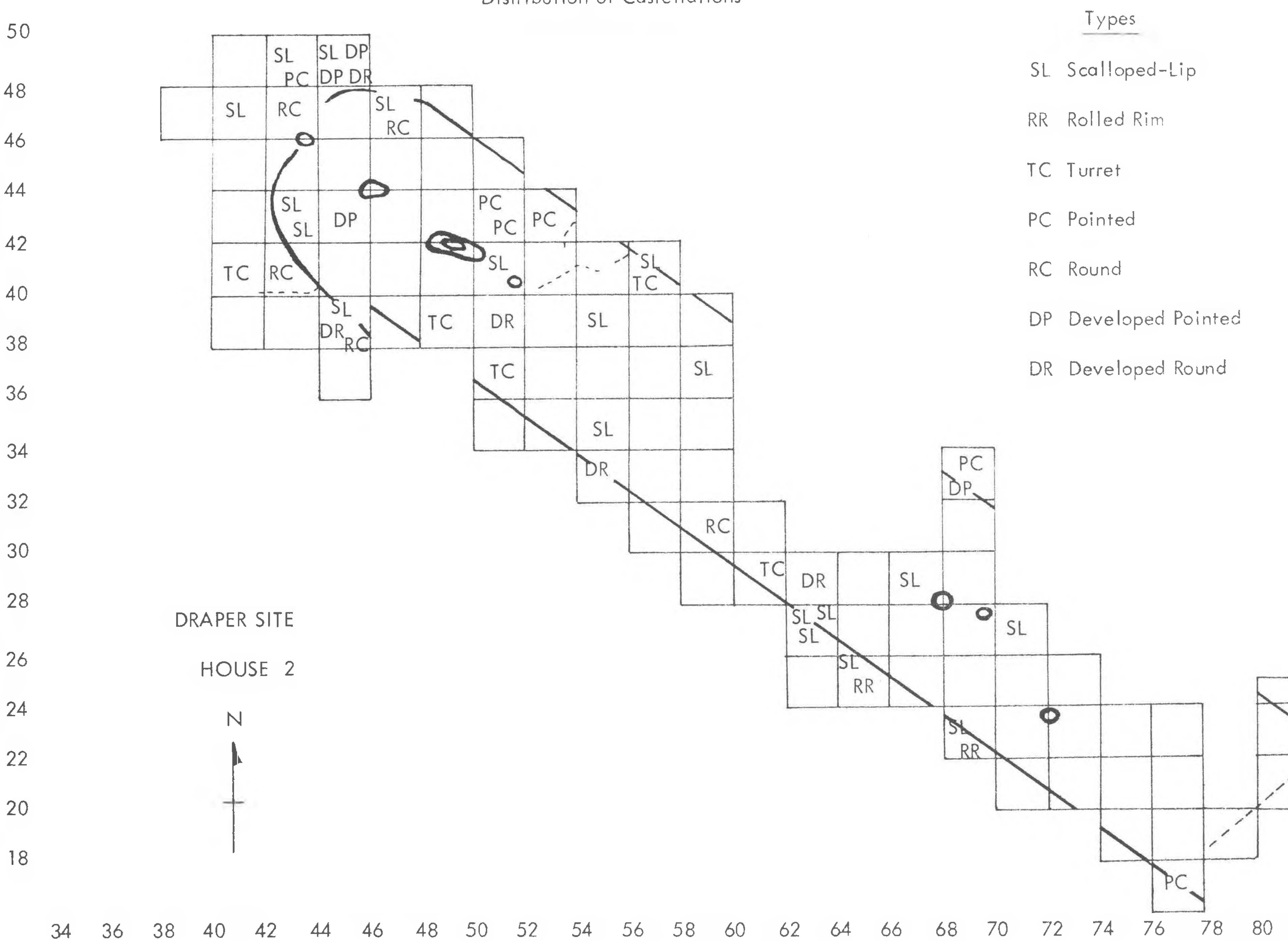
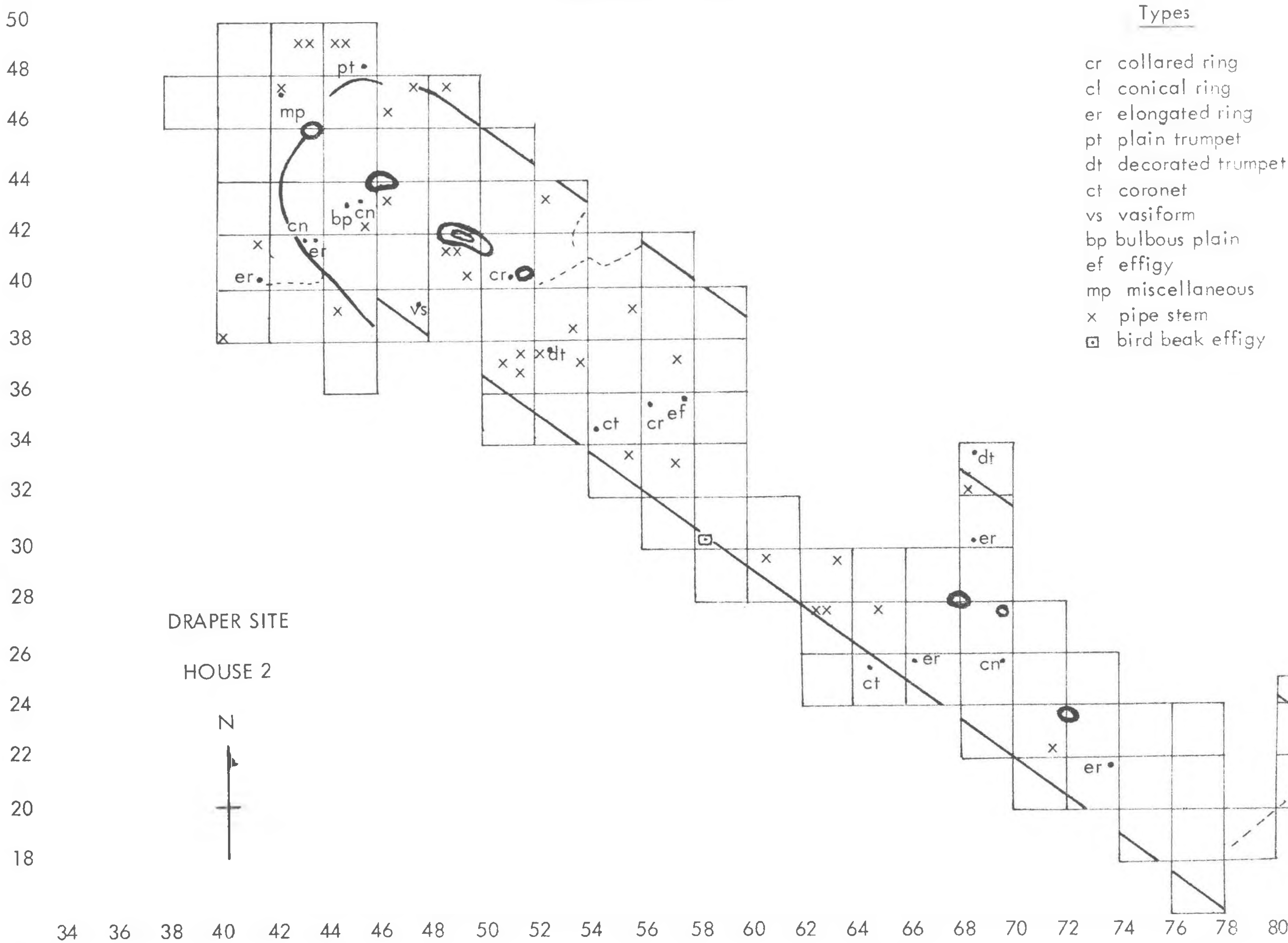


Fig. 13

Distribution of Pipes



castellation, a Draper Diagnostic (see Ramsden 1968), was present in the vicinity of hearths B, C, D, E, and F.

Among the middens, only those along the north wall of the house yielded Pointed and Developed Pointed varieties. Rounded castellations were restricted to the middens outside the house, and to NM2 and SM2 (although there were scattered occurrences of all three on the floor). The Rolled rim was exclusive to the east end of Structure 2. There were no apparent associations of types with specific hearths or families.

The distribution of pottery pipes within House 2 appeared to some extent to reflect patterns of male related activities. Of the 55 bowl, stem and mouthpiece fragments found, 50% were associated with the middens, 25.5% with the open floor area, and 23.6% with the hearths. 74.5% of the pipes were found toward the west end of the house, and only 25.5% in Area B, reflecting the same 3:1 ratio of distribution exhibited by the pottery. In each area there was a definite tendency for the pipes to occur in clusters on the south side of the hearth line, 69.1% occurring between the hearths and the south wall of the house. The pipes and stems were found to coincide with areas of bone, wood, and lithic manufacture (see Ferguson: this volume), while in areas of "food preparation" none were found. It is interesting to note that in the historic period, among the traditional male activities were chipped and ground stone implement manufacture, wood working, and bone working (Trigger 1969:36). The evidence of the pipes would tend to support the delineation of these activity areas. There were no recognizable associations with hearths or wall middens which would correlate with residential patterns (Table IV, Fig. 13).

One interesting aspect of the distribution of pipes was that a number of stem and bowl fragments were scattered on the periphery of the clear area east of hearth D, and that the only effigy pipe from the house, a crudely fashioned, possibly unfired, unidentifiable animal whose body formed the bowl and whose legs were represented by triangular arrangements of three small punctates, was found there as well. A well-modelled ceramic bird's beak which, while rather large to have been part of a pipe, may have been part of a dance mask, was discovered lying along the wall on the edge of this space. This evidence would tend to support the interpretation that the cleared space was a recreational area (see Ferguson: this volume).

In conjunction with the distributional analysis, a technological study of interior carbonization on the rims was performed. 48.5% of the rims in Structure 2 bore traces of utilization as cooking vessels. Of these, 20.8% were Black Necked, 7.1% Pound Necked, and 5.2% Huron Incised. It is interesting that only 3.6% of the miscellaneous rims were encrusted, suggesting, perhaps that some of these at least were trade vessels. Only three types, Lawson Opposed, Niagara Collared, and Seed Incised bore no evidence of having been used as cooking pots, and these were of very low frequency in the house (Table 10).

Besides typology, there are two ceramic indicators which shed light on the nature of Areas A and B; proportion of carbonized sherds in each area and the average sherd size in each area. If both areas are domestic residential areas, these indicators should be very similar for the two areas. If on the other hand, area B was non-residential, and used only for special occasions, one might reasonably expect differences.

Of the ceramics found in Area A, 43.8% were carbonized (this constituted 33.2% of the total ceramic assemblage in House 2). Twenty and four-tenths per cent of these were Black Necked, 6.0% Huron Incised, and 5.1% Pound Necked. This is quite different from the distribution in Area B, where 64.4% of the rims were carbonized. When the average sherd size is examined throughout the structure, (Figs. 14, 15) it is found that the mean size is exactly the same for both areas (2.6 cm average longest dimension). Moreover, in both areas, the larger sherds have a strong tendency to occur along the walls, and in the sweeping middens. It therefore appears that the two areas are very similar in terms of function and trampling activity. The greater proportion of sherds with carbon on them in the east end is interesting. The probable explanation for this skewing as well as the low concentrations of material at the east end of the house, is that it was not occupied continuously throughout the year. Ethnohistorians record that during the historic period the large Huron villages were largely depopulated from early spring till December, when the people were away at smaller hunting or fishing camps, or tending to the fields (Tooker 1967:71-72). That this part of the house was occupied only during the winter months would explain the low concentration of material present and greater use of hearths and cooking wares. In contrast, the western hearths seem to have had continual occupation by groups of people left behind. Perhaps these people were responsible for looking after the local fields and defending the village during the summer months. It is possible, too, that those individuals left behind when the others left in the spring moved to the upper end of the house until the fall. (If this was the case the possibility of determining familiar relationships on the basis of attribute analysis is doubtful.)

In any event, the above indicators certainly do not seem to support the notion of the east end serving only as an occasional ceremonial area. Of further interest regarding the sherd sizes, is the central corridor of activity (high rates of trampling), which continues out the northwest end, at the site of the postulated "doorway". Similar below average sizes occur at the formally recognized door around the northwest corner, and in the central section of the

Table X Carbonization on Rimsherd Interiors

type	House 2 f	%H2	Area A f	%A	%A -H2	Area B f	%B	%B -H2
LO	0	0.0	0	0.0	0.0	0	0.0	0.0
LI	7	2.3	6	2.6	1.9	1	1.4	0.3
PN	22	7.1	12	5.1	3.9	10	13.7	3.2
NC	0	0.0	0	0.0	0.0	0	0.0	0.0
WC	9	2.9	8	3.4	2.6	1	1.4	0.3
SN	6	1.9	3	1.3	1.0	3	4.1	1.0
HI	16	10.7	14	6.0	4.5	2	2.7	0.6
WH	1	0.7	1	0.4	0.3	0	0.0	0.0
SI	0	0.0	0	0.0	0.0	0	0.0	0.0
SC	2	1.3	1	0.4	0.3	1	1.4	0.3
BN	64	42.7	48	20.4	15.6	16	21.9	5.2
OT	4	2.7	1	0.4	0.3	3	4.1	1.0
DU	2	1.3	1	0.4	0.3	1	1.4	0.3
RL	5	3.3	1	0.4	0.3	4	5.5	1.3
RD	1	0.7	1	0.4	0.3	0	0.0	0.0
MS	11	7.3	6	2.6	1.9	5	6.8	1.6
totals	150	48.5%	103	43.8%	33.2%	47	64.4%	15.1%

%H2/%A/%B: proportion of carbonized rims to total rim sample of House 2/(n=308)/ Area A (n=235)/ Area B (n=73).
%A- /%B-H2. proportion of carbonized rims in each area to total House 2 rimsherd assemblage (n=308).

south wall, where posthole preservation was poor, and where there may well have been one or more entrances.

Examining the sherds with carbon deposits in more detail, it can be seen that no major type was expressly used for either cooking or storage. Different preferences were again seen to occur between the east and west areas, Huron Incised being preferred over Pound Necked in Area A. Differential selection for cooking or storage purposes was probably on the basis of vessel size rather than stylistic attributes. Unfortunately rim diameters were not recorded in the initial analysis of the Draper ceramics, and no further study can be made of the problem at this time.

House to Site Comparisons

In the final stage of analysis, the pottery found in Structure 2 was compared with that recovered from Structure 1 and the area of the 1972 Ontario Archaeological Society excavations at the north end of the Draper site. Comparisons were also made with the results of Donaldson's and Wright's tests in the 1960's, and with Ramsden's results (see Donaldson 1962; Wright 1966, Ramsden 1968; Ramsden n.d.). The aims of this phase of the study were to determine possible differences in the ceramic assemblages of the north and south ends of the site which might be attributed to temporal variation, or which might allow inferences to be made concerning social structure within the village community.

Draper was occupied at a crucial period in Iroquois prehistory when, for reasons still largely unclear, but probably dependent to some extent upon an expanding resource base, there was a marked increase in village size. Two models of settlement growth have been proposed (see Hayden: this volume): a simple growth model, and one in which settlement increase was due to the necessity of increasing defences against some external stress. It was hypothesized that if the former were the case at Draper, there would be minimal ceramic typological variance between house structures; if the latter were true, however, more heterogeneous assemblages would be expected, reflecting the coalescence of small villages or groups, each, perhaps, with their own complex of ceramic variants.

Statistical comparisons of the samples showed some interesting differences between House 1 and 2 (Table XII). Unfortunately, the frequencies of only the seven major types in Structure 1 were available for comparison, limiting interpretations somewhat (see Ramsden n.d.). Black Necked and Huron Incised, the two predominant types on the site, both showed significant dissimilarities. In House 1, Huron Incised was much more popular than in House 2, while in the case of Black Necked the opposite was true. This is especially significant in light of Wright's observation that as Black Necked decreased in frequency through time, Huron Incised increased (Wright 1966:71). This would suggest that Structure 2 may be the earlier of the two longhouses and that future examination of the ceramic assemblages from other houses may reveal trends of ceramic

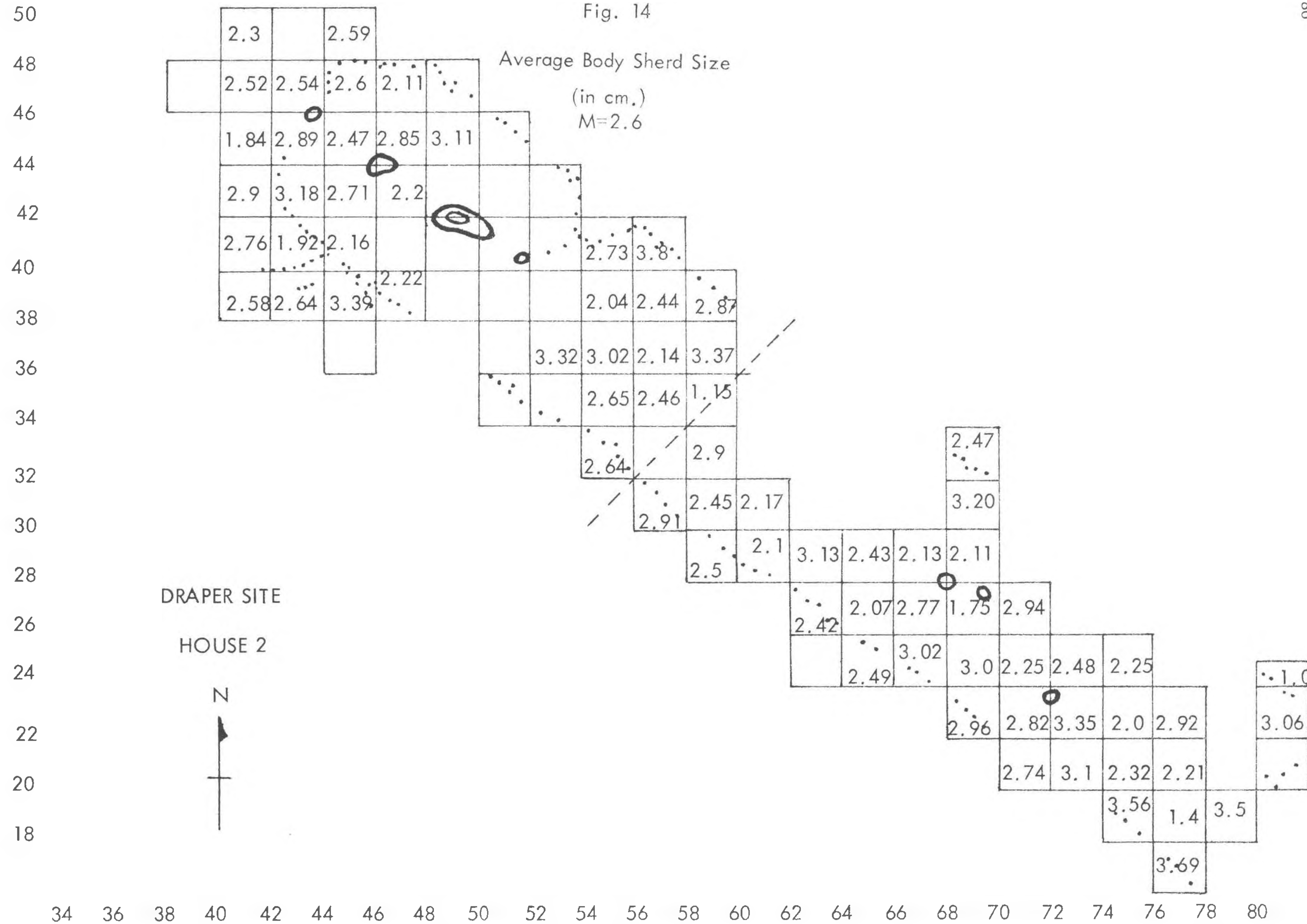


Fig. 14

Average Body Sherd Size

(in cm.)
M=2.6

Fig. 15

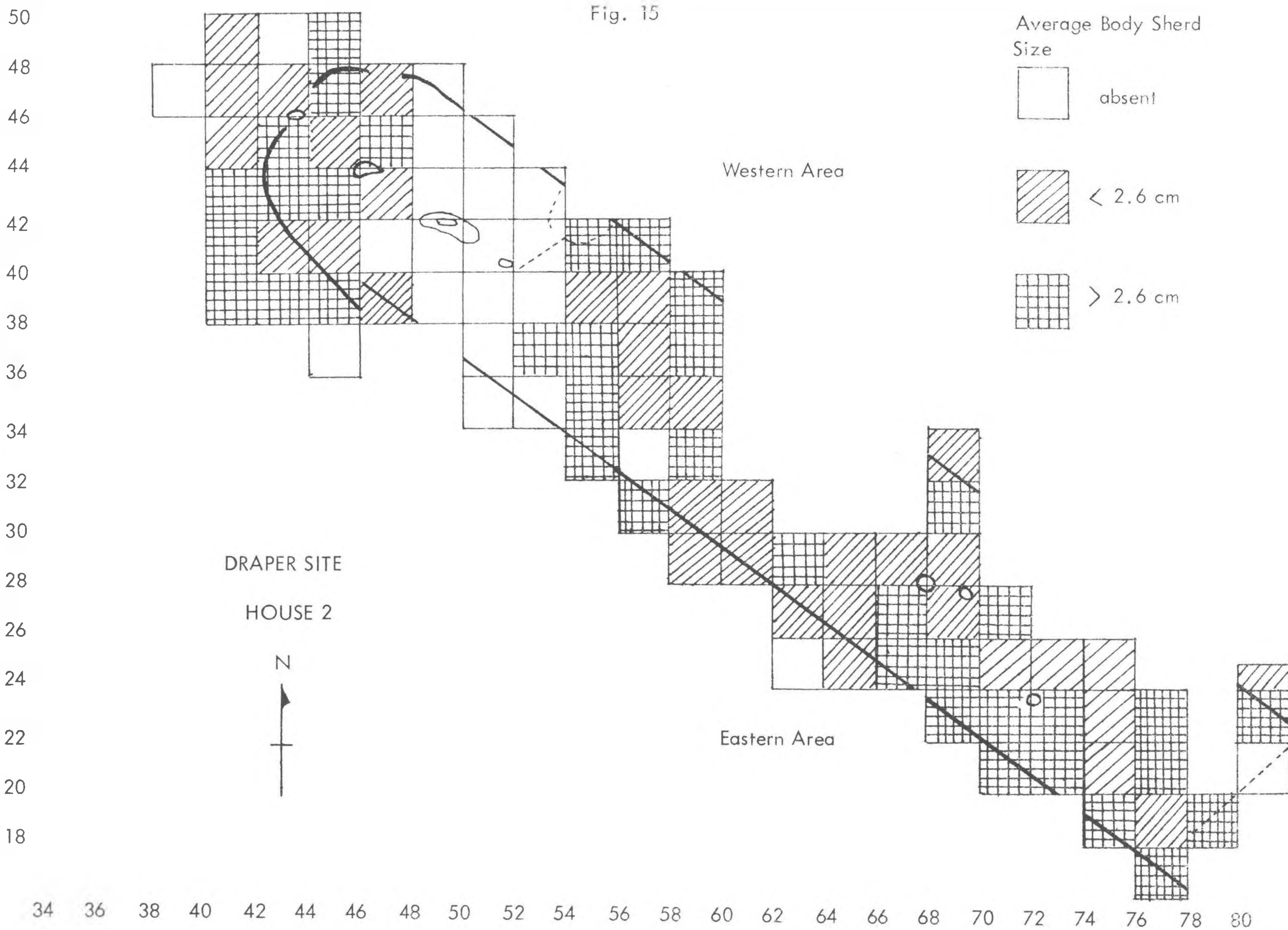

Average Body Sherd Size
absent
< 2.6 cm
> 2.6 cm
Western Area
Eastern Area
DRAPER SITE
HOUSE 2
N
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80

Table XI Comparative Frequency of Pottery Types House 1—House 2

type	House 1		House 2	
	f	%	f	%
LI	4	3.1	19	7.8
PN	3	2.3	33	13.5
WC	8	6.3	26	10.6
SN	8	6.3	12	4.9
HI	29	22.7	30	12.2
SC	1	0.8	5	2.0
BN	75	58.6	120	49.0
totals	128	100.1%	245	100.0%

Table XII CHI-Square Correlation — House 1 — House 2

type	Chi-square	p
LI	2.4	.10
PN	1.7	.10
WC	1.5	.20
SN	0.09	.75
HI	6.9	.005 (significant)
SC	0.2	.10
BN	3.1	.05 (significant)

p values calculated for Chi-2 at 1° of freedom

Table XIII Comparative Frequency of Pottery Types House 2 — Site Area Tests

type	1966		1968		1972		House 2	
	f	%	f	%	f	%	f	%
LO	16	2.0	9	1.0	6	1.4	2	0.7
LI	41	5.0	20	2.3	10	2.3	19	6.2
PN	57	7.0	33	3.7	10	2.3	33	10.7
NC	8	1.0	16	1.8	2	0.5	6	2.0
WC	114	14.0	51	5.8	42	9.7	26	8.4
SN	48	6.0	53	6.0	25	5.8	12	3.9
HI	139	17.0	103	11.7	70	16.2	30	9.7
WH	1	0.1	5	0.6	6	1.4	1	0.3
SI	8	1.0	14	1.6	2	0.5	1	0.3
SC	1	0.1	24	2.7	11	2.6	5	1.6
BN	286	35.0	319	36.2	173	40.1	120	39.0
OT	16	2.0	12	1.4	4	0.9	7	2.3
DU	0	0.0	10	1.1	0	0.0	2	0.7
RL	8	1.0	21	2.4	5	1.2	7	2.3
RD	0	0.0	3	0.3	0	0.0	3	1.0
LH	24	3.0	12	1.4	4	0.9	0	0.0
OH	16	2.0	9	1.0	2	0.5	0	0.0
SY	0	0.0	6	0.7	2	0.5	0	0.0
RP	0	0.0	1	0.1	1	0.2	0	0.0
WI	0	0.0	1	0.1	1	0.2	0	0.0
MS	33	4.0	159	18.1	55	12.7	34	11.0
totals	816	100.2%	881	100.0%	431	99.9%	308	100.1%

modified from: Wright 1966; Ramsden 1968; Ramsden n.d. (freq. in 1966 approximated from % freq.)

change through the period of occupation of the site.

Chi-square values were calculated for the types from House 2 and in the area of the 1972 excavations. Two types showed marked dissimilarities Huron Incised being more prevalent across the site than in House 2 and the opposite being true for Lawson Incised; further evidence for an early position of the house in the temporal sequence. As would be expected from widespread sampling, there were more miscellaneous types in the site sample than in the House 2 assemblage. In addition, there were potentially significant fluctuations in the frequencies of many types, and a number of minority types present at the north end of the site were absent from Structure 2. These included Lalonde High Collar, Syracuse Incised, Wagoner Incised, Ripley Plain, Middleport Oblique, and Ontario Horizontal (the latter being recognized in a midden test trench in a probable longhouse to the south of House 2, but not present in the House 2 assemblage). Rice Diagonal and Durfee Underlined, which together accounted for 1.6% of the sample, were present in House 2 but absent elsewhere (Tables XIII, XIV).

The evidence indicates that differences exist in the ceramic assemblages of different houses, some of them statistically significant, which have not been detected in the course of random testing and excavation. Coefficients of similarity calculated for the results of the present analysis compared with those of Donaldson and Wright (in Wright 1966), and Ramsden (1966; n.d.), were all considerably below Ramsden's suggested level of intra-site similarity of 150, whereas comparisons of the material

Table XIV Chi-Square Correlation House 2 — 1972 Excavations

type	Chi-square	p
LO	1.3	.20
LI	6.0	.01 (significant)
PN	0.03	.80
NC	2.5	.10
WC	0.4	.50
SN	1.4	.20
HI	6.5	.01 (significant)
WH	1.2	.25
SI	0.1	.75
SC	0.4	.50
BN	0.1	.75
OT	1.4	.20
DU	0.9	.30
RL	0.8	.30
RD	2.2	.10
LH	1.4	.20
OH	0.2	.50
SY	0.2	.50
WG	0.03	.80
MO	0.03	.80
RP	0.03	.80
MS	0.03	.80

from random and midden excavations with one another produced consistently higher values (see Ramsden n.d. and Table XV). This reinforces the probability that though testing may indicate an overall homogeneity of ceramics across the site, important variations may exist between house structures which could affect considerably the results of testing and the interpretations concerning both internal and external site relationships made from them.

Table XV Coefficients of Similarity House 2 with Previous Draper Site Excavations

	1966	1968	1972	1973 (H2)
1966	–	163	156	148
1968	163	–	169	142
1972	156	169	–	142
1973 (H2)	148	142	142	–

Sources: Wright 1966; Ramsden 1868; Ramsden n.d.

The castellation assemblage of House 2 was slightly more restricted than that of the 1972 excavations, however none of these was considered significant statistically. Differences in the frequency of castellations probably correlate with differences in pottery types. They appear to have no social or kinship affiliations.

Table XVII compares the distribution of the various pipe forms across the site. It is interesting to note that

Table XVI Comparison of Castellation Frequencies House 2 – 1972 Excavations.

type	1972		House 2	
	f	%	f	%
SL	23	40.4	22	44.9
RR	3	5.3	2	4.1
TC	5	8.8	5	10.2
PC	3	5.3	6	12.2
DP	4	7.0	4	8.2
DR	4	7.0	5	10.2
RC	6	10.5	5	10.2
N&G	5	8.8	0	0.0
NC	3	5.3	0	0.0
NH	1	1.8	0	0.0
totals	57	100.0%	49	100.0%

modified from: Ramsden n.d.

while Collared Ring was the most frequently encountered type across the site and in the area around Structure 1, it was only of third importance in Structure 2. Conversely, Elongated Ring type, most popular in House 2 , was of minimal importance elsewhere on the site, and was not found at all in the area of the OAS excavations. Of the complex of 14 styles recognized at Draper, House 2 had 9 (64.3%), and the area adjacent House 1 produced 6 (42.9%). They shared only 4 types. As can be seen in Table XVIIIb, the differences in the distribution of the two major types in Structure 2, Elongated Ring and Conical

Table XVII Comparison of Pipe Frequencies House 2 – Previous Excavations

type	1968		1972		House 2	
	f	%	f	%	f	%
CR	17	24.3	9	28.1	2	10.5
CN	1	1.4	0	0.0	3	15.8
IR	7	10.0	6	18.8	0	0.0
ER	7	10.0	0	0.0	5	26.3
CP	2	2.9	5	15.6	0	0.0
DT	0	0.0	1	3.1	1	5.3
ST	7	10.0	0	0.0	0	0.0
PT	11	15.7	3	9.4	2	10.5
TT	1	1.4	0	0.0	0	0.0
VS	1	1.4	1	3.1	1	5.3
BP	0	0.0	0	0.0	1	5.3
HE	1	1.4	0	0.0	0	0.0
EF	0	0.0	0	0.0	1	5.3
CT	0	0.0	0	0.0	2	10.5
MP	15	21.4	7	21.9	1	5.3
totals	70	99.9%	32	100.0%	19	100.1%

modified from. Ramsden

modified from: Ramsden 1968; Ramsden n.d.

Table XVIIIa Chi-square Correlation of Major Pipe Types – House 2 & 1972 Excavations

type	Chi-square	p
ER	7.5	.005 (significant)
CN	4.2	.025 (significant)
PT	0.12	.70
DT	0.13	.70
VS	0.13	.70
BP	0.07	.75
EF	0.07	.75
IR	2.5	.10
MP	0.03	.80

Table XVIIIb Chi-square Correlation of Significantly Different Types with 1968 Excavations

type	Chi-square	p
ER	2.17	.10
CN	0.05	.80

Ring, were significantly different from the area in the north of the site. Although the sample is too small to draw any but the most tentative conclusions, the indication is that real differences exist in the pipe assemblages of different houses, which may well relate to their social composition. Assuming matrilocality and rules of exogamy, for example, males entering the community through marriage alliances might be expected to bring their individual, family, or perhaps clan-related pipe style with them, accounting for both intra- and inter-house variability. If, as Trigger contends, pipes were produced for the village by a small group of artisans, it might be possible to build a case for clan or even familial stylistic affiliations (see Trigger 1969: 35). The relatively restricted range of types present supports this to a degree.

To summarize, the ceramic evidence indicates that both stylistic and temporal differentiation occurs between House 2 and other areas of the site. It is not possible with the amount of comparative data available to determine the degree to which either of these affect the artifact assemblages, nor whether they derive from within, or resulted from the influx of motif complexes belonging to peripheral groups which came together at Draper in response to some external threat. These problems crucial to the interpretation of the role of the site in prehistory will hopefully be clarified through future excavation.

Summary

The study of the ceramics on the House 2 living floor allowed the reconstruction of the basic pattern of family residence units and interpretation of aspects of social interaction within a Huron longhouse. Perhaps the greatest significance of the analysis was that it provided evidence which corroborated to a considerable extent the observations of the European explorers and missionaries who described the social organization of the Huron during the historic period. If the interpretations made here are correct, they imply, then, a significant temporal depth for the institutions of the historic period huron.

It was possible, for instance, to demonstrate utilization by 2 families of most of the hearths in the house, and the presence of at least 11, and possibly as many as 14 nuclear families, giving an approximate estimate of household size of between 45 and 70 individuals, assuming an average family size of 4 or 5 people (see Tooker 1967:40). At the extreme limit of our present potential for interpretative resolution, we can suggest the presence of two or three generations within 2 of the family groups, on the basis of their first and second order ceramic relationships, implying at least partial matrilocality (see Trigger 1969: 56). These inferences are highly tentative, and perhaps too speculative at this point. It appears that the families of the household were loosely affiliated with one another, probably along kinship lines, and perhaps at the level of the clan, considering the high degree of correlation among their ceramic assemblages (see Trigger 1969.55).

The presence of pipes in areas set aside for lithic, wood, and bone working substantiates in an archaeological context the ethnographic evidence that the manufacture of projectile points, ground stone implements, beads, wooden artifacts including bowls, bows and arrow shafts, and snowshoes, and articles fashioned from bone, was performed by the men of the house (Trigger 1969:36). It seems clear from the distribution of these activity areas that they were not related to the hearth or family, and provide strong evidence that the household functioned as a single economic unit (Trigger 1967: 41 footnote). This notion is especially substantiated by Ferguson's results (this volume) and its theoretical importance underlined by Hayden (this volume).

During the historic period, the larger villages of the Huron consisted of small groups of people, either clans or clan segments, who lived together in different sectors of the community (Trigger 1969:55). That differences in the frequencies of certain styles of pipes and pottery vessels were encountered in different excavation areas at Draper infers that the village may have been organized along basically the same lines as those visited by the Europeans in the historic period. Future excavation may reveal the presence of groups of longhouses closely related ceramically in various areas of the site from which interpretations of this type can be drawn.

It is possible, however, that some of the differences noted are the result of temporal variation in the ceramics. That House 2 appears to have been occupied earlier than the house at the north end of the site may tend to suggest that the original village was located in the southern area of the site, and that it expanded across the ravine to encompass the north plateau at some stage in its history. However, considerably more information will have to be collected concerning both individual houses and areal settlement patterns in both areas before this can be demonstrated. The analysis of the ceramics from the 1973 excavations represents at best a first approximation of the basic social and residential patterns of House 2, subject to revision and expansion as more sophisticated analytical techniques are developed, and as intra- and inter-site comparative data of equal calibre becomes available. Many questions remain unanswered, concerning the internal organization of the house and its relationship to the Draper village community, which will only be answered by the detailed, problem oriented excavation of other houses on the site. Hopefully, having demonstrated that interpretations of residential and social structure can be derived from an examination of the patternings of ceramics on a longhouse floor, this report will serve as a basis for future research into this important and long neglected aspect of Iroquois prehistory in Ontario.

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APPENDIX A

DRAPER CERAMIC ANALYSIS COMPUTER CODING FORMAT

Draper Ceramic Analysis
Computer Coding System

card column	variable code	variable identification
1– 6	SQ	excavation unit identification (in metres) north-east stake
1– 3	SQV	north–south coordinate of excavation unit
4– 6	SQH	east-west coordinate of excavation unit
7– 8	SSQ	subsquare identification number 00 not applicable 01–16 subsquare numbers (see attached sheet)
9–10	LEV	3 cm excavation level 00 not applicable 01–17 3 cm arbitrary levels
11	MAT	material identification 0 ceramic pipe 1 ceramic pot
12–13	STRID	structure identification number 01–49 middens 50–99 houses 50 House #1 51 House #2
14–16	FEATNO	feature number 000 not applicable
17	FEATYP	feature type 0 not applicable 1 hearth 2 3 burial 4 5
18	SOIL	soil horizon 0 not applicable
19	KARD	card number (if data extends to second card)
20	STYPE	sherd type

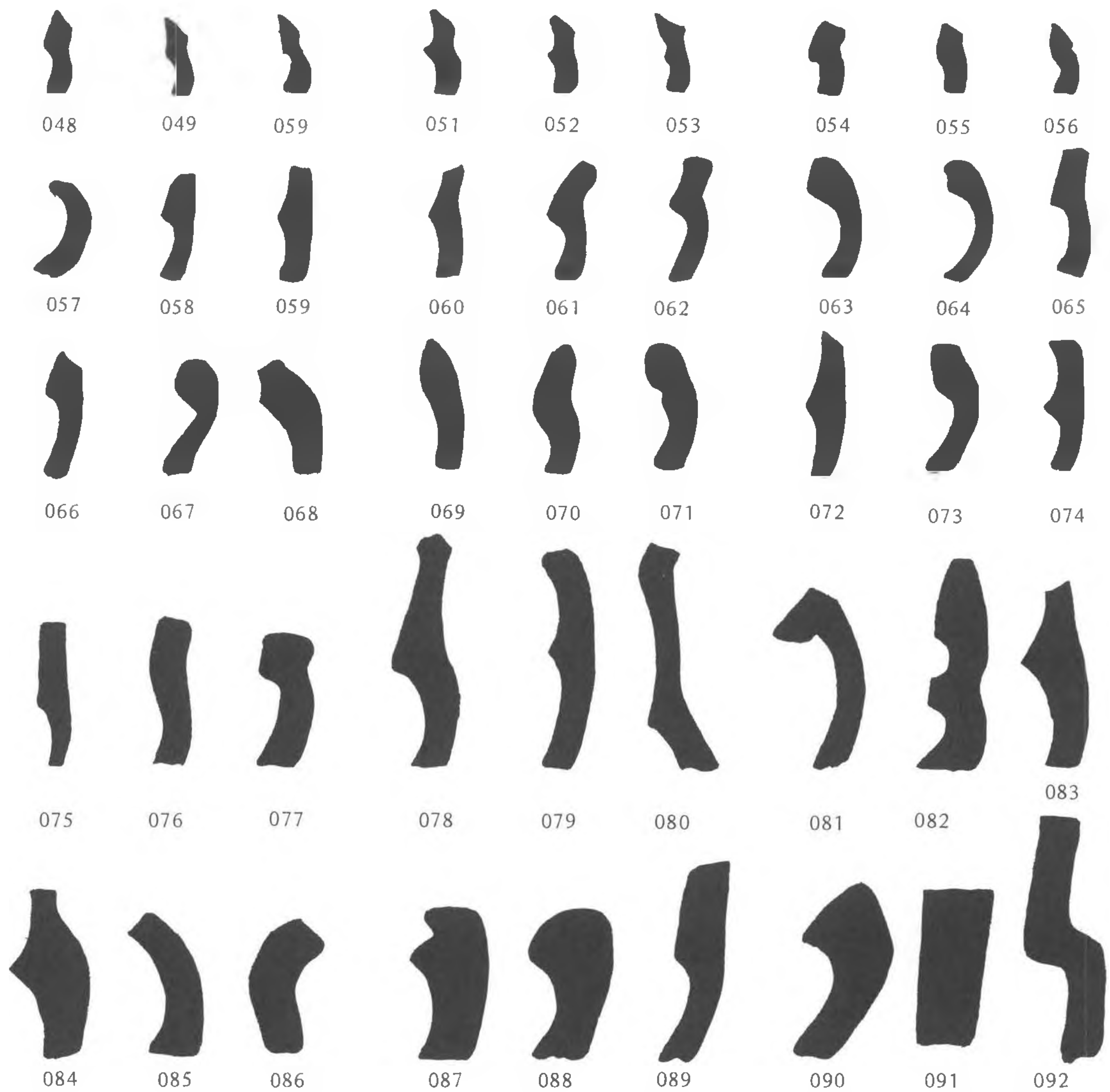
4 neck
5 neck and shoulder

card column	variable code	variable identification
†!–23	POTYPE	pottery type (after MacNeish) 000 unanalyzable for type
	LO	001 Lawson Opposed
	LI	002 Lawson Incised
	PN	003 Pound Necked
	NC	015 Niagara Collared
	WC	018 Warminster Crossed
	SN	019 Sidey Notched
	HI	020 Huron Incised
	WH	021 Warminster Horizontal
	SI	022 Seed Incised
	SC	024 Sidey Crossed
	BN	025 Black Necked
	OT	041 Onondaga Triangular
	DU	042 Durfee Underlined
	RL	043 Roebuck Low Collar
	RD	049 Rice Diagonal
	MS	058 Miscellaneous (includes Draper Group 1 & 2)
24–26	RIMPRO	rim profile 000 not applicable 001 unanalyzable 002 miscellaneous 003–092 see attached sheet
27–29	COLMOT	external collar motif 000 not applicable 001 unanalyzable 002 miscellaneous 003 undecorated 004–045 see attached sheet
30–31	NKMOT	external neck motif 00 not applicable 01 unanalyzable 02 miscellaneous 03 undecorated 04–20 see attached sheet
32–33	LIPMOT	lip motif 00 not applicable 01 unanalyzable 02 undecorated 03–08 see attached sheet
34–35	INMOT	interior rim motif 00 not applicable 01 unanalyzable 02 undecorated 03 –08 see attached sheet
36–37	CASTYP	castellation type 00 not applicable 01 unanalyzable 02 no castellation 03 untyped miscellaneous 04–10 see attached sheet
38	INCARB	interior carbon deposit 0 not applicable 1 unanalyable 2 absent

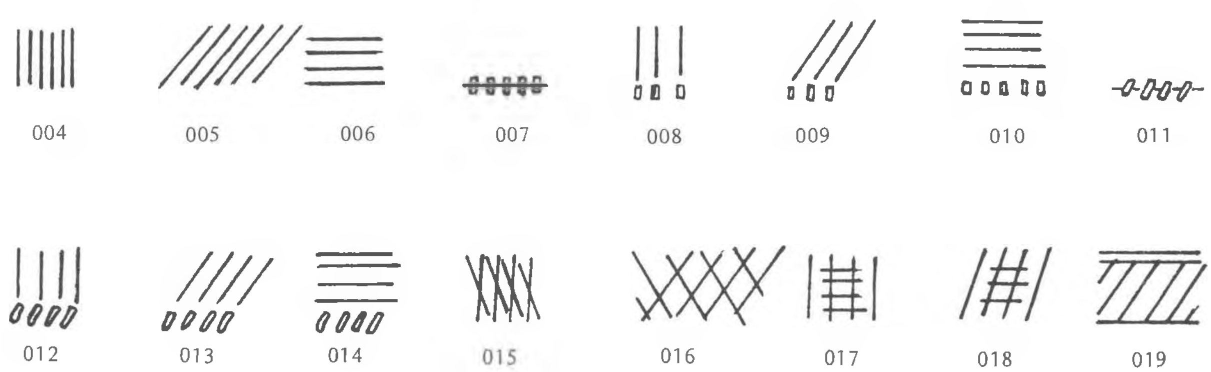
card column	variable code	variable identification
39–40	SHMOT	shoulder motif 00 not applicable 01 unanalyzable 02 undecorated 03 miscellaneous 04–06 see attached sheet

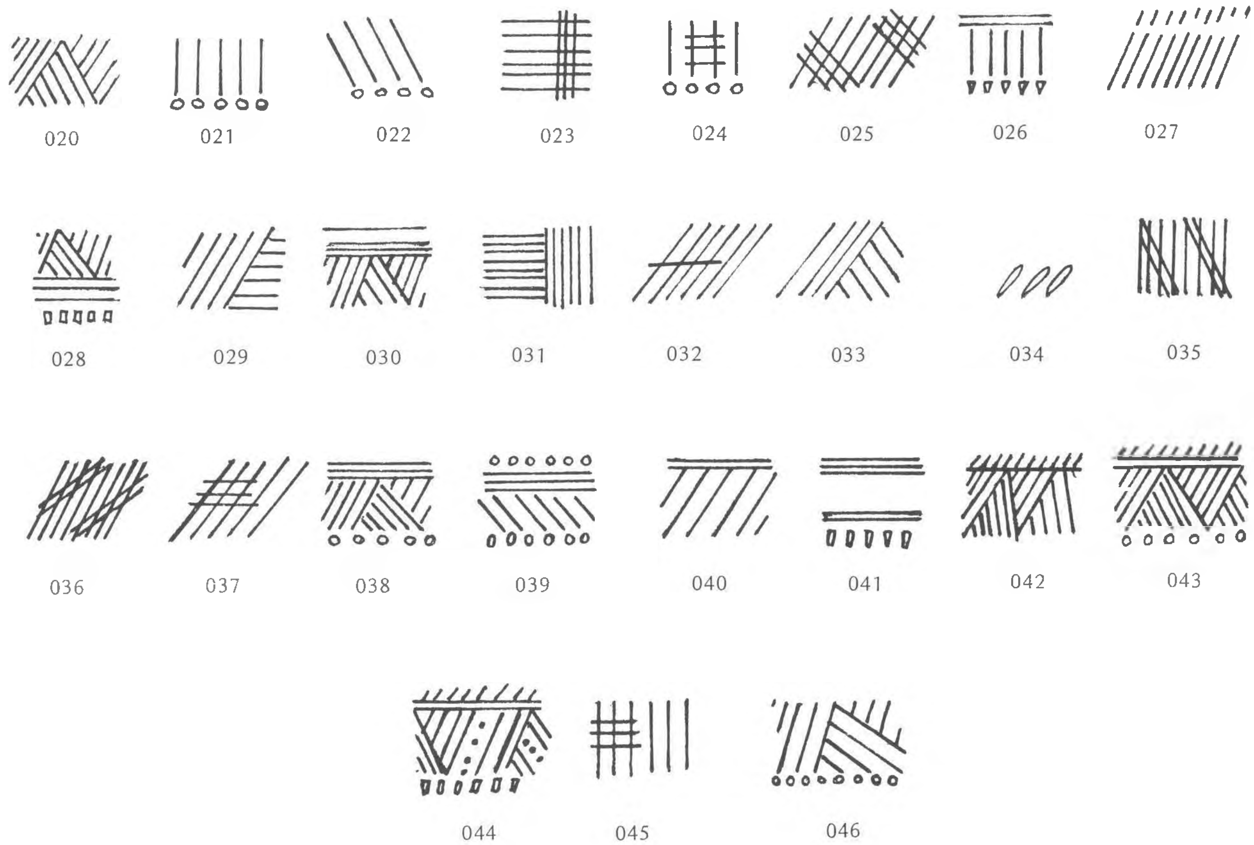
card column	variable code	variable identification
41–42	SHPRO	shoulder profile 00 not applicable 02 unanalyzable 02 miscellaneous 03–05 see attached sheet
43	BODSUR	body surface 0 not applicable 1 unanalyzable 2 miscellaneous 3 smooth and plain 4 smooth and decorated 5 textured
44–45	COLHT	collar height (in mm) 00 unanalyzable
46–47	COLTH	collar thickness (in mm) 00 unanalyzable
48–49	EXCR	colour, exterior surface 00 unanalyzable 01 miscellaneous 02 brown 03 black 04 orange 05 grey-black 06 orange-brown 07 grey 08 tan 09 grey-orange 10 brown-black 11 white 12 black-orange 13 exterior carbon deposit
50–51	INCR	colour, interior surface same criteria as above
52–54	RIMDIA	rim sherd diameter 00 not applicable 01 unanalyzable

Rim Profile

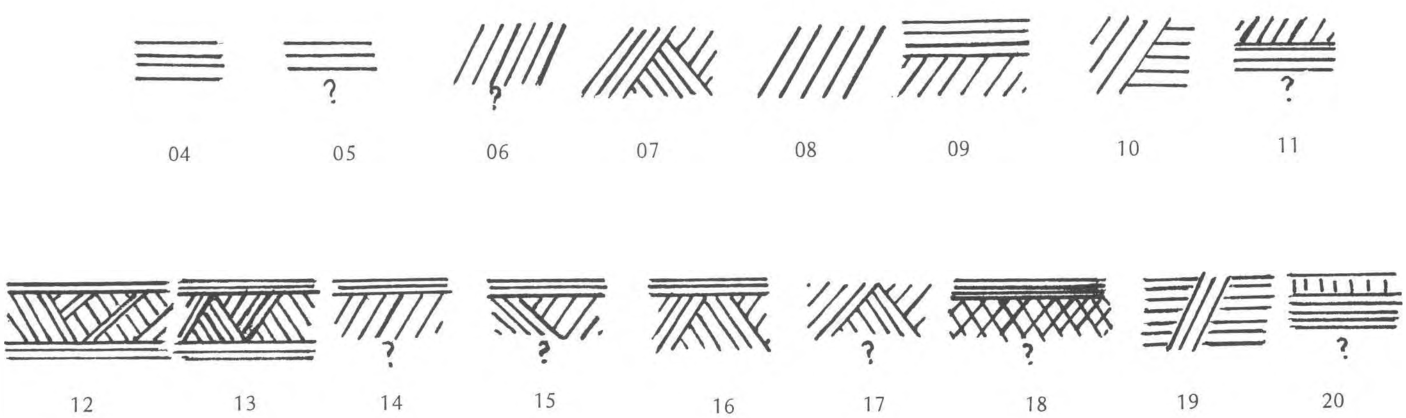


Collar Motif





Neck Motif



Lip Motif

Interior Motif

03 04 05 06 07 08

Shoulder Motif

04 05 06

Shoulder Profile

03 04 05

Castellation Type

rolled

04 05 06 07

08 09 10

Lithic and Bone Tools of the Draper Site (Structure 2) and the White Site

THERESA FERGUSON

DRAPER: LITHIC ANALYSIS

Artifactual lithic material from Structure II and the associated middens of the Draper site totalled 507 pieces and fire-cracked rock totalled 517 pieces. Chert was the predominant raw material and formed 76.2% (n=388) of the artifact assemblage; schist 17.3% (n=88); limestone 1.3% (n=7); granite 2.1% (n=12); quartz 1.5% (n=8) and slate .8% (n=4).

Nodules of chert in a limestone matrix are very common in the glacial deposits of the area (Chapman and Putnam 1966:121). What has been described in this report as chert often contains considerable limestone. The occasional piece of chalcedony is also included in this category. The chert is dark grey with the exception of several buff pieces, one red-and-buff piece and a banded dark grey and buff chert. None of these pieces are worked. Quartz is also present in the local deposits but is less common than the chert. One piece of quartzite is included in this category. A greenish black schist was utilized for the ground adzes/celts. Other groundstone artifacts were made from limestone and a granitic material which are common in the area. A very shaly slate which was utilized to make a bead also has a local origin (Chapman and Putnam 1966:121).

Of the lithic material that is worked (n=196), chert forms 69.8% (n=137); schist 20.9% (n=41); granitic 3.5% (n=7), limestone 3.5% (n=7); quartz 1.5% (n=3), and slate .5% (n=1). The differences between these percentages and those for the entire lithic assemblage reflect the smaller amounts of schist, granite and limestone debitage in comparison to worked pieces. None of the groundstone technologies are as waste-producing in their nature as chert flaking, but this difference might also reflect a practice of bringing schist preforms to the village rather than large schist slabs.

Technology

Two chipped stone flaking techniques appear to be present at the site as represented by two core types — the block core and the bipolar core. These are quantified in Tables I and II for attributes of

a) type — block
bipolar variety 1. ridge-area 2. point-area 3. ridge-point 4. opposing ridge 5. right-angled ridge 6. opposing point
b) maximum length (mm)
c) maximum width (mm)
d) maximum thickness (mm)
e) maximum length of flake scars (mm)
f) type of flaking 1. unifacial 2. bifacial

Both the block and bipolar cores are small and irregular in shape and both were solely of chert.

The block core is a block or cobble from which flakes of a size suitable for later use as blanks for artifacts have been detached. The technique associated with this core form is free-flaking as described by Witthoft (1957).

The bipolar core technique as defined by Binford and Quimby (1963) results in a small core characterized by a ridge of percussion and an opposing zone of percussion which also displays flaking/battering caused by the core's

Table I Block Cores: N=28

Group	#	Max. Length		Max. Width		Max. Thickness		Max. # Fl. Scar		Uni/Bif		Raw Material	
		m	r	m	r	m	r	m	r	type	%	type	%
Unretouched	20	25.7	10-46	20.4	9-40	13.5	2-20	13.5	7-20	1.	80	chert	100
										2.	20		
Retouched	7	26	15-40	22	14-36	8.8	6-14	12.7	5-24	1.	100	chert	100
Utilized	1		30		10		10		26	1.		chert	

m = mean
r = range

Table II Bipolar Cores: N=30

Type	#	Group	Max. Length		Max. Width		Max. Thick.		Max. No. Flak. Score		Flaking		Type	%
			m	r	m	r	m	r	m	r	Type	%	Type	%
1	5	Unret.	25.2	23-32	20	14-31	7.5	6-11	14.5	10-26	unif bif	40 60	Chert	100
3	3	Unret.	21	20-23	11.3	9-15	5	4-7	10.3	10-11	unif bif	33 66	Chert	100
4	8	Unret.	20.1	15-28	20	12-15	7	4-10	11.5	3-13	bif unif	37 63	Chert	100
5	1	Unret.		30		20		8		10	bif	100	Chert	100
Total	17	Unret.	22.5	15-32	17.7	9-31	7	4-11	12.1	3-26	unif bif	35.3 64.7	Chert	100
1	1	Utilized		40		42		22		30	bif	100	Chert	100
3	3	Utilized	20	16-22	14.6	11-21	6.6	4-11	10	9-12	unif bif	66 33	Chert	100
Total	4	Utilized	27.5	16-40	21.5	11-42	10.2	4-22	15	9-30	unif bif	50 50	Chert	100
1	3	Retouched	20	15-23	19	10-23	6	8-7	13	10-16	unif bif	33 66	Chert	100
3	2	Retouched	22	14-30	11	8-14	5	3-7	19	13-25	unif	100	Chert	100
4	4	Retouched	26.2	24-35	20	12-26	7	4-10	17.5	11-24	unif bif	50 50	Chert	100
Total	9	Retouched	24	15-35	16.6	8-26	6.1	4-10	16.3	10-25	unif bif	55 45	Chert	100

m = mean
r = range

placement on an anvil. The bipolar technique is usually considered to be an adaptation to the form in which the raw material occurs naturally. The waterworn chert pebbles found in the glacial deposits of the Great Lakes area are too small to be held in the hand and free-flaked. Admittedly the bipolar technique is not observed in the other raw materials but the block cores, which should therefore be much larger, do not differ greatly in length and width as can be seen in the means and ranges listed in Tables I and II. The small variation in thickness between these two core types is due to the greater frequency of bifacial working on the bipolar cores as well as the inclusion within the sample of ten split bipolar cores.

Six bipolar core varieties are defined by Binford and Quimby (1963) on the basis of type of percussion zones at either end of the core and could quite possibly represent different stages of flake production or even manufacturing accidents. Of the six varieties, the sample does not seem to contain the point-area or the opposing point varieties. In the Maurice site sample (Fox 1971:138) the point-area and the ridge-area varieties are not represented. MacPherron (1967) only recognizes two bipolar core varieties in the Juntunen material – cylindrical and flat. He considers opposed point cores to be possible exhausted cylindrical cores and opposed ridge cores to be worn flat cores. In the Draper sample the opposed ridge variety accounts for 40% of the cores. The other varieties are represented as follows: ridge-area 30%, ridge-point 27%, and right-angled ridge 3%.

In terms of size variability within and between these core varieties, examination of the means and ranges listed in Table II reveals that the ridge-area and opposing ridge variety exhibit both the greatest similarity in means and the most variability in range. The ridge-point variety displays a consistently smaller mean and with one exception, smaller ranges. This variety could thus reflect either a technology of dealing with the smallest cores *or* a later stage in the flaking process.

Another problem in the identification of the bipolar technique is the dilemma as to whether the cores do represent cores from the manufacture of artifact blanks or whether they are pieces de esquillées i.e. core tools. This is particularly emphasized in our sample where the bipolar cores and even the block cores are very small and the total core-debitage ratio is 1:3.4. This in addition to the fact that 30% of the bipolar cores are retouched and 7% utilized, while 25% of the block cores are retouched and 3.5% utilized, strongly indicates that raw material was scarce and that cores were regularly used as tools (Table III). Of the flakes (n=63) that were identified as definitely being produced by the bipolar technique, 33% (n=21) were retouched and 24% (n=14) were utilized, thus indicating that the flaking of the bipolar core could not have been designed solely to produce a core tool. It is interesting to note the presence of some retouched flakes in the sample, the size of which would suggest detachment from larger cores than those found at the site. These may have been detached from block cores in the initial stages of exploitation, or imported.

MacPherron (1967:142) has furthermore suggested that his opposed ridge bipolar cores were created as a gouged-end artifact. This interpretation is based upon the observation that "at one or both ends a kind of chopping-in fine, abrupt multiple hinge-fractures has produced a hollowed out or dished area in the flat face of the piece, so that the ridge forming the end of the piece presents a formal similarity to the cutting edge of a wood gouge". Only 13% (n=14) of the Draper bipolar cores exhibited such a dished area although most of course exhibited the nibbling on the

Table III Bipolar Cores – Marginally Retouched

Type	#	Reworking		Face of Ret.		Ext. of Ret.		Distribution of Ret.		Angle wrkg edge		Length wrkg edge		Width wrkg edge		Thick. wrkg edge		Utilization	
		f	%	Type	%	Type	%	Type	%	Type	%	m	r	m	r	m	r	f	%
1	3			1	100	1	33	non-cnvrg	100	1	33	12	5-20	2	1-3	2	1-3	2	67
						2	67			3	67								
3	2			1	100	1 2	50 50	"	100	1 2	50 ¯0	10	7-13	1	1	1	1		
4	4			1	100	1 2	25 75	"	100	1 2	25 75	17	14-24	2	1-2	2	1-2	2	50
Block Cores – Marginally Retouched																			
	7			1	100	1 2	28 72	cnvrg non-cnvrg	14 86	1 2 3	42 29 29	17.7	5-34	1.5	1-4	1.5	1-4		

m = mean
r = range
f = frequency

polar areas which could easily have been produced by either the bipolar process or by utilization.

One last comment that should be made about the bipolar cores is the presence of ten core fragments which form 33% of the bipolar core sample. MacPherron (1967: 138) notes that these overlap formally with bipolar flakes. The distinguishing feature which the Draper split cores possess are the presence of a genuine cone of percussion and/or the marked concentric ripples on the ventral face.

In summary, the high ratio of cores of both types to debitage, the high percentage of retouched/utilized cores of both types and the relatively small size of the cores indicating exhaustion would suggest that both were regarded as valuable, potential tools. The number of retouched/-utilized flakes derived from these indicates that this was not the sole usage of the core, but a secondary one after its flaking potential had been exhausted.

Debitage

The debitage consisted of chert (n=197); schist (n=45); granitic rock (n=5) quartz (n=4), and slate (n=3). These were measured for maximum length, width and thickness as quantified in Table IV. Five flake groups are defined 1. decortication 2. blocky 3. flat 4. secondary shatter and 5. bipolar flakes.

Table IV Debitage

Raw Material	Flake Type	#	Max. Length		Max. Width		Max.Thickness	
			m	r	m	r	m	r
Chert	1	22	15.9	13-37	13.7	10-23	6.1	2-17
	2	50	20.1	10-30	11.7	5-30	5.8	4-18
	3	4	12	7-20	10	7-17	1.5	1-2
		5	19	13-32	15	10-21	2.6	2-4
		6	14	12-17	14	13-16	3	2-4
	4	81	15.6	7-42	9.3	1-20	2.9	1-10
	5	29	17.4	7-30	12.2	6-25	3.9	1-12
Schist	2	16	33.3	17-57	16.2	10-24	5.8	3-10
	3	29	25.8	12-43	13.6	7-25	3	2-5
Quartz	2	4	27.3	20-40	17	7-23	7.4	3-17
Slate	2	3	25	15-35	15	10-30	7	6-10
Granitic	I	5	23.6	16-35	14	18-25	9	6-17

m = mean
r = range

The fifth group is comprised of those flakes (n=29) which can be definitely identified as resulting from the bipolar process. This flake exhibits a crushed ridge of percussion rather than a definite striking platform and also displays the scars of bipolar working on the outer faces. This is not to say that none of the other four flake groups could not also have resulted from the bipolar technique but merely that those groups could be common to both techniques.

The first group, decortication flakes were those flakes removed from the exterior of the nodule and therefore consist partially of cortex. All the granitic debitage is classified thus. Since the chert is at times so mixed with its matrix, limestone, identification of decortication flakes (n=22) on the basis of degree of limestone present is to a great extent arbitrary. Also those chert flakes which exhibit weathered/eroded exterior surface were considered to be decortication flakes.

The second group consists of blocky flakes, which are thick, heavy and irregularly shaped with no striking platform or bulb of percussion. This constitutes the second largest of the chert flake groups (n=50). According to Binford and Quimby (1963:286) such flakes are primary shatter resulting from the initial shaping of the core. Of the other raw materials, all of the slate and quartz debitage are classified thus as well as 16 flakes of the schist debitage. Because of the flaking properties of schist the technological implication made by Binford and Quimby could not be applied, but these flakes do correspond to the description of blocky flakes given by Binford and Quimby and repeated here in the first sentence of this paragraph.

The third group contains flat flakes which display both striking platforms and bulbs of percussion. Only 15 such flakes are present in the chert sample. Four appear to be billet (soft hammer) produced thinning flakes from bifaces with small, but in comparison to the bipolar flakes, well-defined striking platforms, expanding edges and an acute angle between the striking platform and the exterior surface of the flake. There is only one biface specimen in the sample from Draper which is described later. The other 11 flakes have been tentatively defined as softhammer (n=6) and hardhammer flakes (n=5). A distinction is often drawn between the two types based solely on the presence of a lip in the former case and the absence of a lip in the latter. Such a statement is probably best interpreted as probabilistic and a sample of 11 flakes is not large enough to state whether the presence or absence of a lip corresponds to other features associated with soft or hard hammer techniques. Our distinction is thus based on the presence or absence of a lip and there is a tendency for the latter trait to be associated with a prominent bulb of percussion or crushing at the point of percussion, considered typical of the hard hammer technique, but this association does not always occur. Of the schist debitage in this category, flakes exhibiting only striking platforms occur. The flaking properties do not seem to be such as to give a bulb of percussion. Of these 29 flakes, 4 display a certain degree of grinding on the lateral edge.

The fourth group (n=81) consists of chert flake fragments exhibiting neither striking platform nor bulb of percussion. It has been noted that the bipolar technique results in a large amount of such secondary shatter.

Marginally Retouched Material

Marginally retouched material totals 92 pieces, of which 71 are unifacially retouched flakes classified as scrapers; 9 are unifacially retouched block cores; 9 are unifacially retouched bipolar cores; 1 is a bifacially worked flake interpreted as a knife and 2 are bifacially retouched flakes which are morphologically projectile points but since the retouch is only marginal, they may be interpreted as knives.

The following attributes were measured (in mms) or noted for each group in Tables III, V, and VI.

a) type — scrapers 1. end 2. side 3. end and side
cores — block
— bipolar variety 1. ridge-area 2. point-area 3. ridge-point 4. opposing ridge 5. right-angled ridge 6. opposing point
— knives 1. flake 2. projectile point variety
b) number
c) maximum length
d) maximum width
f) reworking — presence/absence
g) use wear 1. striations 2. gloss 3. grind

e) maximum thickness
f) reworking — presence/absence
g) use wear 1. striations 2. gloss 3. grinding 4. edge-battering 5. flaking 6. combined 1 and 4
h) face retouch 1. unifacial 2. bifacial
i) extent of retouch 1. partial 2. continuous unilateral 3. continuous bilateral
j) distribution of retouch on tool edges 1. convergent 2. non-convergent 3. semiconvergent
k) angle of working edge 1. $<40^{\circ}$ 2. 40°–65° 3. $>66^{\circ}$.
l) length of working edge
m) width of working edge
n) thickness of working edge
o) flake type 1. decortication 2. block 3. flat 4. secondary shatter 5. bipolar
p) utilization — i.e. present or absent
q) raw material 1. chert 2. quartz

The division of the angles of the working edge into three groups is an attempt to relate working edge angle and function as suggested by Wilmsen (1968). He suggests that the low angles of Group 1 are indicative of a function of whittling or cutting; the medium angles of Group 2 related to skinning, hidescraping, shredding and heavy cutting; and the high angles of Group 3 indicating use in boneworking, heavy shredding and skin softening. On an inter-group level the retouched artifacts seem to be distributed evenly in terms of the working edge angle. This is particularly interesting in view of the question of function of bipolar cores. Those that are retouched are not significantly associated with the high angle of working edge which is hypothetically related to boneworking, etc.

Within the scraper group (Table V) it can be observed that a high percentage of the endscrapers display low angles of the working edge. The association between end-and-side scrapers and block flakes accounts for the consistently larger means of length, width and thickness of both the working edge and the scraper itself.

The knives, defined as such on the basis of bifacial marginal retouch will be the only artifacts examined in detail from this category (Fig. 1). The first knife, a decortication flake, exhibits retouch along one edge, extending 1 cm inward on the face. Evident on one of the faces is a flake scar possibly derived from striking off an irregularity. Similar attention to regularity is observed in the removal of the bulb of percussion on some of the larger scrapers. The second, a projectile point variety knife, is a flake worked to a triangular shape. The dorsal side exhibits both flaking and a ridge. A flake scar on this dorsal side represents an abortive attempt to either remove the ridge or to work the face down from the ridge as is evident on the face near the tip of the object. This specimen also exhibits continuous retouch on its ventral side on both lateral edges. The third knife, also of the projectile point variety, is similarly worked to a triangular shape and displays continuous percussion flaking on one side and what would appear to be both percussion and pressure flaking on the other side. None of these projectile point variety knives is modified basally or notched. Attributes are given in Table VI.

Utilized Flakes

These are quantified in Table VII for length, width and thickness. Utilization is defined on the basis of one or more shallow irregular hinge fractures restricted to the flake edge and one face adjacent to the edge. Flaking was the only wear pattern observed and as one might expect, blocky flakes which would not have thin, sharp or fragile edges are in a minority.

Table V Scrapers

Type	#	Max. Length		Max. Width		Max. Thick.		Re-working		Use Wear		Face of Ret.		Ext. of Ret.		Dis. of Retouch	
		m	r	m	r	m	r	f	%	Type	%	Type	%	Type	%	Type	%
1 (end)	7	24.1	10 37	21	12-27	6	1-10	—	—	5	28.5	unif	100	1	28.5	non	
														2	71.5	cnvrg	100
2 (side)	55	25.5	16-76	16.5	7-35	4.5	1-16	—	—	2	4.1	unif	100	1	33.3	"	100
										4	6.2			2	54.1		
										5	37.9			3	13.6		
3 (end) & (side)	9	28.3	20-45	25.3	12-42	6.7	4-12	1	11	1	11	unif	100	3	100	"	100
										5	33						

m = mean
r = range
f = frequency

Angle working edge		Length working edge		Width working edge		Thickness working edge		Flake Type		Tuilization		Raw Material	
Type	%	m	r	m	r	m	r	Type	%	f	%	Type	%
1	85.7	19	6-30	1.8	1-4	1.7	1-3	2	42.8	2	28.5	chert	85.7
2	0							4	28.5			quartz	14.3
3	14.3							5	28.5				
1	34	18.1	6-50	1.5	1-4	1.5	1-4	1	9	1	1.8	chert	98.2
2	41							2	29			quartz	1.8
3	25							3	18				
								4	16				
								5	27				
1	22.2	35	17-57	2 5	1-7	2.5	1-7	1	11			chert	100
2	55.6							2	55				
3	22.2							3	22				
								4	11				

m = mean
r = range
f = frequency

Bifacially Flaked Material

Ovate Biface

This artifact (Fig. 1) is formed from a large flake with expanding sides. The raw material is half grey chert and half limestone. No striking platform remains. The artifact is complete and measures 55 mm long, 45 mm wide at the point of maximum width which is near the distal edge and 11 mm thick at the same point which is also the point of maximum width.

Projectile Points

As well as the 2 knives of the projectile point variety discussed previously, there are 6 other projectile points

Table VI Knives

Type	#	Max. Length		Max Width		Max. Thick.		Reworking		Use Wear		Face of Ret.		Ext. of Ret.		Distribu. of Ret.	
		m	r	m	r	m	r	f	T	Type	%	Type	%	Type	%	Type	%
1	1		25		24		5			5	100	2	100	2		non-cnvrg.	
2	2	29	23-35	13	13	4.5	4-5	—	—		—	2	100	1	50	"	100
														3	50		

Angle Working Edge		Length Working Edge		Width Working Edge		Thickness Working Edge		Flake Type		Utilization		Raw Material	
Type	%	m	r	m	r	m	r	Type	%	f	%	Type	%
2	100		19		4		4	1	100	—	—	Chert	100
2	100	36	32-40	30	20-40	2.5	2-3	—	—	—	—	Chert	100

m = mean
r = range
f = frequency

from the 1973 excavation providing a fair degree of heterogeneity in the sample (Fig. 2). Since only one projectile point was found in the 1972 excavation of Structure I (Fig. 14) no style comparison is possible with such an inadequate sample. The 1973 points are discussed by catalogue number below.

N34E44-2-3 is triangular in outline and biconvex in cross-section. It is made from a dark grey chert with inclusions of white chert and limestone. It measures 25 mm from the tip to the base, 17 mm wide at the base and 3 mm thick at the point of maximum thickness which is halfway between the base and the tip. Both faces exhibit bifacial and a fine marginal retouch. The base is thinned slightly and is concave. The tip appears to be blunted.

N46E42-6-4 is a long point lanceolate in outline and biconvex on cross-section. The raw material is a dark grey chert with white chert inclusions. From base to a broken-off tip, it measures 46 mm long. A projection of the lateral edges would give a length of 54 mm. The base is 14 mm wide and the area of a maximum thickness is 5 mm at the central axis. Bifacial flaking extends from the edge to the central axis and there is a fine marginal retouch. The base is straight and slightly thinned.

N40E48-11-6 is a basal fragment of a shouldered Archaic point made of a pinkish siliceous material unique on this site. The point has been broken off above one shoulder and another oblique fracture has snapped off the other shoulder, however the fragment appears similar to one from the Indian Knoll focus (Griffin 1952:29-g). The base is concave with a width of 15 mm. Ramsden (1968:18) notes two other Archaic points found on this site but neither description indicates a stylistic similarity to this point.

The three remaining points are sidenotched. Specimen N26E76 from Post Mold 7, within Structure II, is long and lanceolate in outline with a plano-convex cross-section. It is made from a dark grey chert and the base appears to be almost totally limestone. The point measures 40 mm in length, 14 mm in width at the base, and 4 mm thick at the point of maximum thickness which happens to be at the ridge between the two notches. On the convex face bifacial retouch is evident from a central ridge to the margins which are also modified by fine retouch. On the plane face there appears to be only marginal retouch. The base is straight

Table VII Utilized Flakes

Flake Type	#	Max. Length		Max. Width		Max. Thickness		Material	
		m	r	m	r	m	r	type	%
2	11	26.5	21-40	20	16-32	7.7	3-12	chert	100
3	19	21.9	11-35	16.3	10-30	4.5	2-10	chert / quartz	95
4	10	16.8	10-21	11.8	7-16	3.5	2-6	chert	100
5	14	24	14-38	16.3	7-22	5	2-10	chert	100

m = mean
r = range

Fig. 1 Biface and knives: Draper 1973. Top left, flake knife; middle and right, projectile point variety knives; bottom, biface.

and appears to be slightly retouched on the convex face. The notch extends from 10–14 mm from the base and is 2 mm wide.

On the two other sidenotched points, the notches are situated more than halfway towards the tip. The tip itself is fairly thick. These two are interpreted as possible drills. Wear pattern consisted mostly of battering along the edges. Both exhibit bifacial and marginal retouch although the latter is not continuous.

N24E72-4-3 is triangular in outline and biconvex in cross-section. It is made of medium grey chert with inclusions of white chert. It measures 31 mm long, 13 mm wide at the base and 3 mm at the point of maximum thickness which is 2 mm from the tip. The notches are roughly formed and extend from 13–19 mm from the base and are 2 mm wide. An irregularity has been left untrimmed from one of the faces. The base is straight and is thinned.

N24E76-13-8 is a longer point of dark grey chert more lanceolate in outline and biconvex in cross-section. It measures 30 mm in length, 15 mm wide at the base and 4 mm thick at the point between the two notches. Again the tip is fairly thick measuring 2.5 mm. The notches are flaked on alternate faces, one extending from 17–23 mm from the base and the other from 20–25 mm from the base.

Ground Material

Adzes/Celts

Initially an attempt was made to distinguish between adzes and celts on the basis of size but an examination of the complete measurements soon established that there is in fact a continuum. Neither does cross-section prove useful for in all cases it is biconvex. Table VIII summarizes the attributes of width, length thickness, presence/absence of use wear and cross-section. The sample also contains four preforms (Figs. 3, 4), the measurements of which are quantified in Table IX. The smallest one listed, although a fragment, is roughly shaped in a manner so as to suggest a preform. Of the other three complete preforms, one is already partially shaped at the working end. This specimen does not exhibit any grinding. The other two preforms which are not shaped at all at the working end are ground on their lateral edge.

The remaining ground schist fragments have been quantified in Table X. These are presumably adze/celt fragments.

Manos/Grinding Stones

The manos are quantified in Table XI for length, width, thickness and presence/absence of wear patterns. One grinding surface was examined for vegetal remains but none were

Fig. 2 Projectile Points: Draper 1973. Top, sidenotched specimens; bottom left, triangular; middle, lanceolate; right, shoulder fragment of Archaic point.

Table VIII Adzes/Celts

Length	Width	Thickness	Use Wear	Cross Section
120 c	47 c	30 c	edge battering	bi-convex
107	22	11		
30	36	6		
104	32 c	20	striation	
63	27 c	14 c		
61	50 c	13		
31	30 c	3		
20	46	5		
67	30	10		
66	40	10	striation	
37	33	10		
57	24	40	edge battering & striation	bi-convex
110	27	20		
70	44	13		
105	60 c	12		
86 c	25 c	15 c		bi-convex
92 c	38 c	20 c	edge battering	bi-convex
50	21 c	7		
22	24 c	20 c		bi-convex
30	23 c	5		
60	25 c	13		

c = measurement of complete specimen

Fig. 3 Celt-adzes Draper 1973. Top, adze/celt complete; bottom, adze/celt preform.

Table IX Adze/Celt Preforms

Length	Width	Thickness	Grinding
50	32	15	–
140	48	35	–
155	55	40	present
125	56	40	present

Fig. 4 Draper 1973. Adze/celt preform.

observed. Three ground stone pieces are large enough to have been part of a metate but no depression was noted to suggest that function. These are included in Table X with the rest of the ground stone fragments. Measurements of complete specimens are followed by a "C".

Beads

Three ground beads are present in the sample (Fig. 5). The first, a highly polished bead of greenish chalcedony, measured 14 mm in diameter and the perforation measured 4 mm. A second one of some granitic material possessed no performation and measured 13 mm in diameter. A third bead was made from a polished ground slate. It measured 25 mm in diameter. The performation measured 4 mm in diameter and around it was visible a wear groove of a width to indicate something with a blunt edge such as a thong.

Table X Ground Material – Unidentifiable Fragments

Type	#	Max. Length		Max. Width		Max. Thickness		Use Wear	
		m	r	m	r	m	r	Type	%
Ground Schist	18	36	13-58	15.9	3-25	7.2	4-11	1	11
Ground Metam/-Sed. Rock	10	84.5	44-180	62.6	22-110	30.2	23-54	1	50

Table XI Manos

Length	Width	Thickness	Use Wear
90c	48 c	32 c	striations
40	35	41 c	
61	106 c	37 c	
74 c	70 c	60 c	striations
140	87	51	
102	84	34	
85	85	33	
105 c	105 c	35 c	

Table XII Hammerstones

Length	Width	Thickness	Pitting
90	75	40	one end
60	35	35	one end
50	55	40	one end

Hammerstones

The three hammerstones, one of schist and 2 of a granitic material, displayed battering at one end only. These are quantified in Table XII.

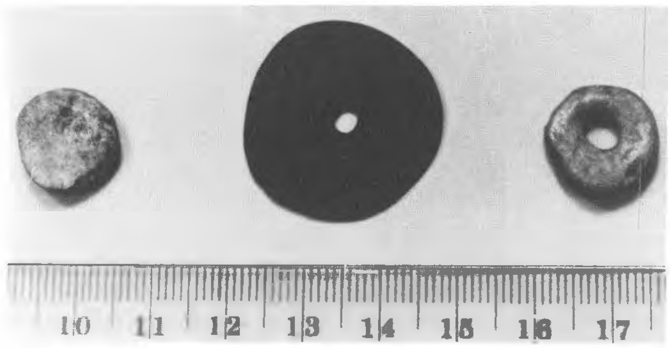


Fig. 5 Beads: Draper 1973.

DRAPER: WORKED BONE

There are 242 pieces of bone which appear to be modified by human activity represented at Structure II and the associated middens of Draper. Of these, 35.1% (n=85) are identified as white-tailed deer *(Odoicoileus virginiana);* 35.1% (n=85) simply as mammal, 11.1% (n=27) as avian; 6.2% (n=15) as *Canis sp.* of which 13 are definitely domestic dog *(Canis familiaris);* 4.9% (n=12) as beaver *(Castor canadensis);* 1.6% (n=4) as turtle .82% (n=2) each for rabbit *(Leporidae)* and human; .41% (n=1) each for raccoon *(Procyon lota)* and bear *(Ursus americanus)* and fish, and 2.9% (n=7) are unidentifiable.

Of the 242 pieces of modified bone, 88 specimens are classified into tool categories. The remainder of the material is classified as polished/ground, drilled/cut, scored or randomly worked. From these were drawn various groups whose function is more tentative, such as worked deer phalanges, beaver incisor tools and other miscellaneous objects.

Beads

The beads constitute the largest number of categorized bone tools (n=57). Source materials are avian long bone 40.3% (n=23); mammal long bone 38.5% (n=22); dog long bone 10.5% (n=6); *Leporidae* long bone 3.4% (n=2); *Canis sp.* long bone 1.7% (n=1); and unidentified long bone 5.2% (n=3).

Most of these beads are fragmentary. Of the 15 complete specimens, (Fig. 6), 9 exhibit high polish and well finished ends, while 6 are unpolished, with the ends still exhibit edges ragged from the scoring and breaking process. One of the polished and finished beads, an exceptionally long one, was scored heavily near the middle of the bead at the point of maximum curvature of the bone in preparation for breaking off a new bead. A series of parallel scoring marks is visible further along the bead as if several points were tested for easy breakage before deciding on the heavily scored area. The measurements of complete bone beads are given ,n Table XIII in millimetres.

Awls

Seventeen long pointed bone objects from the 1973 excavation are classified as awls (Fig. 7). There are roughly 5 other pieces of bone classified as polished/ground material which might very well have been part of awls but insufficient amounts were preserved for such an identification. Of the 17 objects, 11 are identified as sections of mammal long

Table XIII Bead Measurements (Complete specimens)

	Length	Diameter		Length	Diameter
1. roughly finished			2. well finished		
	50	16		14	12
	25	9		34	8
	20	10		57	11
	21	10		20	10
	27	9		35	7
	16	10		13	10
				31	9
				20	6
				31	7

Length r = 16 - 57
m = 27.6
Diameter r = 6 - 16
m = 9.6

bone, 5 as deer metapodials and 1 from an unidentifiable portion of a mammal. Ten of the awls are represented only by tips. Three of the deer metapodial awls are complete and another 4 of the long bone awls are possibly complete. These 7 are quantified in Table XIV. In this case the mode is included since the two exceptional lengths tend to obscure what would appear to be the 'normal' range.

Wear patterns in the awls are varied. Considerable polish on the tip is present on 6 of the specimens. On 3, striations appear to run parallel to the axis of the awl; and on 4 the striations run perpendicular to the axis. This latter wear pattern would seem more in keeping with the function of an awl. It should be observed however that in any discussion of wear pattern, it is difficult to discern the difference between wear pattern and manufacturing marks.

Punch/Flakers

Three pieces of antler tips are classified as either punches or flakers (Fig. 8). Only one exhibits the marks of scoring and breakage at the proximal end and is therefore considered a complete specimen. The others have gashed ends which might indicate use in an indirect percussion technique of some sort. The distal tips are blunted in various ways. One has a depression in the centre of the end; another appears to have been worn or possibly ground into a wedge-shape; and the third displays a raised boss on the blunt end. These specimens exhibit small gouges near the working end. These punch/flakers are quantified in Table XV.

Conical Points

There are 4 specimens of socketed conical points (Fig. 9). Only one is complete and measures 93 mm in length and 10 mm in diameter. This point is made of antler and is sharply pointed and highly polished. The socket is V-shaped and round in cross-section. Striations on the surface near the point perhaps indicate use of a scraper in its

Fig. 6 Bead Specimens: Draper 1973. Note that left 3 show traces of scoring.

Fig. 7 Awls: Draper 1973. (Selected complete awls.)

Table XIV Awl Measurements (Complete specimens)

Length	Diameter			
134	10	Length	mean	117.4
120	12		range	75 - 134
120	20		mode	120
121	12			
125	12	Diameter	mean	13
126	15		range	10 - 20
75	10		mode	12

Table XV Punch/Flaker Measurements

	Length	Diameter	Wear Pattern	Tip
complete	66	14	gouges	depression
fragmentary	37	12	gouges	wedge
fragmentary	36	13	- - -	boss

manufacture. The other three specimens are just fragments of seemingly the same type of point made from mammal long bone. One is a piece only of the V socket. The remaining two are very fragmentary and represent the initial cut for and smoothing of the socket.

Needles

Five needle specimens are present in the 1973 Draper material (Fig. 8). The one complete needle measures 83 mm in length, 6 mm in width and 2 mm in thickness. It is made from a splinter of dog radius. The oblong perforation is biconical and measures 3 mm in diameter. The needle is slightly curved both in plane-view and cross-section.

Two fragments each represent half a needle broken at the perforation. One is well polished whereas the other appears to be merely smoothed. Both are made from part of a mammal long bone. Two other fragments display part of a perforation each and are polished. Both of these are also from a mammal long bone.

Among the modified material are two pieces of dog radius which fit together to show that a very long splinter of bone has been hacked away. That these pieces represent the waste material from the needle-making process is a strong possibility. The length of the splinter removed suggests that either more than one needle was made from it or enough bone was cut away to ensure that the best piece was available, perhaps that with the right curvature.

Pendants

There are two canine pendants in this sample (Fig. 10), both from *Canis sp.*, probably dog. Both specimens measure 27 mm in length. The teeth are highly polished and the root

Fig. 8 Artifacts: Draper 1973. Left, needle fragments; right, punches.

Fig. 9 Conical Socketed Points: Draper 1973.

Fig. 10 Modified teeth: Draper 1973. Left, ground beaver incisor; middle, perforated dog canine; right, drilled mammal tooth.

is perforated.

Also present in this sample is what appears to be a shell pendant, measuring 37 mm long, 30 mm wide and 3 mm thick. Part of the perforation and one end has broken away.

Worked Deer Phalanges

Worked deer phalanges at Huron sites are traditionally divided into two groups, the ground faceted 'toggle' variety of unknown function and a polished perforated variety, generally considered to be used in cup-and-pin game (Fig. 11).

Two of the modified deer phalanges exhibit the drilling of the distal epiphysis which is associated with the cup-and-pin artifact. One specimen represents a complete phalange and although there is a distal perforation, the specimen is not polished and appears to be unfinished. The second specimen is very highly polished and the proximal portion of the phalange is broken off. A V-shaped breakage line on one side could represent part of a lateral opening.

The 42 examples of the ground faceted variety form a continuum of workmanship from those which appear to be only slightly ground on one side to those which are heavily ground and polished and display openings on both sides. Fourteen of these 42 specimens are so fragmentary that nothing can be discerned of the objects' original shape. Eight phalanges appear to have been only slightly ground. As only two of these are whole, it is possible that some of the fragmentary ones may have had lateral openings as well but none of the breakage lines exhibit either the shape or the smoothed edge of the lateral openings on other specimens. One of these 8 phalanges displays a scorch mark on the side. Two specimens exhibit some grinding and one lateral opening while 12 specimens are quite heavily ground and have two lateral openings on opposite sides. One open-

Fig. 11 Modified Deer Phalanges: Draper 1973. From left: 2 cup-and-pin artifacts the rest are ground phalanges.

ing is usually much larger than the other and the edges of the perforation are generally quite smooth. One specimen exhibits extensive grinding, openings on both sides and one small round perforation near the proximal epiphysis. Finally there are 5 fragmentary specimens which are extensively ground, highly polished and have only one lateral opening and on the opposite side a round perforation near the epiphysis.

The ratio of the cup-and-pin variety to the ground toggle variety has been suggested as a stylistic marker for sites in the Southern Division of the Late Ontario Iroquois. Wright (1966) notes that the former appear to be dominant early in the Huron sequence and the latter became numerous only in the later period. Draper is considered to be fairly early in the sequence and therefore should have predominantly the cup-and-pin variety. Structure II and its associated midden possess, on the contrary, an abundance of the ground toggle variety (n=42) and very few of the cup-and-pin type (n=2).

Beaver Incisor Tool

Of the 10 beaver incisors which appear to have been modified by abrasion, 4 are sufficiently preserved to attempt classification. Of these, 2 specimens are split and 2 are whole (Fig. 10). All 4 exhibit abrasion or grinding of the bit end, perhaps to enhance a scraping function. Wear, in the form of flaking on the bit end, is visible on three of the specimens and one of these, a longitudinally split incisor, also exhibits a high degree of polish on the interior facet of the wedge-like bit. This artifact also possesses striations which run perpendicular to the axis of the incisor.

Miscellaneous

There are 3 other objects in the Draper sample whose function is speculative but which are worthy of mention.

The first is a large mammal tooth which is highly polished at the root. A hole has been drilled straight down into the root to a depth of about 10 mm (Fig. 10).

The second object is part of a mammal long bone, one end of which is broken and the edge of which is smoothed. This has been tentatively identified as a flesher.

The last specimen is a small piece of human skull which has not only been highly polished but is perforated as well. This suggests that it could be part of a skull gorget.

DRAPER STRUCTURE 2 DISTRIBUTIONAL ANALYSIS

The lithic and bone material appear to be similarly distributed vertically throughout the excavation. Artifacts were found from Levels II to XI, and deeper in features, but were concentrated from Levels IV to VIII with the mode of distribution definitely in Level V. In the area around one hearth at least one living floor was identified in the field within this level.

Horizontal analysis proved more fruitful as the excavation of a longhouse presented an excellent opportunity to attempt to delineate activity areas. The tables included in this section give artifact distributions relevant to the specific areas discussed and Figure 12 outlines these activity areas. Activity areas are, of course, determined on the basis of a significant association of certain artifact types. Significant associations were identified with the following procedures. In describing the extent of any activity area, the square designations were used which were roughly coterminous with the concentration. In some tables, the artifact representation in the squares involved was compared to the representation in the total area of the structure

Fig. 12 Activity Areas of Structure 2.

Area I:	chipped stone manufacture: (cores, debitage, scrapers)
Area II:	bone manufacture (scored material, beads, ground material, ground phalanges, awls, knife variety of projectile points)
Area III:	pecking and preforming (with hammerstone) adzes (adze blanks, hammerstones, adzes)
Area IV:	grinding and finishing adzes: (adzes, grinding stone)
Area V:	woodworking: (adzes, biface, utilized flakes)
Area VI:	floral processing: (manos, scrapers, & absence of other materials)
Area VII.	general bone working: (ground material, ground phalanges, beads, scored material, scrapers, ground stone, debitage)
Area VIII:	bead manufacture: (scrapers, scored bone, beads – predominantly unfinished projectile point variety knife)
Area IX:	recreational area (ground and faceted phalanges, "cup-and-pin" phalange)
Area X:	hide working and recreation: (awls, scrapers, "projectile points", ground phalanges)
Area XI:	bipolar technology workshop: (cores, anvil stones, debitage, scrapers on bipolar flakes, punch/flaker, lack of schist or ground stone debitage, ground stone)

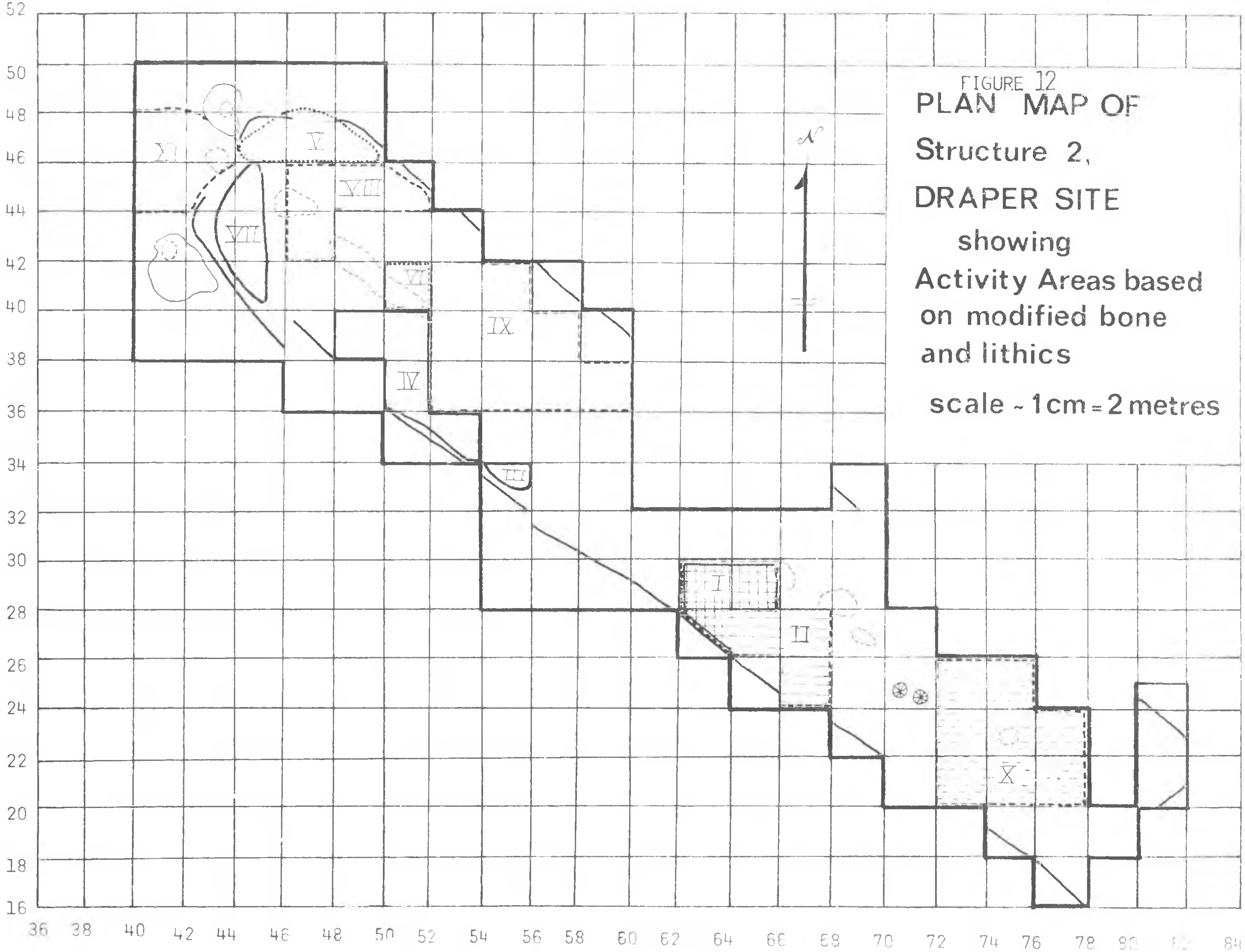


FIGURE 12
PLAN MAP OF Structure 2, DRAPER SITE showing Activity Areas based on modified bone and lithics

scale ~ 1cm = 2 metres

which was roughly 73 grid squares. Therefore, if 4 squares or 5.6% of the total structure area contained 40% of all of a certain type of artifact found in the structure, then this was felt to be significant. If distribution were random, one would expect only 5.6% of that artifact type to be found in that area. Naturally with small samples of tool types, proportional distribution can be easily skewed. For instance if there were 2 hammerstones within the structure as was the case, and 50% of the hammerstones (n=1) were found in one square this was not considered to be significant by itself. A significant occurrence of one artifact was only considered archaeologically significant if it occurred in a context with other tools which were significantly represented, and with which it could form a toolkit. In this distributional study as in all, absence was as important as presence in determining what was significant. In instances where artifact density was low and where activity areas were defined primarily in terms of what artifact types were simply present, rather than in terms of which types had the highest percentage, the tables do not make a comparison with the structure sample but simply illustrate what does occur in the area as opposed to what is not present. The working definition of the term 'association' in this analysis is that 2 artifacts are associated if they occur in the same or an adjacent subsquare in significant proportions.

Before outlining the various tool configurations felt to be significant, it should be stated that of the lithic and bone materials from the structure interior, a majority (65.5% lithic; 71.5% worked bone) was located in the northern half which for the purposes of this analysis is regarded to be north of the N32 line (see Fig. 12; Table XVI). The exterior pits and area will be discussed after the structure interior is reviewed.

Table XVI Draper Distribtuion — General Distribution — Structure II.

	Interior north half	South half	Exterior Between & Including 2 Features
drilled/cut bone	3	0	4
randomly worked bone	4	1	1
polished/ground bone	15	7	5
ground deer phalange	20	8	1
cup-and-pin			
beads (bone)	22	9	10
needles (bone)	2	0	2
points (bone)	0	0	1
pendants (bone)	1	0	0
incisor tools	0	0	2
awls	2	3	2
punches	0	0	1
scored material	8	3	11
adze/celt	12	1	4
adze blank	3	0	1
ground schist	6	2	3
hammerstone	1	1	1
scrapers	22	17	14
debitage	67	42	47
mano/grinding stone	6	0	0
ground stone fragment	5	2	0
projectile point	1	3	4
projectile point variety knife	2	0	0
biface	1	0	0
bead (stone)	2	0	0
pendant (stone)	1	0	0
unretouched cores	11	8	8
retouched cores	2	3	3
unmodified lithics	23	7	1
utilized flakes	10	6	9
utilized cores	3	0	1
Total	246	131	136

Structure Interior – Lithic Manufacture

Area I–II

The artifact:debitage ratio of 1:2 for the Draper 1973 lithic sample was not very promising as an initial indicator of whether any areas of lithic manufacture would be discerned. The lithic analysis of the site shows that both a chipped stone and a ground stone technology were employed and thus two different tool manufacturing kits could potentially be present.

To delineate an area of chipped stone manufacturing a comparison was first made of the distributions of unretouched cores and chert debitage, and then of possible flakers, unmodified chert pieces which might have served as potential cores, and finished retouched materials.

Only one area consisting of 3 squares N30E64, N30E66 and N28E64 appeared to be a possible location for chipped stone manufacture. These squares contained 26% of the cores found in the entire structure interior, 15% of the chert debitage and also 7.6% of the scrapers. Both the core and debitage representation are significantly greater than what one might expect to find in 3 squares out of a possible 73 excavated within the structure. However there is no correlation with flakers or unmodified chert pieces to support the inference of an area for chipped stone manufacture. Moreover the presence of a high amount of bone materials in the same squares and in the squares immediately to the south might indicate a bone working area, the possibility of which will be discussed later. It could be suggested that within a bone working area, a small lithic workshop was maintained to produce bone working tools. Table XVII lists the representation of both lithic and bone materials. Area I refers to the lithic concentration and Area II refers to the overlapping bone concentration.

Area III–IV

The ground stone technology centred on the production of 1) adze/celts and 2) grinding stones/manos/metates. The smooth surfaces and depressions which characterize the latter are usually a product of use, not of technology.

Table XVII Draper Distribution: Combined Lithic and Bone Work Shop

	Area I 3 squares (4.1% structure area)	Area II Area I & 3 squares (8.2% structure area)	Structure 73 squares (100%)
Retouched cores	0	1	5
Unretouched cores	5	7	19
Debitage	14	17	109
Utilized flakes	2	2	16
Scrapers	3	4	39
Ground schist	0	1	8
Unmodified lithic	1	1	30
Hammerstone	0	1	2
Scored material	0	5	11
Beads	5	6	31
Ground material	4	5	22
Ground phalanges	3	3	28
Awl	1	1	5
Randomly worked	1	0	5

Table XVIII Adze Work Shop

	Area III 1/2 square (.6% structure area)	Area IV 7 squares (9.6% structure area)	Structure 73 squares (100%)
Adze blank	2	0	3
Hammerstone	1	0	2
Schist debitage	1	6	23
Adze	1	5	13
Ground Schist	0	1	7
Ground stone fragments	0	1	7

Although hammerstones may be used to trim irregularities from the surfaces of such items before usage, no hammerstones were found in association with grinding stones/ manos/metates in the interior of Structure II.

In an area of adze/celt manufacture, one might expect to find hammerstones, adze/celt preforms, schist debitage, grinding stones and possibly finished adze/celts. One area in particular in the structure interior seems to be just such a location. The northern half of the square N34E56 contains 2 of the 3 adze/celt blanks found in the structure interior, 1 of the 2 hammerstones, 1 of the 12 adzes and 1 of the 23 pieces of schist debitage. This half-square represents the southernmost extent of an expanse along the western wall of the structure which contains 38.4% of the finished adze/ celts, two of which are associated with grinding stones. There is no association with hammerstones although there is a random distribution of schist debitage throughout the area. Therefore, one location is suggested for each of the final two steps in adze/celt production. The half-square first mentioned served as a concentrated location for pecking the rough preform into a more suitable shape with a hammerstone. The latter area was a more diffuse expanse over which the adze/celts were ground into their finished form. Table XVIII lists the representation of artifacts in these areas. These are shown in Figure I as Areas III and IV respectively. It should be noted that very little of the ground adze/celt toolkit is represented in the southern half of the structure.

Structure Interior -- Use of Lithics

In terms of interior activity areas involving lithics it has been shown that there is only evidence of manufacturing for manufacturing's sake in the ground stone tradition. For chipped stone, therefore, it would seem more profitable to consider tools in the context of their use rather than as end products of a manufacturing process.

Area V

An area of woodworking (Area V) was tentatively defined along the north wall of the structure in the squares of N48E46, N48E48 and N48E50. A concentration of 5 adze/celts which constitutes 33% of the sample from the structure interior and 2 ground schist fragments, presumably pieces of broken adze/celts, was observed and first thought to represent an area of adze/celt manufacture. This inference was not supported, considering the absence of adze/celt blanks and the poor representation of schist debitage. However, in association with the adze/celts in these squares were the one biface from the structure and a concentration of utilized flakes (n=5; 30%) which would serve to corroborate an inference of woodworking activity (Table XIX).

Area VI

Square N42E52 probably represents a location for floral processing (Area VI; Table XX). Both manos (n=2) and scrapers (n=3) are associated with this square and correlated with this is a striking absence of other lithic materials. This square has a high concentration of features, two of which contain high amounts of vegetal material (see King and Crawford, this volume). Best represented is the Zea maize although cultivated Phaseolus and wild Chenopodium species are also present. A large amount of

Table XIX Woodworking Area

	Area V 3 squares (4.1% structure area)	Structure 73 squares (100%)
utilized flakes	5	16
biface	1	1
unretouched core	1	19
debitage	6	109
adze	5	
ground stone fragments	2	8
retouched cores	0	5
unmodified lithics	2	30
mano/grinding stone	2	6
scrapers	0	39

Table XX **Floral Preparation**

	Area VI 1 square
mano/grinding stones	2
scrapers	3
debitage	2
other artifacts	0

Table XXI General Bone Working

	Area VII 4 squares 5.4%	Structure 73 squares 100%
Ground Material	9	22
Ground Phalanges	2	28
Beads	4	31
Scored Material	3	11
Pendant	1	1
Needle	1	2
Awl	1	5
Ground stone	2	13
Knife	1	2
Scrapers	3	39
Unretouched core	1	19
Debitage	11	109
Adzes	2	13

Zea maize was also recovered from two features in the adjacent square N42E50. Interestingly enough, none of this floral material in square N42E52 is found in the adjacent feature designated as a hearth (hearth "C" in Arthurs' analysis; this volume). The great amount of fire-cracked rock found in the square adjacent to this hearth (N42E56) suggests that the hearth was very thoroughly cleaned and this perhaps accounts for the lack of floral material as well. If so, perhaps the two small features in N42E50 in which the large amounts of carbonized floral materials were found represent refuse pits.

Area VII

Bone working would appear to be a major function of lithic tools in structure 2. In considering the identifiable worked bone objects in this structure, the most numerous category was that of the beads. The method of breaking the bone was frequently observed to be that of scoring which can be achieved through the use of scrapers, knives, pièces esquillées or even thick flakes. The ground and perforated phalanges which constituted a large proportion of the bone sample would require grinding stones and possibly drills. The awls and bone points could be manufactured using scrapers and grinding/polishing stones of some kind. These associations would therefore be expected in areas of bone working.

It can be observed that 30% of the worked bone material of interior provenience comes from the area between the NW wall and the E44 line. Table XXI outlines the representation of materials. Lithic materials are not overwhelmingly represented but all of them with the exception of the adzes could have served to manufacture the bone tools in this area. There appears to be no emphasis on either a particular type of lithic tool or on a particular type of bone tool. The conclusion is that this locality (Area VII) is one of general bone working.

Area VIII

Two probable areas of bead manufacture are discernible. In the process of comparing lithic and bone tool distributions, a gap in both was observed in an area roughly coterminous with the squares N46E48, N45E50, N46E52 and N44E48. These squares, Area VIII, possess about half of what the adjacent squares possess, as Table XXII illustrates. However the artifacts which are present seem to indicate an area of bead manufacture. 5 scrapers, 1 projectile point variety knife; 3 scored pieces of bone and 3 beads, 2 of which are unfinished and still exhibit the marks of scoring.

The other area which could also have served as a centre of bone working is the location mentioned previously as possibly including a lithic workshop. This artifact repre-

Table XXII Bead Manufacture

	Area VIII 4 squares	Surrounding Area 4 squares
Ground Tools	2	7
Knife	1	0
Cores	1	3
Debitage/Unmodified lithic	2	8
Scrapers	5	0
Utilized Flakes	0	6
Polished/ground material	1	7
Ground Phalanges	1	8
Scored Bone	3	3
Beads	3	4
Other bone artifacts	0	4

N.B. A comparison was made with 4 surrounding squares rather than with the structure as a whole to illustrate both the general paucity of artifacts in Area VIII in a section of this structure which is otherwise quite rich in lithic and bone tools and to demonstrate from the types of tools that it is a bead manufacturing area rather than an extension of the general bone working area to which it is so close.

Table XXIII Recreational Area

	Area IX 9 squares
ground phalanges	7
cup-and-pin	1
beads	2
other bone tools	0
scrapers	5
adze blank	1
debitage	14
cores	5
unmodified lithics	7
utilized flakes	1
ground stone fragment	1

Table XXIV Hide Work Shop

	Area I 8 squares
scrapers	10
projectile points	3
debitage	13
utilized flakes	4
cores	1
other lithic	0
beads	2
phalanges	4
ground material	1
awls	1
other bone	0

sentation is outlined in Table XVII. It can be observed that scored pieces are greatly over represented and beads only slightly. Unretouched cores are greatly over represented and debitage slightly.

Structure Interior – Worked Bone Function

Area IX

One bone artifact type, the ground faceted deer phalange, was plotted with an aim of possibly deriving its function from the contexts in which it was found. Excluding the area in which it was probably manufactured (Area VII), the other 17 occurrences of ground faceted deer phalanges are principally in 2 areas: 1) the central squares of the northern half of the structure in between the two major hearth areas, and 2) to a lesser degree around the features in the very southern part of the structure (roughly N20–24 E74–78). Out of these 17 occurrences, 10 phalanges are found as pairs and the other 7 singly within either of the 2 general areas. That ground faceted phalanges tend to occur in pairs suggests that these were used in a game similar to the cup-and-pin variety. Furthermore the central area between the major hearth areas in the northern half is occupied by very few other artifacts and, as these squares do not seem to represent a working area for either bone or lithics, the temptation to say that this is a recreational area is great. Also, it is within this area (Area IX) that the one cup-and-pin artifact found within the structure is located (Table XXIII).

Area X

In the southern area, (Area X) ground phalanges are not only fewer in number but constitute a smaller percentage of the total artifact set. The lithic and bone tools which do occur here seem to suggest an area of hide working. Awls and scrapers are well represented, considering the general paucity of artifacts in this area. One interesting feature of this area is the presence of all three side-notched projectile points. Possibly these are actually part of a hide working tool kit, just as the projectile point variety knives seem to be associated with bone working. Table XXIV outlines the artifact representation of this area.

Table XXV Chipped Stone Manufacture

	Area XI 3½ squares
anvil stone	1
cores (bipolar)	3
debitage	20
punch/flaker	1
scrapers	3
utilized flakes	2
hammerstone	1
projectile point	1
scored material	8
beads	4
ground phalanges	0
other bone tools	4

Structure Exterior – Lithic and Bone Manufacture

Area XI

The area exterior to the northwest wall of the structure also contains a great deal of modified lithics (n=93) and 16.5% of the sample's modified bone (n=40). Table XVI outlines the artifact representation in this area.

The northernmost feature, 9A, overlaps 4 squares N48E44, N48E46, N50E44 and N50E46. The relation-

Table XXVI White: Bipolar Cores

Raw Material	Type	#	Group	Maximum Length		Maximum Width		Maximum Thickness		Length of Flake Scar		Face of Flaking
				m	r	m	r	m	r	m	r	
Chert	2	1	Unret.	45		32		22		45		bifacial
	3	2	Unret.	32.5	30-35	19	18-20	10	8-12	23.5	20.22	unifacial
	4	2	Unret.	22.5	20-25	20	15-25	6.5	6-7	20	20	1. Unifacial 2. bifacial
	4	3	Ret.	33	26-40	20	20-21	8	5-11	17	15-31	bifacial

m = mean
r = range

ship of this feature to the structure is not entirely clear. However, in the area to the south of it, the southwestern half of the square N48E44 is definitely outside of the structure and serves as a bipolar technology workshop (Area XI; Table XXV). In the area mentioned are 2 bipolar cores and an anvil stone. The adjacent sub-squares yield a large amount of chert debitage (n=22), of which only two can be definitely identified as bipolar flakes. However of the 5 scrapers found in the area including Feature 9A, two are from bipolar flakes. Moreover the presence of a punch/flaker further substantiates the interpretation of a chipped stone manufacturing area. Missing from this area is schist debitage or ground stone of any kind. Correlated with this is the absence of any ground stone in the area between the two features. Bone artifacts present are scored bone and beads, plus 3 of the needle specimens and one antler point.

The southernmost exterior feature, number 1 extends into 4 squares N44E42, N44E44, N42E42, and N43E44. This contains a variety of lithic and worked bone types but to a lesser degree than Feature 9A and with no amount of specialization.

WHITE: LITHICS

The lithics and worked bone from the 1973 excavations at the White site are analyzed in a similar manner to those from Draper.

Modified lithic material from the White site totals 204 pieces. Of this chert comprises 87.3% (n=178); quartz 3.9% (n=8); slate 2.8% (n=6); schist 4.4% (n=9) and granitic material 1.5% (n=3). Of the lithic material that was actually worked, the same drop in chert percentages is observed at White as at Draper i.e. by about 6%. Of 61 worked artifacts, chert forms 81.9% (n=50); schist 11.5% (n=7), slate 3.2% (n=2); and granitic material 3.2% (n=2).

Technology

Only one flaking technique appears to be represented at White. All 8 cores are bipolar, of which 3 are retouched. These are quantified in Table XXVI. The same code is used as for Draper.

There is one bipolar core variety, point-area which occurs at White but not in the Draper sample. This particular core is the largest of any found at either site and represents the only core at White which is not split. The coincidence of novel variety and larger size suggests again that these core varieties represent stages of core reduction in the bipolar process rather than differences in methodology. The other types of cores in the sample are opposing ridge (50%) and ridge point (37.5%). In the Draper sample a comparison of the measurements of the varieties led to the suggestion that the ridge-point variety could represent a last stage of bipolar working. In the White sample, unfortunately rather small, it is the opposed ridge variety core which appears to be smallest. While all of the retouched cores are of the opposed ridge type, it can be observed that there is selection for the larger of these cores.

Debitage

The debitage consists of chert (n=128), quartz (n=8), slate (n=4), schist (n=2) and granitic material (n=1). These are quantified in Table XXVII. There are 13 decortication flakes, 27 blocky flakes, 13 flat flakes, 81 secondary shatter and 9 bipolar flakes. One of the notable differences between the technology of White and Draper is in the core/debitage ratio. In the latter case, this is fairly high as has been previously mentioned, 1 core per 3.4 debitage. In the White sample, the ratio is 1:16. This suggests that the use of cores in flint knapping was more important at White than in structure II of Draper. This is congruent with the previous observation that the large core found at White possibly represented an earlier stage of manufacture and that more knapping was done at White than at Draper in the samples and from the areas examined here.

Comparison of the flake types represented at Draper and White reveals that secondary shatter is more abundant at White, perhaps as a result of using the bipolar technique solely. Conversely, however, bipolar flakes are noticeably under-represented in the White sample.

Marginally Retouched Material

Marginally retouched material at the White site consists of 24 chert scrapers and 3 retouched cores. These are quantified in Table XXVIII. Generally these are comparable to Draper materials in terms of the angle of working edge. There is a larger percentage of end scrapers found in the White sample (25%) than in the Draper sample (12.6%). These also tend to be slightly thicker flakes than those selected at Draper.

Two of these pieces from White which are classified as end scrapers might in fact be the working edge which has snapped or been driven off by a blow to the scraper. One

Table XXVII White Debitage

Raw Material	Flake Type	No.	Maximum Length		Maximum Width		Maximum Thickness	
			m	r	m	r	m	r
Chert	1	13	26.5	10-35	17.8	12-34	7.2	2-12
	2	25	29.7	15-53	18.1	10-37	17.5	5-10
	3	13	15	10-23	16	10-40	2.1	1-2
	4	70	18.1	10-35	11	4-31	3.5	1-8
	5	7	21	20-33	14	8-24	3.6	1-6
Quartz	1	1	30		17		5	
	2	1	20		20		7	
	4	5	18.4	10-22	11.4	8-15	5.2	3-8
	5	1	22		17		6	
Slate	4	4	22.5	16-30	14.7	10-24	2.7	2-4
Schist	2	1			14		5	
	5	1	40		20		5	
Granitic	4	1	8		7		4	

m = mean
r = range

Table XXVIII White: Marginally Retouched Material

Type	#	Max. Length		Max. Width		Max. Thickness		Resharpening		Use Wear		Face Retouch	
		m	r	m	r	m	r	f	%	Type	%	Type	%
side	18	27	15-52	15.5	10-31	4.5	1-10			5	5.3	Unif.	100
end	6	26.6	12-40	23.6	5-35	5.1	3-8			5	33.3	Unif.	100
end & side	1	24		15		4						Unif.	100
ret. cores	3	see table XXVI										Unif.	100

White: Marginally Retouched Material

Ext. of Ret.		Type Ret.		Angle wrkg. edge		Length wrkg. edge		Width wrkg. edge		Thick wrkg. edge		Flake Type		Utilization		Raw Material
code	#	code	#	grp.	%	m	r	m	r	m	r	type	f.	f	%	
1	7	2	18	1	50	20.9	10-56	1.1	1-3	1.3	1-4	1	1	3	16.6	chert
2	8			2	44.4							2	2			
3	3			3	5.6							3	4			
												4	5			
												5	5			
2	6	2	5	1	16.6	31.3	21-36	2.6	1-5	3	1-4	1	1	1	16.6	chert
		3	1	2	50							2	1			
				3	33.3							2	1			
												4	3			
1	1	2	1	1	100	38		1		1		3	1			chert
2	3	2	3	1	100	28	17-37	2.3	1-4	2.3	1-4					chert

m = mean
r = range
f = frequency

Fig. 13 Detached Working Edge: White 1973.

piece is larger than the other but both represent the same phenomenon of a long, very thin piece of chert featuring very steep retouch along one side (Fig. 13). Although the morphology precludes a definitive opinion, one wonders if they might not be burin spalls.

Utilized Flakes

There are 16 utilized flakes quantified in Table XXIX. As at Draper, the majority of these flakes are of the flat and bipolar varieties which both have thin and sharp edges. The utilized flakes from both categories are also similar in size. The observed utilization was in the form of a flaking type of wear pattern only.

Projectile Points

Two projectile points are found in this sample (Fig. 14). N40W2–SE–2 is a long lanceolate point made from a dark grey chert and measuring 39 mm in length, 10 mm in width and 2 mm in thickness. It is plano-convex in cross-section. The plano side exhibits discontinuous marginal retouch with most of the working near the tip. The convex side exhibits facial and marginal retouch. The base is straight and thinned slightly. The very end of the tip is broken.

N38W4–F1 is more triangular in outline and also plano-convex in cross-section. A complete specimen, it measures 38 mm in length, 18 mm in width, and 3 mm in thickness. It is made from a light grey chert possibly from a decortication flake since not all of the cortex has been trimmed off. Both sides exhibit thinning flakes along the margins. The base is thinned and straight.

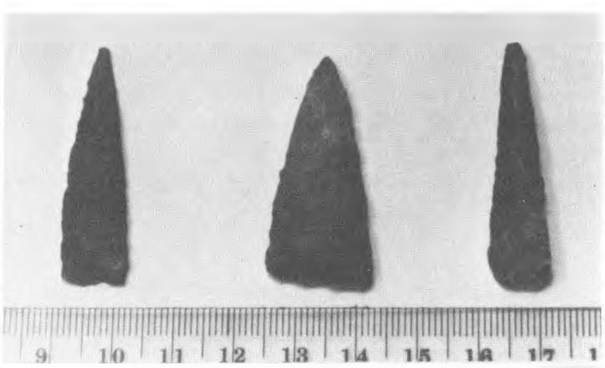


Fig. 14 Projectile Points: Left, White 1973; Middle, White 1973; Right, Draper 1972.

Adze/Celts

Only one complete adze is present in the White sample (Fig. 15). This measures 65 mm in length, 20 mm in width and 11 mm in thickness. The working edge is battered.

The remainder of the ground schist is quantified in Table XXX. These consist of four bit fragments and two pieces of ground schist.

Pendants

Two ground slate pendants are present in this sample (Fig. 16). S22W2–15–4 is a complete specimen measuring 21 mm in length, 15 mm in width and 3 mm thick. The perforation appears to be biconical. The sides of the pendant exhibit vertical incised lines.

The second pendant is incomplete but even so is considerably larger. The remaining portion is 45 mm long, 39 mm wide (a complete measurement) and 5 mm thick. Only the edges have been ground. The two faces of the pendant both bear fossil shell impressions.

Table XXIX White: Utilized Flakes

Material	Flake Type	No.	Max. Length		Max. Width		Max Thickness	
			m	r	m	r	m	r
Chert	1	1	33		22		3	
	2	2	23	21-26	25	20-30	7	6-8
	3	8	22.2	14-30	16	10-25	3.5	1-6
	4	1	24		26		5	
	5	4	22	14-27	15.2	12-20	3.5	1-2

m = mean
r = range

Table XXX White: Ground Schist

	Length	Width	Thickness
Adze/celt fragments	52	40(c)	20(c)
	31	20	6
	33	30	8
	75	27	10
Ground Schist fragments	45	8	11
	95	35	25

Fig. 15 Adze/celts: White 1973: top, complete specimen; bottom, bit fragment.

Mano/Grinding Stone

A granitic rock, circular in shape, exhibits one smoothed, flat side and could have been used as a mano or grinding stone. It measures 111 mm x 95 mm x 40 mm.

Fig. 16 Pendants: White 1973.

Miscellaneous

One rock made of a soft porous material displays striations on one side and could have been used as a polisher. This specimen measures 60 mm x 40 mm x 10 mm.

WHITE: WORKED BONE

The worked bone in the 1973 White site sample totalled 54 pieces. Deer represented 37% (n=20) of the sample; dog 12.9% (n=7); rabbit/hare 3.7% (n=2); beaver 7.4% (n=4); red fox 1.9% (n=1), *Canis* sp. 1.9% (n=1); mammal 18.5% (n=10); avian 12.9% (n=7) and 3.7% (n=2) were unidentifiable.

Beads

Again, as at Draper, this was the most common category forming 37.5% (n=18) of the worked bone sample. Avian long bones provided 38.9% of the raw material; dog long bone 22.2%; mammal long bone 16.6%; rabbit/hare 11.1% and 11.1% were unidentifiable. Exactly half the specimens were complete and their measurements are given in Table XXXI. Of these 9 complete specimens, only 2 exhibit unfinished edges. On one of the incomplete specimens the interior surface exhibits fine abrasion, probably the result of rubbing by a thong.

Awls

Five pointed bone objects are classified as awls. Source material consists of deer tibia (n=1), deer metapodial (n=1) and mammal long bone (n=3). Three of these awls are represented by the tip and one lacks the tip. All five are quantified in Table XXXII. Wear patterns are varied. Two exhibit striations parallel to the awl axis; one exhibits striations oblique to the axis and one displays a battered tip.

Punch/Flaker

This specimen is a portion of an antler measuring 67 mm in length and 12 mm in diameter. The blunt end is unusually pointed for a punch but not enough to be classified as an awl. The tip displays striations which run perpendicular to the axis.

Table XXXI Bead Measurements

Well finished	Length	Diameter	Roughly finished	Length	Diameter
	40	7		30	4
	25	10		30	4
	32	5		40	10
	44	14			
	44	11			
	67	11			

Table XXXII Awl Measurements

Length	Diameter	
143	10	complete
148	10	tip missing
60	10	incomplete
45	8	incomplete
60	4	incomplete

Projectile Points

The first specimen is made from a dog tibia, the distal portion of which has been ground and cut away to a blunt point. The object is merely smoothed and not at all polished. It probably represents an unfinished stage of manufacture. The measurements are 82 mm in length and 9 mm in diameter.

The second specimen is a highly polished mammal long bone which has been worked to a point. It much resembles an awl except that a side notch is worked into the bone. This notch exhibits striations running perpendicular to the axis which suggests that the specimen was hafted. This object measures 65 mm in length and 8 mm in diameter.

Cup and Pin

One fragmentary specimen is represented in the White sample. This is a lightly ground and distally perforated deer proximal phalange.

Ground Phalanges

Of the 10 specimens, 4 are complete and 6 are fragmentary. All are made from the proximal phalange of a deer. Of the 4 specimens, one is slightly ground, 2 display grinding, 2 lateral openings and extensive polish and the fourth is ground and has openings on 3 sides.

Incisor Tools

Four beaver incisors are found in this sample, of which 2 are laterally abraded and one is split. Evidence of their function is indistinguishable on any of these three. On the fourth, however, the bit surface is lightly abraded, perhaps to enhance a scraping function.

Scored Material

There are 8 pieces of scored material: 3 deer, 1 red fox, 1 *Canis* sp. and 3 mammal. The *Canis* sp. specimen is actually 2 pieces which fit together. From the location of the scoring marks, as the faunal analyst, Jim Burns, has noted, there seems to be selection for the part of the bone which displays a more uniform cross-section.

Polished/Ground Material

Two polished deer bone specimens are probably portions of awls. The third object is a dog tibia, the distal portion of which has been abraded to a scraper-like end.

Cut Material

Of the 2 specimens in this category, one is a piece of antler tine which has been severed by hacking rather than scoring and the second is a dog radius of which the lateral margin was removed. In the discussion of the Draper sample a similar object was proposed as the raw material for manufacturing needles.

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Faunal Analysis of the Draper Site

JAMES A. BURNS

PREFACE

The Draper longhouse referred to as Structure 2 has offered an opportunity to study the domestic aspects of a single swelling unit in greater detail than any such unit excavated to date. While it is immediately clear that pottery and lithic material are traditionally of greater value in delineating social and economic foundations of the human group, there are certainly other marks of that group which involve the collection of animal foodstuffs and whose remains we can examine for such marks.

What must be borne in mind during faunal analysis is that while food bone does represent one sector of the artifact inventory (all material deposited by human agency, altered or not, is artifactual), it is not generally a diagnostic part of the assemblage except as it indicates exploitative patterns – and then only in a general way. Patterns of bone deposition within an occupational context may also be of limited value as, for instance, bone-working does not leave recognizable detritus of the type that results from stone-knapping; too, bone is likely to be rearranged and disturbed by human intervention (in housecleaning or in choosing raw material for tools or ornaments) or by canine interference. The effects of this latter indulgence can be affirmed in the present study but not measured. Further, it is of dubious value to segregate, say, deer and bear limb bones since they obviously do not carry the same distinctive values as projectile points and scrapers – given that they be defined as artifacts.

It is most unfortunate that the entire floor area was not excavated, due to the occurrence of large trees and shortness of time. One comment which holds true in the present study is the very evident concentration of material at the west end of the structure. By comparison, the two hearth areas within the house at 22–24N and at 26–30N are more or less associated with 865 portions of bone and shell refuse; the hearth areas included within the house between 40–47N are associated with 1373 portions, not including the possible midden squares at 48–50N, just beyond the end wall. The large area remaining unexcavated at the centre of the structure no doubt harbours a further store of bone, situated, as it is, upon another hearth area.

Several interesting patterns arise from the current investigations. One involves the treatment of scrap bone by dogs, a point alluded to earlier in this section. With more excavation from within houses and from middens, a comparison of proveniences of the peculiarly affected bone would give a clearer impression of the role of domestic animals in the daily scene. A pattern which escapes explanation is the paucity of fish bone. In the White site assemblage, over 50% of the bones were of fish origin, while at Draper we find less than 8% of the remains are fish. If these two sites are in reality contemporaneous, and culturally linked, why should we find such a difference in the importance of fish? Possibly, the difference does not reflect site function.

In defining the area, and thus the material, to be considered, the study was guided by the necessity to deal with only the house structure and its immediate environs. With reference to Figure 1, it was decided that the house and environs should be represented by faunal remains from 85 2-metre squares; those NOT included are as follows: C, D, I, J, P, Q, X, AI, AO, and BU. In addition, there are four units in a trench along 29–30E which were faunally examined but which are included only as noted. Those squares designated BC, CO, CP, CQ, and CS *ARE* included, however tenuously – despite the existence of a midden in CQ – because there is really no way of segregating the data; the proximity of the midden argues that it served the house and is, therefore, integral to its history.

The above letter designations for squares are for the convenience of the analyst, and while they may have been substantially more convenient on a site-wide basis for the researchers than the system of metric coordinates, their use ends here; coordinates are cited in the remaining text where necessary. Further, when individual bone specimens are identified, they have been given a number (e.g. 1282:6). The first number designates a bag into which bone material from a single level of a 50 cm subsquare unit was placed during the excavations; the second indicates the specimen number within that lot number. Both are recorded in the faunal analysis catalogue in the possession of the National Museum.

Comparison of the data from the 1973 excavations with material from previous work cannot be effected here. None of the bone from Ramsden's initial diggings (Ramsden, 1968) has been thoroughly examined to my knowledge, and subsequent recoveries by the OAS crews up to 1972 have been left virtually untouched. In future it is suggested that the bone removed prior to 1973 should receive analytical treatment particularly that from Structure 1; additionally, consideration should be given to comparative indexing of bone recovered from individual structures, precedence for which appears in Stewart's handling of intra- and inter-house faunal remains at Nodwell site in Bruce County, Ontario (Stewart, 1974).

Tables I–VII give particulars of material identified in the faunal assemblage of the 1973 work at the Draper site. Since the material examined includes both intra- and extra-house bone, two listings are provided, one for the house alone and one for the entire sample.

Taxonomic references and order of listing both in the tables and the text are given according to Conant (1958), Godfrey (1966), Peterson (1966), and Scott and Crossman (1973).

ZOOLOGICAL DESCRIPTIONS OF THE FAUNAL REMAINS

Mammalian Remains.

Mammal bone was easily the greatest component of the faunal assemblage, providing just over 3500 pieces from the interior and environs of the house; an additional 300 portions from other test pits were also examined. Twenty-one wild species plus human and domestic dog are included to fill out an impressive list which features a least estimate of 10 individual deer – easily the backbone of the subsistence economy of the house (see Tables I and II).

Hare and Rabbit

The family Leporidae is one difficult of separation; apparently, both the Snowshoe Hare and the Eastern Cottontail are present at Draper, the former being more

Table I Distribution of Animal Remains from the Draper Site 1973

	IN HOUSE				TOTAL			
	# Bones	Percent	# Indiv.	Percent	# Bones	Percent	# Indiv.	Percent
Mammalian	3518	85.4	49	66 2	3816	85.2	52	65.8
Avian	100	2.4	11	14.9	120	2.7	13	16.5
Fish	340	8.3	10	13.5	357	8 0	10	12.7
Reptile(Turtle)	40	1.0	3	4.1	42	0.9	3	3.8
Amphibian	1	tr	1	1.4	3	tr	1	1.3
Invertebrates	119	2.9	—	—	123	2.7	—	—
Indeterminate	-	—	—	—	17	0.4	—	—
Total	4118	100	74	100	4478	100	79	100

Table II Mammalian Distribution and Frequency of Occurrence in the Draper Site, 1973.

	In house		Total	
MAMMALIAN	# Bones	# Indiv.	# Bones	# Indiv.
cf Snowshoe Hare *(Lepus americanus)*	12	2	12	2
cf. Cottontail Rabbit *(Sylvilagus floridanus)*.	1	1	2	2
Hare/Rabbit (Leporidae).	19	2	22	2
Grey Squirrel *(Sciurus carolinensis)*.	1	1	1	1
Red Squirrel *(Tamiasciurus hudsonicus)*	4	1	4	1
Woodchuck *(Marmota monax)*	41	4	44	4
Eatern Chipmunk *(Tamias striatus)*.	2	1	2	1
Beaver *(Castor canadensis)*.	37	3	41	3
Deer Mouse *(Peromyscus* sp.)	4)			
Meadow Vole *(Microtus* sp.).	2)	5	10	5
Mouse spp	4)			
Muskrat *(Ondatra zibethicus)*	17	2	17	2
cf. Domestic Dog *(Canis familiaris)*.	122	3	136	3
cf. Timber Wolf *(Canis Lupus)*	11	1	12	1
Dog/Wolf *(Canis* sp.)	14	—	15	—
Red Fox *(Vulpes vulpes)*.	2	1	3	1
Grey Fox *(Urocyon cinereoargenteus)*	2	1	3	1
Fox sp. (Vulpinae)	3	—	3	—
Black Bear *(Ursus americanus)*	57	2	60	2
Raccoon *(Procyon lotor)*.	12	1	12	1
Mink *(Mustela vison)*	2	1	2	1
Marten *(Martes americana)*.	2	1	2	1
Fisher *(Martes pennanti)*	4	1	4	1
Otter *(Lutra canadensis)*	3	1	3	1
Weasel Family (Mustelidae)	1	—	1	—
Unidentified Carnivore (Carnivora)	10	—	11	—
Whitetailed Deer *(Odocoileus virginiana)*.	822	10	929	11
Eastern Elk *(Cervus canadensis)*.	4	1	4	1
Human *(Homo sapiens)*	11	3	22	4
Unidentified Mammal	2292	—	2439	—
Total	3518	49	3816	52

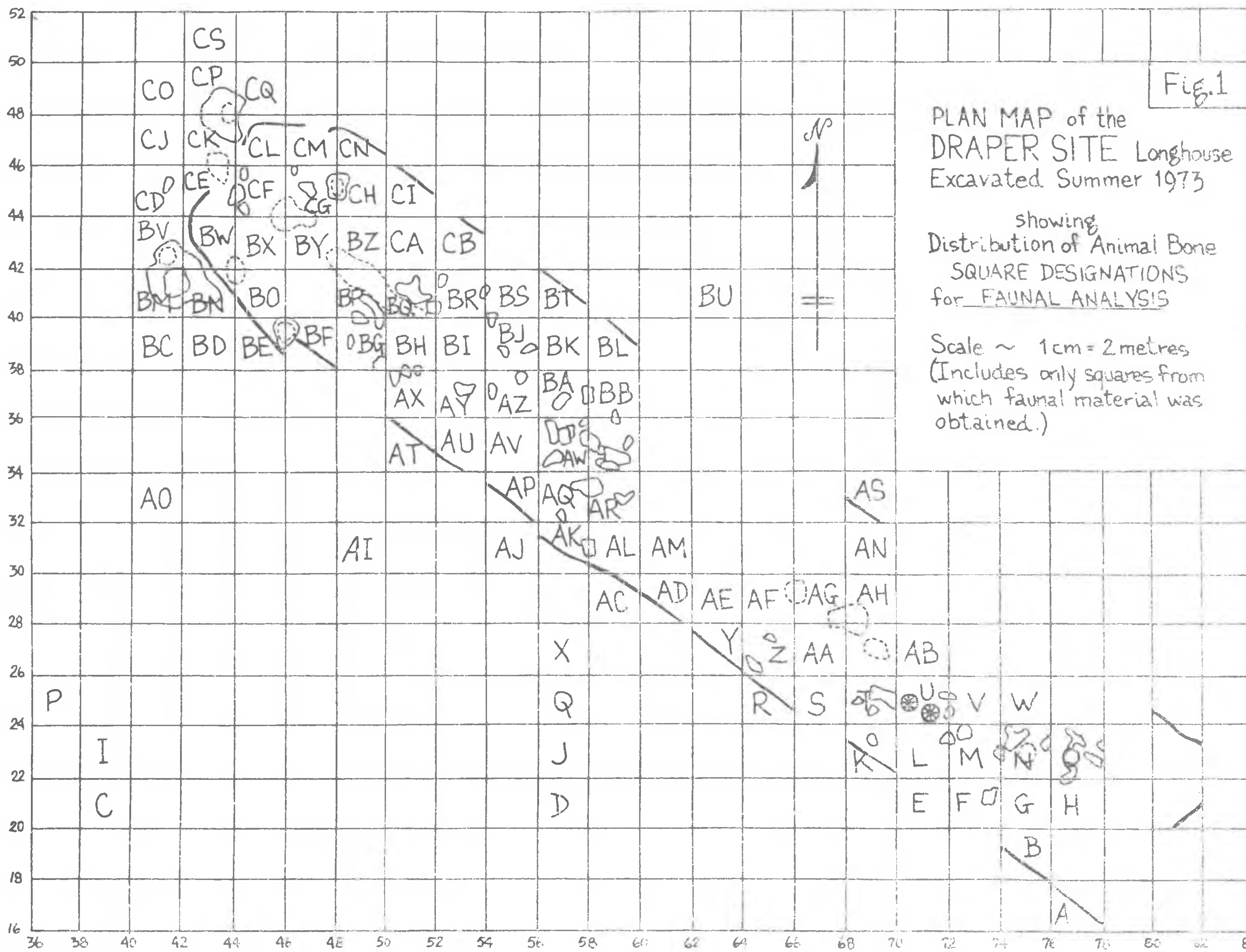


Fig. 1
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
SQUARE DESIGNATIONS
for FAUNAL ANALYSIS
Scale ~ 1 cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N
CS
CO CP CQ
CJ CK CL CM CN
CD CE CF CG CH CI
BV BW BX BY BZ CA CB
BM BN BO BP BQ BR BS BT BU
BC BD BE BF BG BH BI BJ BK BL
AX AY AZ BA BB
AT AU AV AW
AO AP AQ AR AS
AI AJ AK AL AM AN
AC AD AE AF AG AH
X Y Z AA AB
P Q R S U V W
I J K L M N
C D E F G H
B
A
52 50 48 46 44 42 40 38 36 34 32 30 28 26 24 22 20 18 16
36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84

numerous. Additionally, twenty-two portions are assigned only to family level. Thirty-two of thirty-six items occur in association with the house. According to Peterson (1966), both species are within current distribution range.

Squirrels, Chipmunk, and Woodchuck:

Representatives of the squirrel family are not numerous. The two tree squirrel varieties – Red and Grey – and the Chipmunk account for a mere seven bones all of which occur in the house context.

The woodchuck is the 4th most numerous mammalian species by simple bone count (44) and is represented by four individuals. Only three items do not occur in the structure (see Figure 2). That this animal is common here is little surprising, given the abundance of open field for maize agriculture and the loamy soil occurring throughout the region, being ideal for woodchuck tunnelling (see Bowman, this volume). Perhaps for this very reason, some of the bones are of intrusive, post-occupational occurrence.

Beaver:

This ever-present creature is known from forty-one bone portions which indicate the presence of at least three individuals. If beaver were important in trade, we might have expected to recover more evidence, but one cannot extrapolate village economy from one house and besides, the timing is premature for the high pressure of trade with Europe. Thirty-seven items were recovered from the house (see Fig. 3).

Mice and Muskrat:

The genera of *Peromyscus* (Deer Mouse) and *Microtus* (e.g. Meadow Vole) are accounted for, collectively yielding a complement of ten bones and five individuals. Deriving any significance from these is difficult since, as with woodchucks, mouse remains could be intrusive. No doubt the Indians were much bothered by these vermin and probably ate them on occasion.

Muskrat, a fine fur-bearer, provided a minimum of two individuals from seventeen bone and tooth portions, all from within the structure.

Dogs, Wolves, and Foxes:

Material referred to the genus *Canis* may include both dog and wolf but assignments to each species are provisional, based on the weakest of criteria, namely size. Thus, small *Canis* bone – 136 portions – may be Domestic Dog, comprising three individuals, and larger *Canis* bone – twelve portions – may be Grey Wolf (*C. lupus*) (see Fig. 4).

In a later section, discussion will involve the rather high occurrence of bone which has been chewed and possibly swallowed by carnivorous animals. While it would be impossible to prove the source of these modifications, it is probable that the majority of the changes were caused by domestic Indian dogs. The bone material identified as "cf. Dog" is not impressive as their imputed activity indicates.

Both Red and Grey Foxes are present in the remains. In some cases, the identifications are provisional, as is the case above. Altogether, nine bones derive from fox, one of each species at best estimate.

Black Bear:

This animal, essentially an inhabitant of the forest, is rarely absent from Iroquoian site faunal assemblages, either because it represented an economically valuable meat source, or because it had ritual importance, or both. As with most large animals, the identificable remains far outnumber the count of individuals; sixty items of bone and tooth derive from a minimum of two animals. Of these, seventeen (28%) were phalangeal portions, one bearing cut marks (see Figs. 5 and 13).

Raccoon:

Another primarily woodland species, the raccoon occurs sparingly in the assemblage, consisting of twelve portions of at least one individual; all items were recovered from the house structure.

Weasel Family:

The Mustelidae consist of important fur-bearing species which, in the current analysis, include Mink, Marten, Fisher, and Otter. With no recurring bone elements, the minimum numbers of each stands at one. As with raccoon, they are all woodland creatures but the mink and otter have marked affinities for aquatic habitat.

While we cannot be certain of the population sizes of these animals in pre-contact times, it is evident that the Pickering area of the 20th century is poorly represented in all of these species, but particularly marten and fisher (Peterson, 1966). Certainly, they are not extinct but their ranges have experienced marked reduction along the southern boundaries.

It is probable that the category of "Carnivora sp." contains several other portions belonging to the Mustelidae but comment is limited by the difficulty in identifying those bones.

Whitetailed Deer:

Standard mainstay of an Iroquoian longhouse food economy is the deer. The total assemblage examined contains 929 portions of deer bone representing at least eleven individuals. Actually associated with the house structure are 822 bones and teeth from at least ten animals –

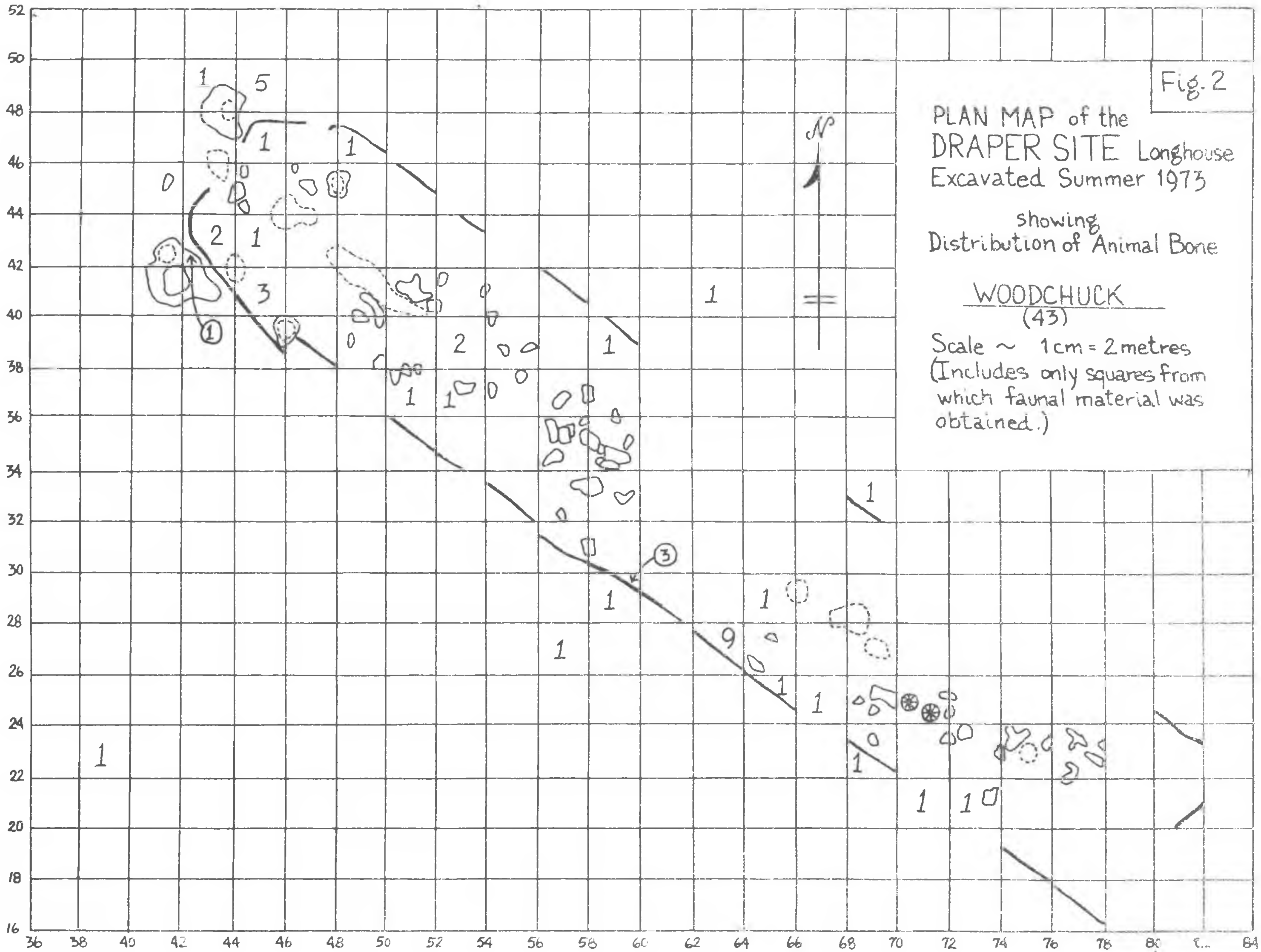


Fig. 2
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
WOODCHUCK
(43)
Scale ~ 1cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N

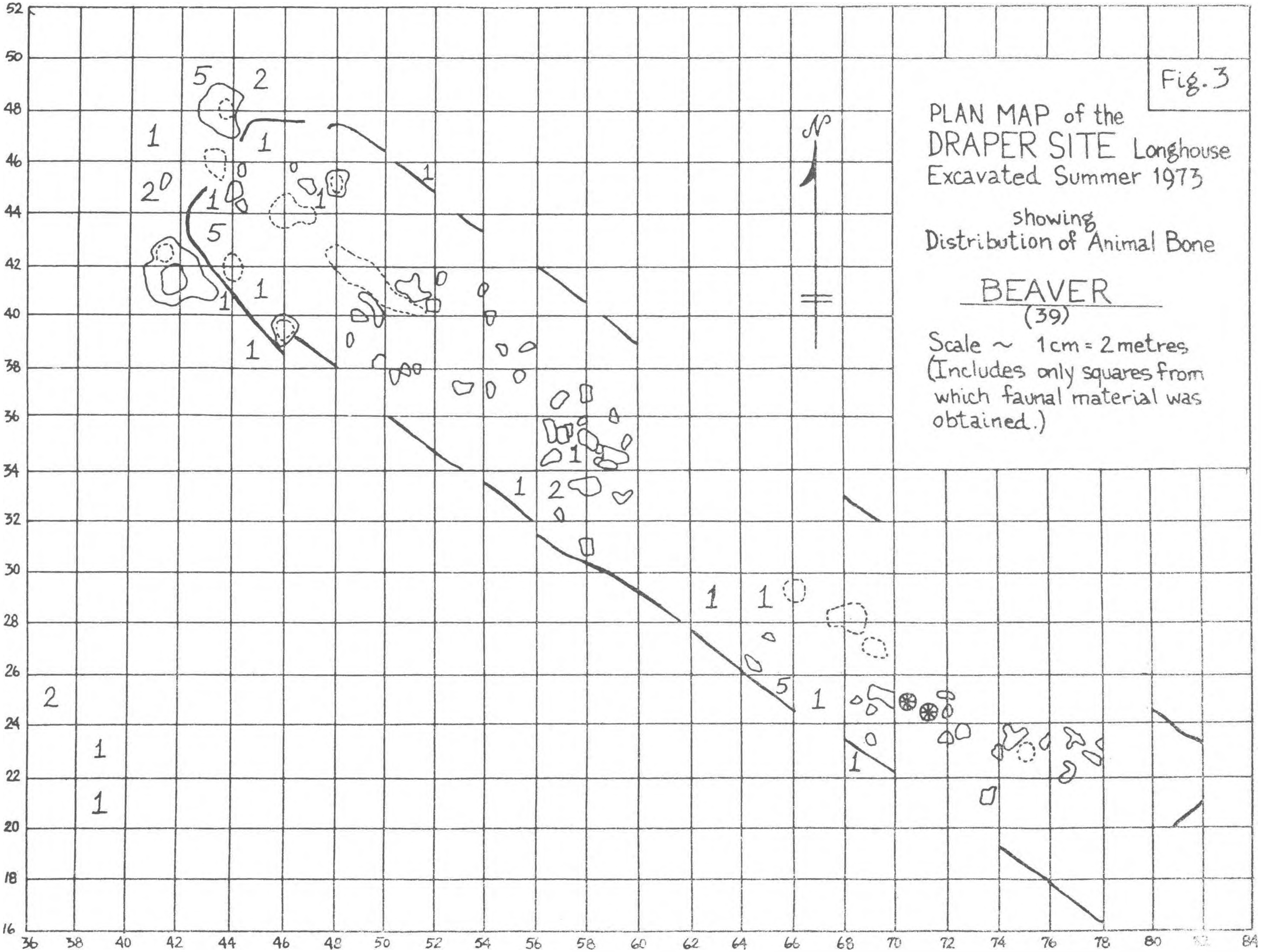


Fig. 3
PLAN MAP of the DRAPER SITE Longhouse Excavated Summer 1973
showing Distribution of Animal Bone
BEAVER
(39)
Scale ~ 1 cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N

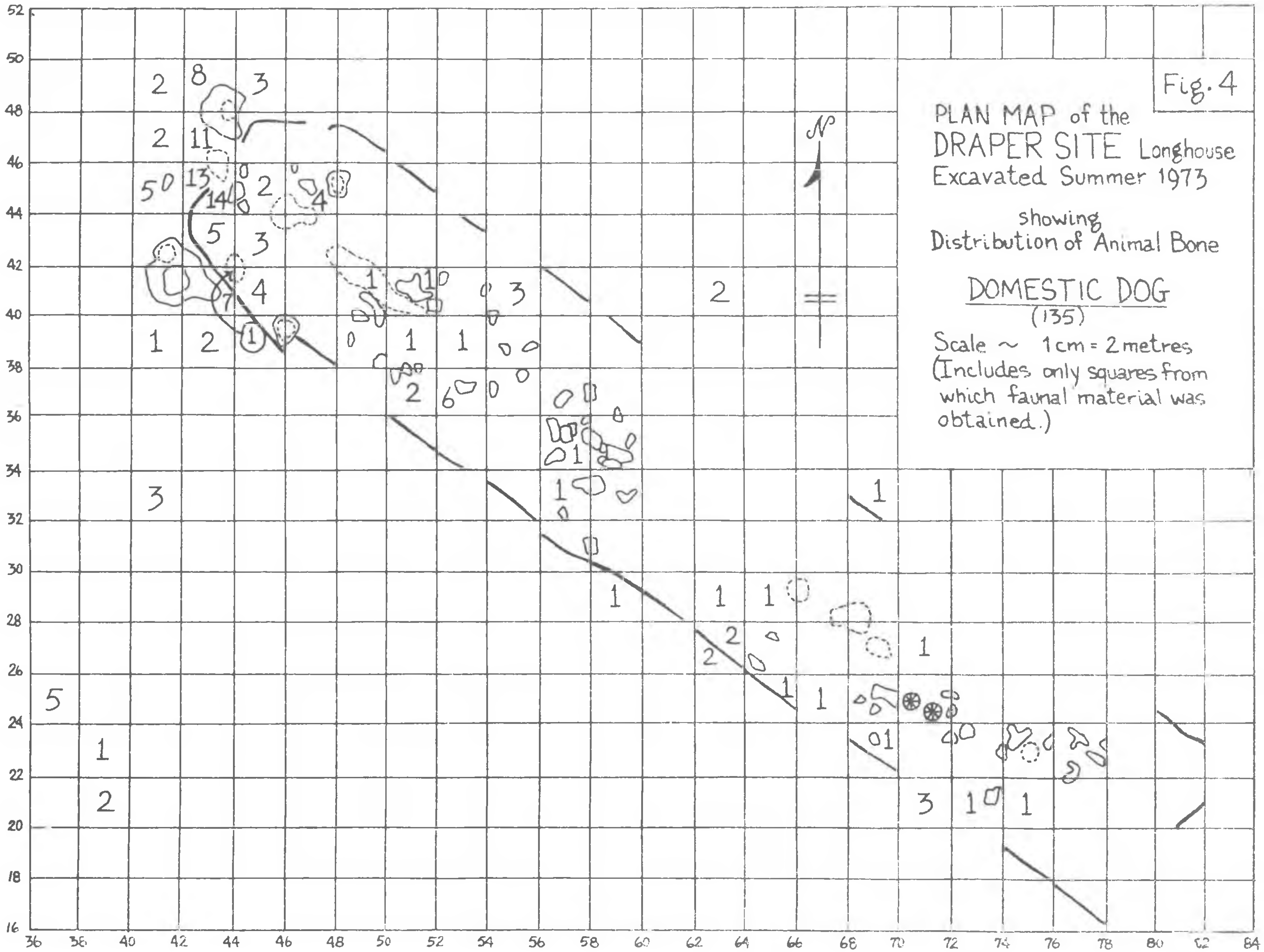


Fig. 4

PLAN MAP of the DRAPER SITE Longhouse Excavated Summer 1973 showing Distribution of Animal Bone

DOMESTIC DOG (135)

Scale ~ 1 cm = 2 metres (Includes only squares from which faunal material was obtained.)

nine adults and one or more juveniles (see Fig. 6).

The fact that deer bone totals are by far the most impressive is no doubt explainable by the fact that such relatively large animals provide a great number of fragments which are only partly identifiable. For instance, while it is a simple thing to identify cannon bone fragments as deer (by the presence of anterior groove and the distal condyles), it is not at all easy to distinguish which of the four cannon bones of deer are involved. Thus, the figures in Table VIII may be misleading for, in fact, of the 181 items listed as "lower leg metapodial" elements, only 54 could be assigned to a specific metapodial (cannon) element. Likewise, the 178 phalanges listed in Table VIII are not necessarily complete elements nor can they be given specific allocation within the hoof skeletons.

That almost 49% of the bone of deer origin is from the lower limbs is not surprising, then, for the reasons stated above. Despite these facts, however, there is still a possibility that selection was operative in House 2; the metapodial and toe elements are rather more common than other portions of the skeleton. In this connection we might consider that the bones of the lower leg are ideal for tool and ornament manufacture. For example, phalanges are used in the production of "toggles" and cup-and-pin game components, and metapodial slivers are commonly recruited for manufacture of durable, pointed objects such as awls, needles, and projectile points, the cortical thickness and density are well suited to the purpose. While selection for these limb elements is therefore suspected, it cannot be flatly related to capture and/or butchering techniques.

With larger animals, perhaps the meatless lower extremities would have been removed before return to the village, thus effectively eliminating the occurrence of metapodials and phalanges. Too, in preparing hides of long-legged beasts – like deer and moose – the toes and shanks would be removed before tanning. There seems, however, to be an appropriate number of these bones in the House 2 assemblage to suggest that skinning was performed in or near the longhouse, if not also the tanning process, and that butchering was performed local to the house also.

Elk or Wapiti:

This animal could well have been important but the paucity of elk bone begs the question of whether the items recovered were from an animal taken locally or in trade, or even if it was obtained for meat. The four elements include two phalanges and a portion each of vertebra and rib. There is no doubt that the species was available throughout most of southern Ontario but its numbers may never have been great. They were extirpated from eastern Canada by AD 1850 (Peterson, 1966).

Human.

The bone associated with the house and ascribed to *Homo sapiens* (apart from the two infant burials in 24–26N 70–72E) is found in the west half of the house with half of it occurring round about the door (see Fig. 7). A further eleven portions were concentrated in a single square 24–26N 36–38E.

Most notable is the nearly complete mandible (1437:1) from 46–48N 42–44E – complete in the sense that it consists of the corpora of both halves, although the right angular portion and the left coronoid process are broken away. The only tooth remaining *in situ* is the left 2nd incisor, but others were present and lost *post mortem.* Remarkable is the total absence of alveolus for both P_2-M_3 series; complete loss and alveolar resorption have occurred which, along with the very heavy attrition of the incisor, indicate an elderly person. Two other teeth, a lower left 1st incisor (1252:1) and a lower right 2nd incisor (1397:1), came from more or less adjoining squares and it is tempting to associate the three teeth because (a) they are not duplicates; (b) they all exhibit heavy attrition; and (c) they occur contiguously (although 1252:1 is almost four metres distant from the mandible).

A second mandible (522:1) occurs near the centre of the structure in 30–32N 58–60E. It is also virtually intact and possesses P_2 and M_1. Again, partial edentulism occurs but the alveolar resportion has not proceeded to the extent witnessed by the mandible above. Age is indeterminate. Occurring approximately one metre north in the same square is the left arch of a juvenile 5th cervical vertebra (510:1) which derived from a child of less than seven years of age, judging by the lack of central fusion (Anderson, 1969).

The square northeast of this last (32–34N 56–58E) contained a single middle phalanx of *Homo.* Other identifiable portions include the central protuberance of an occipital (1975:1) and a frontal portion above nasion and extending over the left orbit (1662:1). Three other items are neurocranial fragments not satisfactorily assigned to element; they all manifest some form of alteration which suggests some human modification but final judgment is withheld (see 805:1, 1028:1, 1295:1).

Outside the house, in 24–26N 36–38E, eleven human bone portions were recovered. Fifteen portions are probably of the same left tibia, but with fitting and gluing these reduced to three definite tibial portions and five miscellaneous pieces. More important was the finding of a right mandible corpus (187:1) with I_2-P_1 *in situ.* As with the first mandible described, this mandible featured loss of the entire molar series with subsequent and complete alveolar resorption – another old person of indeterminate sex.

In review, the sample examined features evidence of at

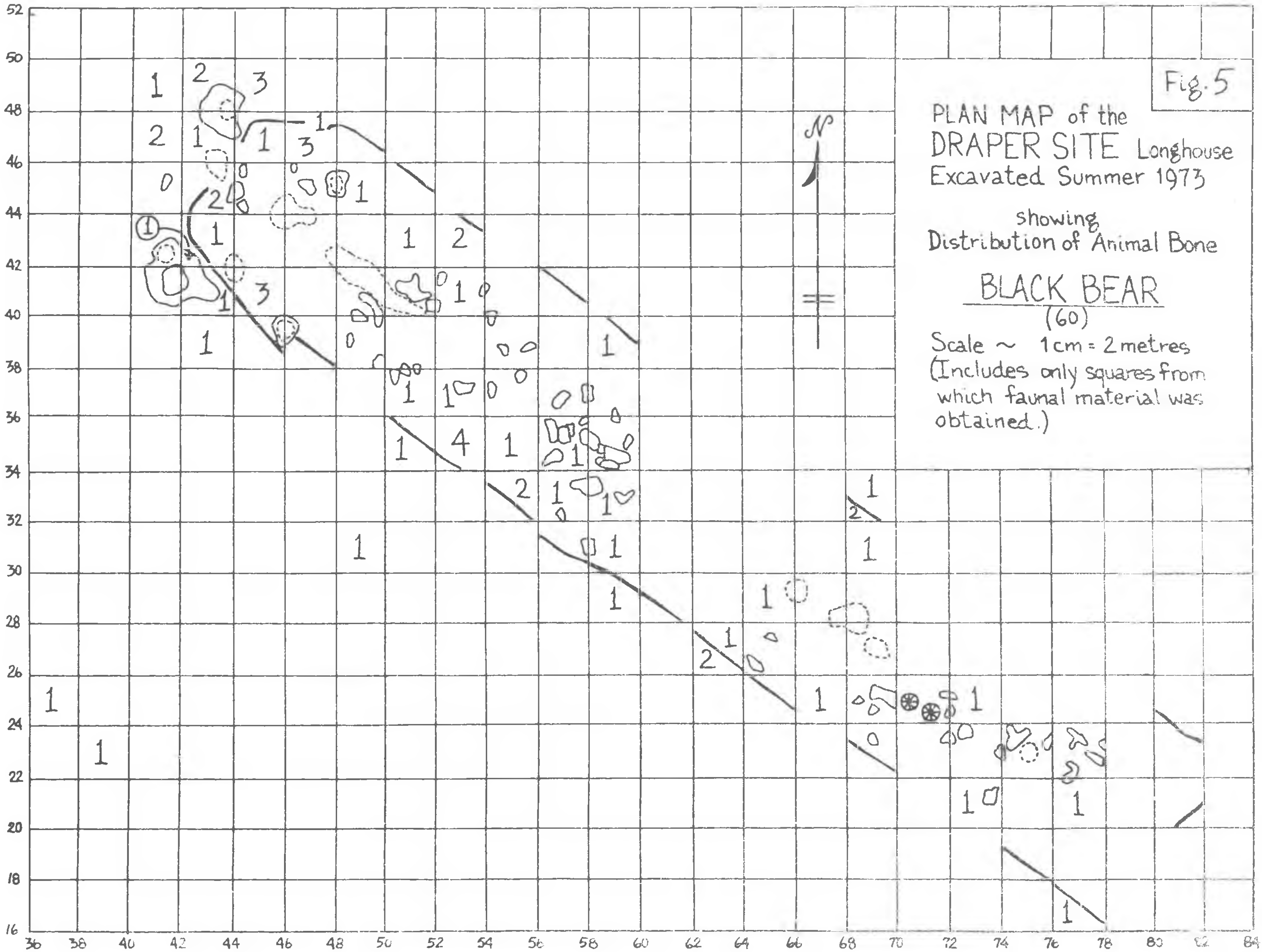


Fig. 5
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
BLACK BEAR
(60)
Scale ~ 1cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N

least four individuals not including the two infant burials which have been described by both Hayden and Kapches (this volume). Discounting the half mandible southwest of the house, we are aware of the remains of at least five persons (two adults and three juveniles). The lack of anything close to complete skeletons in the west half appears to indicate ritual anthropophagy. One frontal portion bears cut marks and possibly five cranial vault fragments are similarly modified; whether these marks resulted from death blows or were wrought after death is not presently known.

Unidentified Mammalian Bone:

While this category is not considered highly significant a few notes are in order. In the main, unidentified waste bone was assigned to categories of medium – or medium/large-sized bone, based on various criteria including cortical thickness and estimated outer diameter. Thus 705 bones were labelled "medium" (m) and 1565 bones were labelled "medium/large" (m/l). An additional 169 were classed as "small", "large", and indeterminate. A total of 2292 such waste portions were found in and about the house structure.

In some cases a hint of bias in the actual choice of animals identified can be gained by resort to these bone counts. If medium/large bone (here, count bear and deer) is not much more numerous than medium, then it may be that the large animals are not brought to camp in (skeletal) entirety, or that choice selected for smaller animals. Consider in this that a larger animal will produce a far greater number of fragments and splinters than a medium-sized animal such as a beaver or a dog. Therefore, the fact that the ratio of "medium/large" to "medium" bone is only just over 2:1, we might not think deer as important as the smaller beasts. However, these figures do not include the identified bones of which deer, bear, and elk number 933, and the "medium" animals only 352.

The distribution of these so-called "waste" bone portions may be useful in recognizing activity areas related to butchering and tool-making foci, and possibly the areas frequented by dogs that have secured discarded food bones for supper. One might also query the distribution of waste bone as the consequence of systematic bone-cracking for marrow extraction; tool-making activities and dog feeding habits may be equally important.

Avian Remains:

The bones of bird species are not numerous but they represent fair variety. Fifty-one bones were identified to species except in two cases where family and genus were the lowest taxa reached (see Table III). Only one species was found to be of extra interest, being much south of its normal range and thus affording support for the winter occupation of the house. Figure 8 details the distribution of avian bone.

Waterfowl:

The Common Loon seems to occur very widely in Ontario Indian sites. Once abundant, its numbers are apparently dwindling due to insecticide residues which prevent total success in hatching eggs, and to encroachment on breeding grounds by cottagers and motor boats (Godfrey, 1966). Adults alone on the water are wary and often difficult to approach but when they are training their downy young in the spring, the adults will not leave the young and can be taken from a skilfully manoeuvred canoe. Loons, herein represented by two bones, can, under certain conditions, be rendered edible. Feathers for personal adornment may also have been sought.

Canada Geese, too, have been favorites of the native people. Again, only two bones represent a single individual at the least. Eminently edible, these large waterfowl may average 8 lbs. live weight (Cleland, 1966).

A teal species (subfamily Anatinae) and a Bufflehead (subfamily Aythyinae) are the sole representatives of the ducks in our sample, and then only sparingly. The two small *Anas* sp. bones fitted well with the teals but distinction between the Blue- and Green-winged varieties was not possible. Likewise the Bufflehead is the smallest of its subfamily.

Table III Avian Distribution and Frequency of Occurrence in the Draper Site, 1973.

	In house		Total	
AVIAN	# Bones	# Indiv.	# Bones	# Indiv.
Common Loon *(Gavia immer)*	2	1	2	1
Canada Goose *(Branta canadensis)*	2	1	2	1
Teal *(Anas* sp.)	2	1	2	1
Bufflehead *(Bucephala albeola)*	1	1	1	1
cf. Hawk (Accipitridae)	–	–	1	1
Ruffed Grouse *(Bonasa umbellus)*	4	2	4	2
Wild Turkey *(Meleagris gallopavo)*	19	2	26	2
cf. Domestic Chicken *(Gallus gallus)*	–	–	5	1
Hawk Owl *(Surnia ulula)*	1	1	1	1
Passenger Pigeon *(Ectopistes migratorius)*	5	1	6	1
Robin *(Turdus migratorius)*	1	1	1	1
Unidentified Avian	63	–	69	–
Total	100	11	120	13

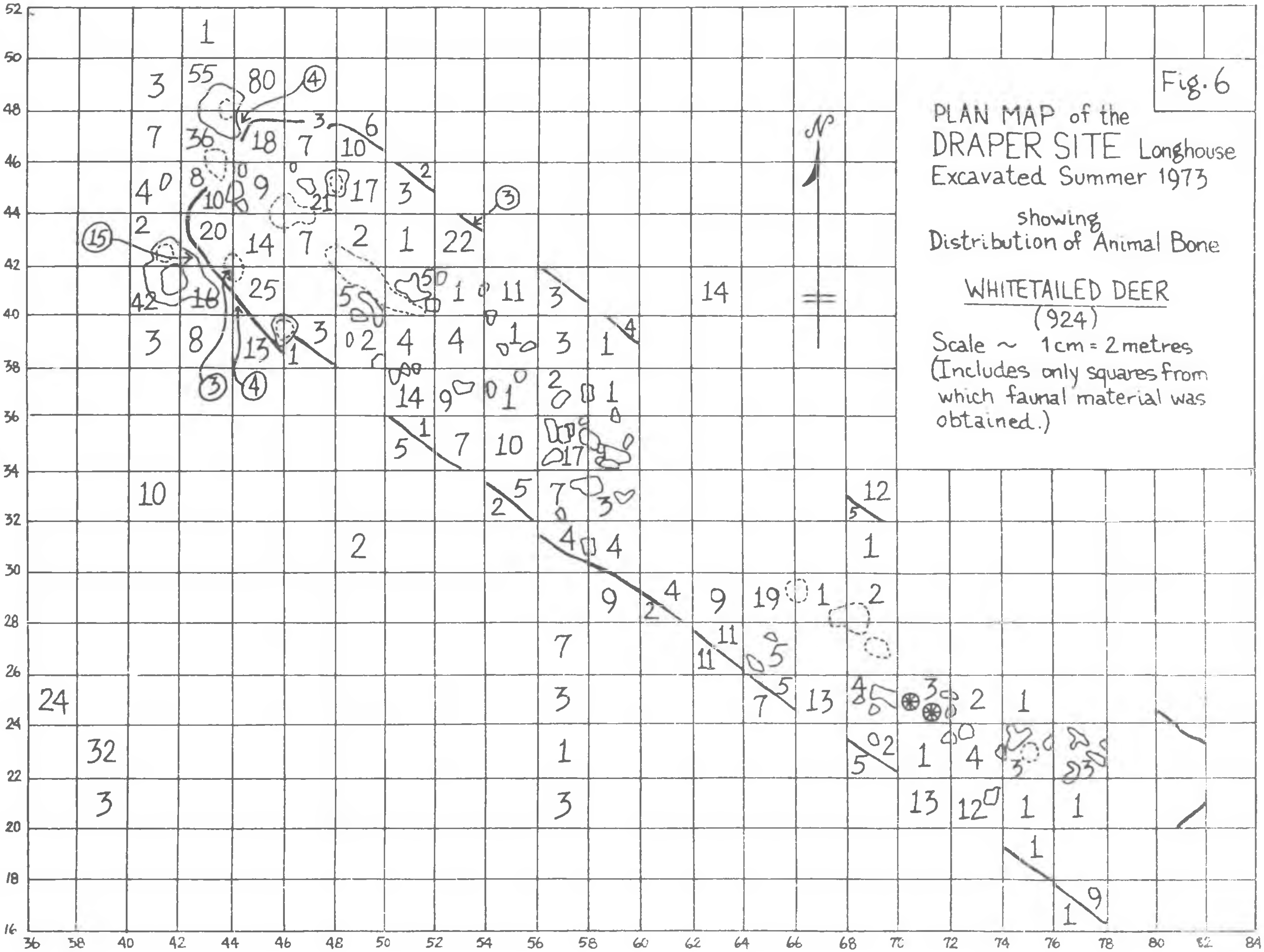


Fig. 6
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
WHITETAILED DEER
(924)
Scale ~ 1 cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N

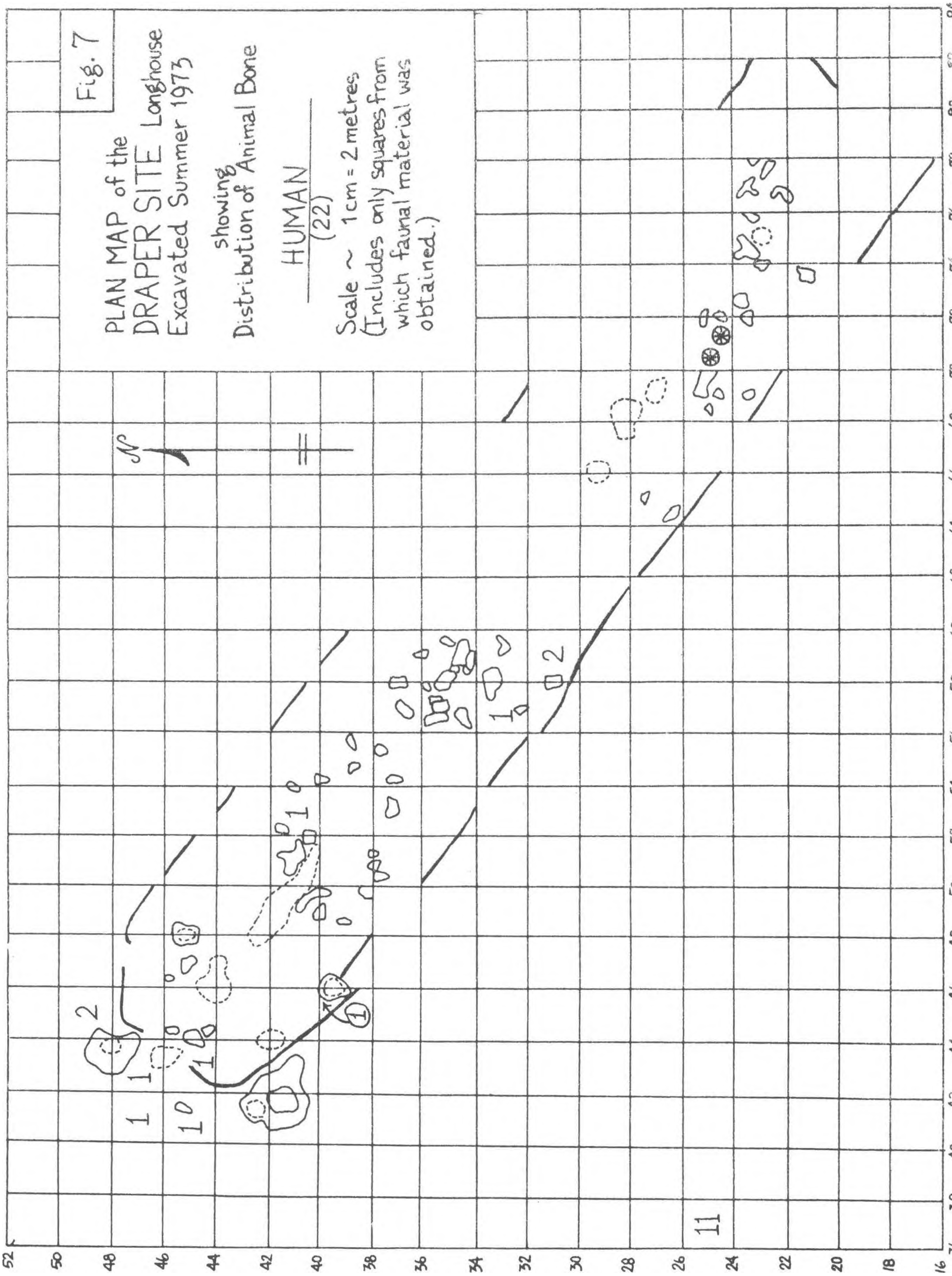


Fig. 7
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
HUMAN
(22)
Scale ~ 1cm = 2 metres
(Includes only squares from which faunal material was obtained.)

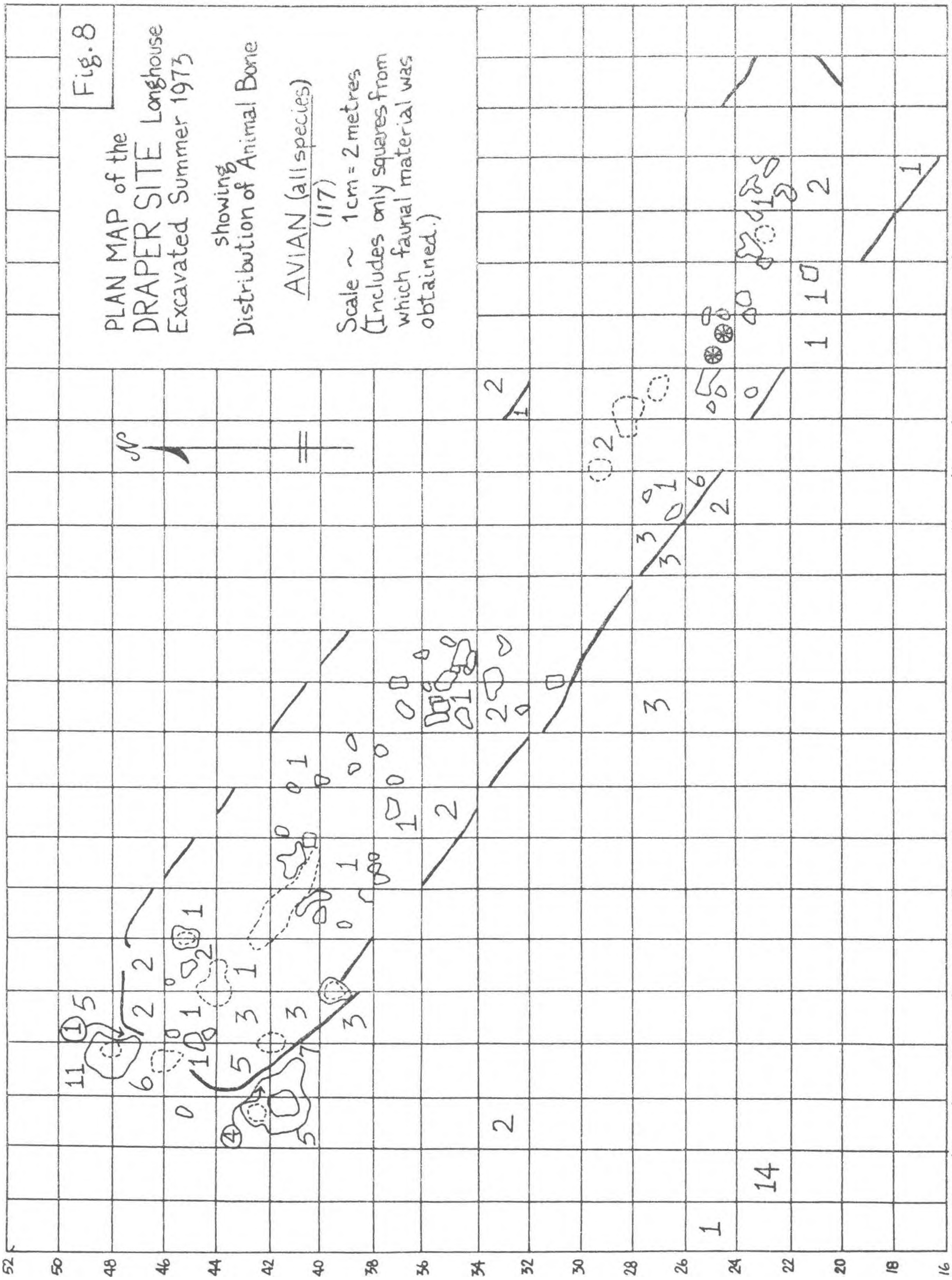


Fig. 8
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
Showing
Distribution of Animal Bone
AVIAN (all species)
(117)
Scale ~ 1cm = 2 metres
(Includes only squares from
which faunal material was
obtained.)

Hawk Family:

A single distal tibial portion was deemed, by its special morphology, to represent one of the many hawks found in the area. Unfortunately, the cortex featured the porous texture of juvenile bone, so that final identification could not be made. It was recovered from 22–24N 38–40E, well outside Structure 2.

Gallinaceous Birds:

Under this heading are included the grouse, turkey and chicken. At least two individuals of the Ruffed Grouse were present as judged by four bones including humerus, femur, and two portions of tibia. This bird is very common in the wooded areas of much of Ontario, and is quite easy to capture with a minimum of effort and equipment.

Wild Turkey is no stranger in the deciduous forests of Ontario Woodland times. According to one source, they ranged as far east as Durham Co., Ontario with their distribution controlled by the severity of the winters (Clarke, 1948) and the maintenance of suitable hardwood forest habitat (Godfrey, *op. cit.*). Of turkey in Structure 2 there were twenty-six bones and portions featuring duplication of only one element, thus giving a least estimate of two individuals (see Fig. 9). Considerable use of turkey bones for tools and ornaments is encountered in some Ontario Iroquois sites – especially Neutral sites – but only one tool was identified as turkey here and it was found outside the house.

Five bones recovered from outside the house (22–24N 38–40E) are of problematical nature. They are gallinaceous and they derive from birds larger than grouse; they have affinities to both turkey and domestic chicken; one is definitely juvenile and another shows signs of surface weathering. Since none is of a size approaching turkey, the bones have been provisionally assigned as "cf. Domestic Chicken". The juvenile ulna (87:2) came from Level VIII and the weathered piece (113:4) came from Level V, the depth of which mitigates against recent intrusion. At any rate, they do not bear directly on the history of the structure in question.

Passenger Pigeon:

The now extinct but once "ubiquitous" pigeon is sparsely present. Of six pigeon bones identified in the assemblage, five are associated with the house. Only one individual is indicated.

Hawk Owl:

This species is a bird of the open boreal forest and mixed woodland (Godfrey, *op. cit.*), or the forest edges "which provide high perches close to open areas presumably well-populated by meadow voles" (Smith, 1970). According to record (T.F.N.C., 1968), these birds are occasional winter residents around Toronto. They seem to occur in southern Ontario at irregular intervals from the 3rd week in October to the last week in February *(ibid.)*, although Smith *(op. cit.)* has observed nesting pairs as far south as Ottawa, Ontario. If the single specimen of evidence from Draper is a local capture, then we have firm ground on which to suspect at least winter habitation in House 2.

Robin:

Of the passerine or perching birds only the perennial "harbinger of spring" was recognized in the collection. The single ulnar fragment was found just outside the west end of the house. In a seasonal sense, it is the opposite of the Hawk Owl.

Unidentified Avian:

Under this heading is subsumed a total of sixty-nine bone portions, or 57.5% of the bird bone. The majority are merely shaft portions but some include parts of articular surfaces that defy identification.

Fish Remains:

Fish bones were found in somewhat greater numbers than avian, but a higher proportion remains unidentified due to inaccessibility to adequate reference collections of fish. At least six taxa are recognized, being the easiest ones to identify (see Table IV). If the house indeed sheltered multiple family groupings, then the 340 fish portions

Table IV Fish Distribution and Frequency of Occurrence in the Draper Site, 1973.

	In house		Total	
FISH	# Bones	# Indiv.	# Bones	# Indiv.
Bowfin *(Amia calva)*	3	1	3	1
Pike/Muskellunge *(Esox* sp.)	1	1	1	1
Sucker sp. (Catostomidae)	19	2	21	2
Catfish sp. (Ictaluridae)	30	4	32	4
Yellow Perch *(Perca flavescens)*	2	1	2	1
Pickerel/Sauger *(Stizostedion* sp.)	8	1	8	1
Unidentified Fish	277	—	290	–
Total	340	10	357	10

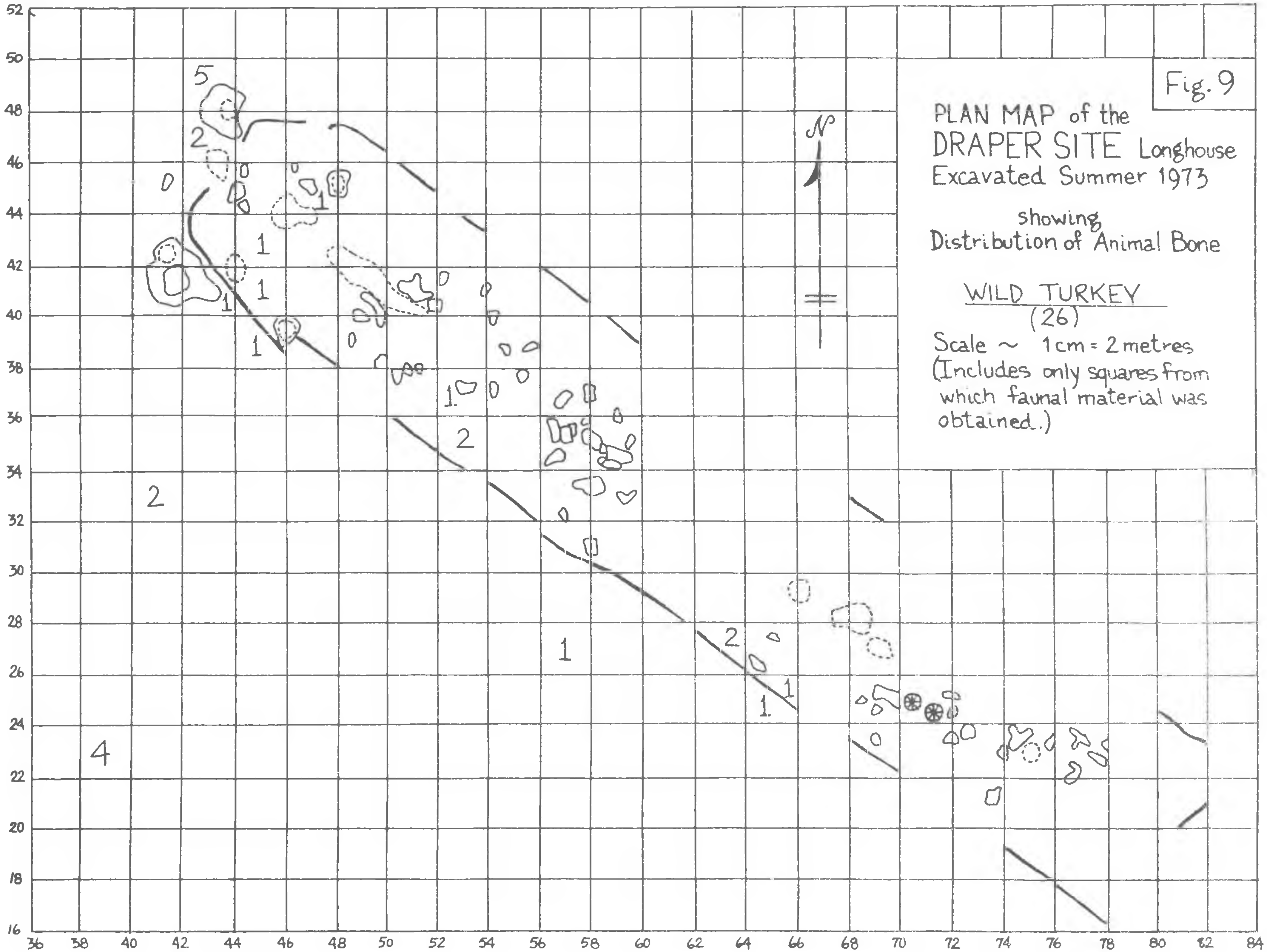


Fig. 9
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
WILD TURKEY
(26)
Scale ~ 1cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N

associated with it argue for minimal use of fish protein. The remains do seem to be more evenly distributed in the structure, given that the heavily favored west end does contain a majority of all types of habitation debris (see Fig. 10).

Bowfin:

This ancient fish was represented by a skull portion and two vertebrae. Quite within its range at Draper, this fish may reach two feet in length and up to three pounds in weight (Scott and Crossman, 1973).

Pike (Esox sp.)

A single bone of *Esox* sp. was identified in the collection from the north-south trench well to the west of the house. The vertebra could not be separated below the species level to Northern Pike or Muskellunge.

Sucker (Catostomidae):

Due to problems with reference material, but also with the separation of species within Family Catostomidae, all of the sucker material has been gathered under one heading. Most commonly occurring in the area are White Sucker *(Catostomus commersoni)* and Longnose Sucker *(C. catostomus).* Also possible is one of the Redhorses *(Moxostoma* sp.). Of the twenty-one bones of sucker, nineteen were found in the house area and derive from at least two fish, counting left dentaries. According to species these fish vary in size and weight but range from about 1–4 lbs. (Scott and Crossman, *op. cit.*).

Catfish (Ictaluridae):

A problem similar to that in sucker identifications obtained in the catfish family as well; thus, all *Ictalurus* sp. bones are grouped together. As the majority of the bones examined were relatively small, it is presumably from the bullhead types of catfish that the bones derived. Four right operculars indicated the presence of four individuals.

Perch and Pickerel (Percidae):

These two fishes often turn up in Ontario middens. While pickerel is generally a common fish, the two families last treated usually occur more numerously, despite the greater live weight of the pickerel. This last species produced eight portions from the house floor but only one individual was recognized.

Perch may carry greater importance than the two bones argue for, but the meagre identifications do not support the notion. In absence of extensive reference skeletal material, the various members of the Sunfish family (which share some osteological features with perch) cannot be differentiated from perch, and all remains as "Fish sp.".

Unidentified Fish:

A total of 290 portions of fish bone remain unidentified. Of this sum, numerous elements are assignable to element, but species identification of these is held in abeyance till access to reference collections is gained. With reports of salmon and trout in Duffin Creek in historic times (Bowman, this volume) there is always the possibility that the salmonid group of fishes was used to advantage and that traces may be found amid the unidentified stack of fish bones. Regardless, this will only confirm that fish are scarce in Structure 2 – a fact which may reflect several points, the most likely being that fillet preparation at the site of capture precluded transport of the majority of the fish bones to the main village.

Turtle Remains:

Forty-two bones were recognized as turtle. Not ordinarily a large portion of faunal assemblages, turtles do make their way into most refuse heaps. Often the shells are used for tools or utensils and several portions examined from the Draper longhouse have been altered (see Table V).

Painted Turtle:

Perhaps the most common turtle in Ontario, the smallish Painted Turtle was found in the structure debris represented by fifteen bone portions, none of which is duplicated. The suspected midden square at 48–50N 42–44E yielded nine of the bones, six of which were interrelated and derived from the same animal; the carapace fragments were glued together from the following items: 1625:3,4; 1626:10,11, 14; 1629:8. The outer edge of the assembled carapace was

Table V Reptile Distribution and Frequency of Occurrence in the Draper Site, 1973

	In house		Total	
	# Bones	# Indiv.	# Bones	# Indiv.
Painted Turtle *(Chrysemys picta)*	15	1	16	1
Blanding's Turtle *(Emydoidea blandingi)*	4	1	4	1
cf. Map Turtle *(Graptemys geographica)*	2	1	2	1
Unidentified Turtle	19	–	20	–
Total	40	3	42	3

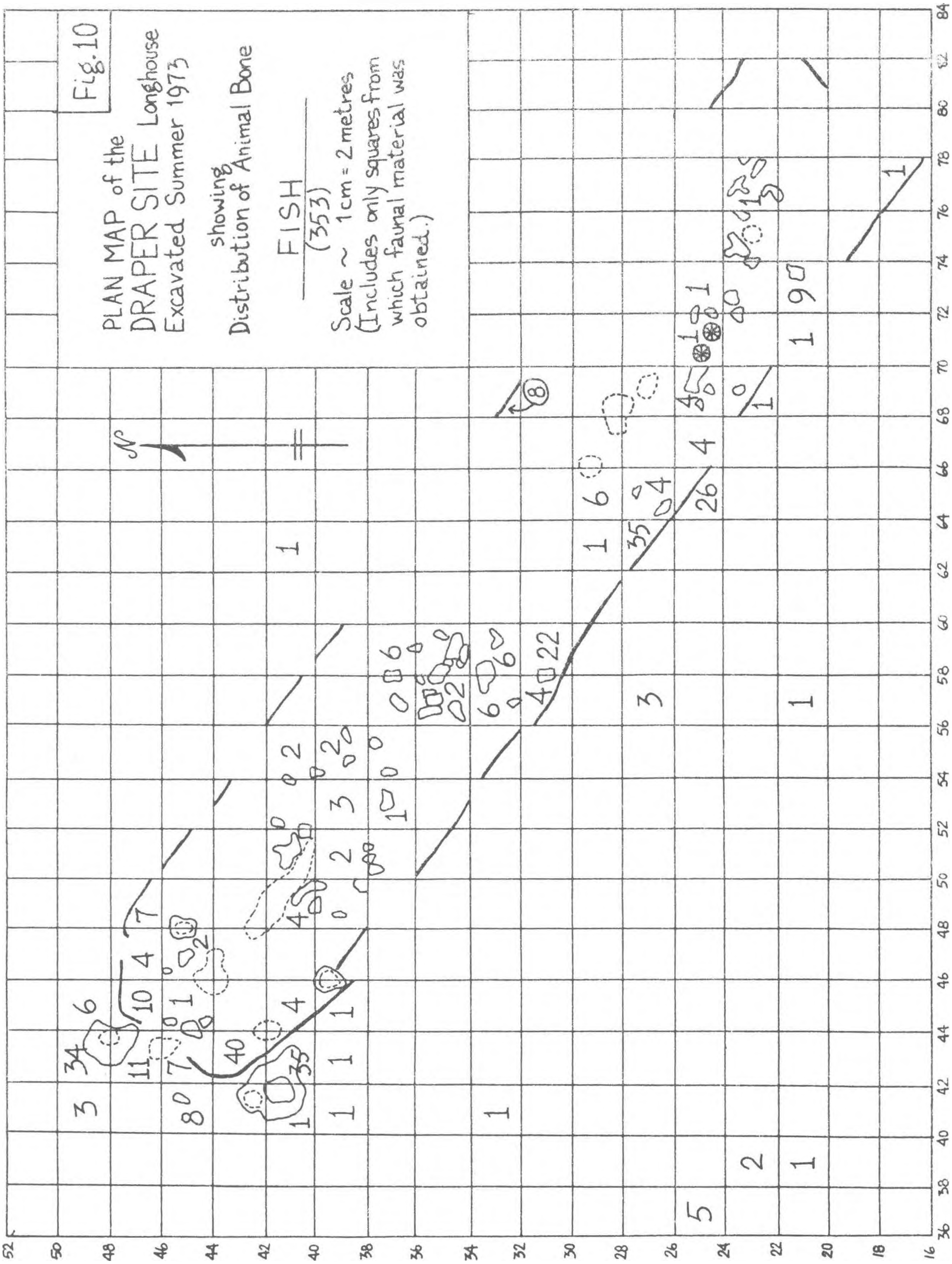


Fig. 10
PLAN MAP of the DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
FISH
(353)
Scale ~ 1cm = 2 metres
(Includes only squares from which faunal material was obtained.)

notched and obviously represents some type of artifact, possibly a bowl or scoop. Perhaps it was discarded into the midden after breakage.

Blanding's Turtle:

A considerably larger though far less common turtle, the Blanding's was represented by four peripheral bones which were at one time adjoining bones of the left carapace edge. Some polish on the surfaces suggests an artifact. The two isolated finds (1400:2 and 1478:6–8) were separated by just over one metre – the latter on the west "doorstep", the former almost straight west, outside the structure.

Map Turtle:

Only two portions of this species were recovered, both from the hinder region of the plastron or underside of the shell and both from the same house square. Judging from the scute lines and the lack of a hinge, it cannot be anything but Map Turtle, it is larger than a Painted Turtle, having the size of a Blanding's. They do occur occasionally in the area in rivers and lakes, are quick and decidedly difficult to capture (Conant, 1958).

Table VI Amphibian Distribution and Frequency of Occurrence in the Draper Site, 1973.

	In house		Total	
AMPHIBIAN	# Bones	# Indiv.	# Bones	# Indiv.
cf. True Frogs (Ranidae)	1	1	3	1

Unidentified Turtle:

Very few longbones or parts of longbones were recovered; most of the scrap is from shells, perhaps further supporting the notion that turtles were sought more for raw material than for food. At any rate, just under 50% of this reptilian bone is unidentifiable; without suture and scute lines there is no certain identification possible.

Amphibian Remains:

Amphibians are not of great significance judging by the scant evidence. A femur and a radio-ulna were recovered from 32–34N 42–44E, that is, outside the house, and the third amphibian bone, not identifiable to element, was from the house unit 32–34N 56–58E. The three items probably find their origins in the family of true frogs, Ranidae. Flotation on a more regular basis may have turned up a greater representation of this vertebrate class.

Table VII Invertebrate Distribution and Frequency of Occurrence in the Draper Site, 1973.

	In house	Total
INVERTEBRATES	# Items	# Items
Freshwater Clams (Pelecypoda; Unionidae)	13	13
Snails (Gastropoda): *Anguispira* sp.	63	64
Triodopsis sp.	38	38
Unidentified	5	8
Total	119	123

Invertebrate Remains:

Little can be related to this group of organisms. Too seldom was mention made ethnographically to determine the true importance of these animals in the human diet. References to the discovery of large "pockets" of snails in an excavation may in fact be describing colonies of snails which band together during aestivation, a pattern common among land snails (Burch, 1962). It is interesting to note that Table VII locates almost all of the invertebrate remains in the house.

As for clams, we are little surer of their uses. They are known for their delightful taste in chowder and the Indian quite likely used them as food (see Wintemberg, 1908). Waugh's (1916) study of Iroquoian foods finds that molluscs were often used and cites the presence of such shells in archaeological sites as proof, the Draper people were certainly not relying on shellfish for any substantial part of their diet.

No rigorous examination of these remains was carried out, but the gastropod genera *Triodopsis* and *Anguispira* are represented, the latter occurring somewhat more frequently. Both are very common, undistinguished terrestrial snails. The clams are of the family Unionidae – freshwater bivalves – and may be mostly genus *Elliptio.*

Indeterminate:

A total of seventeen portions of bone were recovered whose identity even at the class level remains in doubt.

IMPLICATIONS OF THE FAUNAL ASSEMBLAGE IN HOUSE STRUCTURE 2

Introduction:

Due to the nature of the material herein examined, we cannot, by mere extrapolation, project the economic patterns of this one house structure onto the entire village. If all the houses to be excavated were occupied simultaneously there may be a good degree of similarity; at present, however, there is only a single house to describe. This is to be kept in mind throughout these discussions, despite any tendencies to make more generally applicable statements.

Subsistence Economy:

No subsistence economy is entirely dependent on animal resources for support. The plant kingdom is almost always involved and the excavations of the Draper longhouse prove that this fact applies at the site. Seed analysis by Crawford and King (this volume) bears out the variety and importance of ancillary plant gathering activities — all this to say nothing of corn horticulture, already well-established in southern Ontario by AD 1450. Bowman (this volume) has pointed to the likely location near the Draper site of a major tract of land, under white pine forest at the time of European contact, representing re-colonized land where the site's corn was probably grown.

Since we are working with the remains of food consumed by only one multiple household, it is not realistic to evaluate the relative importance of plant and animal subsistence resources for the Draper village at this time. Historically, the latter Iroquois occupation of Huronia — into historic times — has been described by eyewitnesses (*viz.* Sagar, Champlain, the Jesuits) as one of impoverished wild game resources, and myriad are the references to consumption of corn gruel (sagamite) with only the occasional addition of flesh, generally fish. Heidenreich (1971:159-60) succinctly reviews the data on corn, noting estimates of 50%—75% as the proportionate importance of corn in the Huron diet. All of these estimates are speculative, and the lack of quantitative figures makes precision impossible.

With problems of preservation of vegetable materials, there is a consequent bias in the archaeological record of food waste towards the more durable bones and teeth. It is then tempting — armed with both the inherent bias and the difficulty of quantifying animal remains — to formulate patterns of subsistence which run counter to extant historical documents. It would appear that most faunal analyses of Iroquoian sites tend to neglect the importance of vegetable sectors, usually due to shortages of talent directed towards analysis of non-animal organic materials. Even then, the collection of vegetable material, by flotation in particular, is not yet a standard practice, although it is becoming more so.

Thus, the ensuing statements must be tempered by considerations of plant value in the diet; it is not enough merely to say "such-and-such an animal supplied the bulk of meat at the site" . . . etc. The number of persons sheltered by Structure 2 could easily have consumed the meat represented by the animals' bones in a period of a year, depending on the population estimate. The squares excavated were cleaned out in their entirety and thus represent a complete sample within the limits of that house; no one can definitely account for midden refuse for food consumed in that house. To further confuse the issue, it must be added that no method has yet been devised to determine the length of occupation in a single house. While ten deer constitute a great deal of meat for one of these multiple households for one year, who can assert that these remains were deposited during one year's occupation, or ten years', or twenty?

Several references in the primary sources on Huron society relate accounts of feasts which temporarily swelled the numbers of house guests manyfold, and such festivities must have substantially augmented the assemblage of food waste. Additionally, we have been given to believe that often enough game was not plentiful and that when hunting success proved good, "eat-all" feasts were common (Tooker, 1964:74). There is no immediate reason to expect the situation at Draper to have been much different, at AD 1450, from a historic northern Huron settlement; for the moment, let us assume similar customs.

Until much more complex "bio-archaeological" analysis has been done on Ontario Iroquois sites, the degree of sophistication in elaborating food economics will *remain* low. The rules of decimal point precision are aptly applied here, simply: precision of conclusion depends on the precision of component information.

Now, to look at the identifications. If we exclude the data from the Invertebrates for the moment, the resulting proportions of vertebrate classes gives a decided advantage in the numbers of bones to the mammals — a full 88% — and fish follow at 8.5%; the other classes combine to make up the remaining 3.5%. Whether the worth of invertebrate findings was significant is a moot point in light of the poor ethnographic coverage of the subject. Freshwater clams are definitely edible and in lakeside villages they must surely have been exploited. Snails, on the other hand, are of questionable status; while being small and inconvenient sources of minimal protein, they could have been consumed. Clusters of terrestrial snails in the earth, such as are found in three squares examined [1], do not necessarily represent caches since, as mentioned before, they tend to congregate during periods of aestivation. However, it should be noted that as 85 of 95 squares analyzed for faunal content are considered within house limits, fully 119 of 123 invertebrate remains, including clam shells, were recovered from house context; there is, then, a strong suggestion that these items were brought in as food. However, some of the pit features might be *expected* to possess a high organic content, similar to midden soil and thus be attractive to aestivating gastropods; this phenomenon probably continued well after abandonment of the site.

Mammalian protein yield was obviously related intimately with the deer hunt. At nearly every Ontario Iroquois site deer is the major mammalian species. A minimum count of individuals in Structure 2 is ten animals, each adult yielding an average of one hundred pounds of meat (White, 1953). The 900+ lbs. of venison would have been just under half the total yield of mammalian meat. Black bear is often recorded as present in Iroquoian sites and the Draper house boasts of at least two bears for which White *(ibid.)* would allow approximately 210 lbs. of edible meat each. The elk – if indeed the meagre representation of bones argues for the capture and consumption of one whole animal – may have provided another 350 lbs. of edible stuff *(ibid.)*. Many of the other animals trapped or otherwise procured may have served in times of scarcity when larger animals could not be found. Of course, the other species may reflect hunting aimed at procurement of fur primarily, and not food. At any rate, we are dealing with a bone assemblage that argues for consumption of 1670+ lbs. of meat from three mammalian species only.

Avian material appears to take very limited part in the Draper diet by the standards set in House 2. Only one species seems important it was represented by only two individuals. Grouse and passenger pigeon were marginally important but the small sample is difficult to interpret. According to White *(op. cit.)*, a turkey might provide 8.5 lbs. of edible flesh from an average 12 lb. bird. The remainder of avian material can at present be relegated to the status of occasional or fortuitous occurrence.

The remains of fish are puzzling to some extent by their scarcity. Only 340 bones were associated with the house, indicating ten individuals of six or more species. (The counts would be increased with further identifications.) If these scant remains actually do represent the consumption of fish, then the inhabitants were either not in a position to harvest the nearby creek resources, or the creek (and Lake Ontario?) was not their choice of focus for exploitation. The latter seems more tenable considering that agriculture, hunting, and trading would likely have been the mainstays of the economy. Too, we are aware of the accounts of Sagard and Champlain telling of intensive fishing taking place away from the home village – hence part of the justification for the concept of satellite hamlets of specialized nature. If filletting was completed at the auxiliary hamlet for most fishing, fish bone would be scarcer at the home village. Perhaps the White site is that very thing – the associate or adjunct of Draper where specialized food-gathering activities took place. The limited test excavations at White carried on simultaneously with the work at Draper did, indeed, produce an array of fish bone just over 50% of the total. Avian bone was also much higher in number, leaving mammalian bone at a level of less than 30% of which 10.3% is human material. It may be added, in absence of firmer support for the more tenable alternative above, that clam shell remains are likewise scarce at Draper; while the two activities are not intimately related, fishing and clamming may have been combined by their focus on the same environmental locations along the creek.

Further animal remains are of minimal importance in the food economy. As stated in an earlier section, the turtles were captured probably as much for their use in manufacturing tools and utensils as for their value in supplementing the native diet. Frogs may not have had any effect at all; rather, they may be of entirely fortuitous occurrence.

Seasonality of Occupation:

From a zoological standpoint, a statement on the seasonal habitation is generally based on the occurrence of transient avifauna which ideally occur at certain set times during the year. In addition, there is data to be gathered from examination of the developmental stages of deer antler and frontal pedicles. Reliable, isolatable age data on certain creatures, correlated with published information on the timing of births, can give broad grounds for seasonal predictions; in this latter, the variability of physiological function (e.g. epiphyseal fusion) is great enough that tight predictions are highly suspect. Too, it is somewhat ludicrous to assume that fish were necessarily caught during spawning time when the fish retire to shallow water, inshore; fishing is an activity of the entire year, and ice is no barrier to the keen fisherman.

First, we shall examine some of the evidence from the

[1] 20 *Anguispira* in 30–32N 58–60E; 25 *Anguispira* in 40–42N 48–50E; 11 Anguispira in 46–48N 48–50E.

avifauna. The waterfowl including loon, goose, teal, and bufflehead are migratory water birds but they may occur in the Pickering area at almost any time of year. Loons are occasionally seen on larger, unfrozen bodies of water in winter but only if the weather remains mild enough; they are too vulnerable on land because they can get airborne only from the water. In regard to Canada Geese, the Baillie-Saunders records for Toronto and environs (T.F.N.S., 1968) indicate occasional wintering birds, but that during the three summer months from June to August they are wholly absent. Much the same may be said for buffleheads, in that they are absent from the area in midsummer; they do however remain throughout the winter in good numbers and return north starting in May. The lack of specific identification of the teal bones precludes a precise statement since one species removes south in the winter while the other may remain in small numbers.

Other migrants include the Robin and Passenger Pigeon. Of the first we know that very occasionally small numbers will remain in the area over winter, but the bulk of the population flies south to usher in the spring with its return. The pigeon, on the other hand, probably did not stay around after fall had set in. Another migrant of special notice is the Hawk Owl. As noted in the Descriptive section the Hawk Owl is an Arctic bird, one of few characteristically northern birds. Since its diet depends largely on meadow voles and other like creatures, it is natural that it, like the great Snowy Owl – in similar straits, would migrate south. Local records indicate a residence from the 3rd week of October to the last week of February, thus conveniently dating a late fall-winter capture.

Of less importance for the seasonal cycle at Draper were the non-migrant Wild Turkey and Ruffed Grouse. Since they were able to forage throughout the winter months, they did not move south and were available to the inhabitants of the longhouse at that time. Notwithstanding the pressure on waterfowl available during winter, it may be significant that the largest of all the birds collected was that which was represented by the greatest number of bones and by at least two individuals – not an overwhelming sample but possibly indicative of an economy of effort.

One of the conditions eminently responsible for the lack of firm habit in several of the migrant bird species is the moderating effect of Lake Ontario. Only rarely is a winter on the north side of the Lake labelled "severe", and often the sunny, calm days stand in dark contrast to the snow cover. Thus, many of the hardier individuals may find tolerable habitat and can forego the flight south, so that in the area of the lake we must be prepared for anomalies of habit. The avian bone data, then, are broadly suggestive of a year-round occupation of House 2.

Another approach to seasonality involves the examination of deer antler basal portions and frontal bone pedicles. In the process of normal rack shedding, the antler base presents a convex surface while the pedicle is concave. A regenerating pedicle, on the other hand, features a convex growing surface. So, in Structure 2 there occurred six portions of frontal bone with at least a part of the pedicle. One item (656:1) included frontal, pedicle, and a portion of still fused antler below the first, or brow, tine; it was not shed before the animal was killed. Another (1434:1) is too short in the pedicle to judge its state of fusion. The remaining four frontal bones feature definite signs of forceful removal of antler from pedicle, before the natural shedding had run its course. That they all appear to be hard and dense suggests that they are full grown and well past the velvet stage; therefore, the antlers were probably removed during the fall, say, September to early December. After this time, the antlers have been shed (Henke, 1971). No instances of naturally shed antlers were noted in the collection.

While antler evidence points to fall hunting activities, there is some evidence of deer hunting at other times of the year. The very young metapodial bone (1487:1) just inside the west end doorway is not precisely ageable but assuming that fawns are born from May to June and are weaned at three to four months (Peterson, 1966:324), it may be that it was still a fall kill. Other subadult material was recovered in the form of deciduous teeth and one each of maxilla and mandible containing deciduous teeth. While the method of aging by attrition has been called into question by recent workers on annual incisor cementum ring counts, it has some value in a broad way. (One Natural Resources Game officer said that it has been shown, by the new method, to be less than 70% accurate. G. Preston, pers. comm.) As single teeth cannot be aged by attrition it remains to examine the mandible (576:1) and maxilla (582:1). The mandible features the deciduous premolar series P_2-P_4 and the maxilla features the deciduous P_3, P_4 and permanent M_1. With reference to Severinghaus' (1949) treatment of whitetailed deer dental ageing techniques, the mandible is judged to be between 6 and 8 months of age. The maxilla is, no doubt, of similar age. Deer of that age, born in May or June, were likely killed sometime between November and February.

Thus, we have circumstantial evidence for the capture of deer at least during the months from September to February. Summer kills are not ruled out, however. What is apparent is the lack of reliable means for determining summer kills; the presence of incompletely calcified antler may indicate antlers "in velvet", but this is not a recommended criterion.

Beyond avian and deer remains, little of the faunal assemblage is of value in assessing the time of occupation. Bears, although not the deep sleepers of popular belief, would usually be captured during the spring to fall period, and woodchucks are usually underground from October to March (Peterson, *op. cit.*:116). Chipmunks hibernate from November to March, with occasional forays in milder weather (*ibid.*:123). The remainder of the mammalian species associated with the house could be taken at any time of year. The warm months are indicated by the fact that the amphibians and turtles repair to the creek bottom to pass the winter, and are not available except in summer. Fish as stated before are active year-round and it only requires a keen and knowledgeable fisherman to make a catch, summer or winter.

The foregoing inclines us to accept that House 2 was occupied on a year-round basis; that in some seasons the house may have been only nominally occupied by a few people is an inference requiring additional data. It is assumed that the bones in the house were deposited shortly after capture by the hunter – that is, assuming that the material was not deposited after abandonment, nor brought in by non-human agent.

Local Environment:

Insofar as animals react with their environment and all the organisms in it, there is some basis for reconstructing the local conditions through interpretation of the fauna identified in the Draper house. Of course, at a prior level namely the trophic level which includes the plants that nourish the herbivores, there is firmer basis for defining the environment. Thus, what can be said of local habitat availability on the evidence of animals alone is necessarily of a general nature.

One assumption that seems well-founded is that the Pickering area, at the time of Late prehistoric Iroquoian occupation, was forested by a typical beech-maple "climax" (Bowman, this volume). The even-aged pine stand which forms the focus of Bowman's hypothesis is considered the successful result of forest clearance for maize agriculture which was eventually abandoned.

Two points are then clear: (a) the surrounding, undisturbed countryside was covered by a primarily hardwood forest, and (b) clearings for maize production created forest edge habitat and to some extent a treeless tract, attractive to some varieties of animals and birds. The cornfield itself may have attracted a few species. We also have to consider the resources of the creek which runs alongside the village to the east. Such watery habitat was essential not only for the villagers but also for certain types of animals and birds. The variety of habitat is nearly complete and requires only the addition of some coniferous cover attractive to the marten and fisher, for example. It is altogether likely that white pine and other conifers were occasionally present in abandoned plots or burn areas; pine is a pioneer species in many situations. Nichols' (1935) definition of the "eastern hemlock-white pine-northern hardwood forest" terms the white pine "an important tree in the reclamation of abandoned farm lands and of burned or lumbered forest lands" (p. 410). Further, from observations in an undisturbed plot of similar forest in Michigan, Nichols noted that "scattered uneven-aged pine usually grew in small forest openings due to windfalls and the like" (p. 411).

One simple method of extrapolating habitat is the scheme of grading animals by their habitat preferences, giving a grade of 2 for preferred habitat, and a single point for a lesser choice. Table IX was constructed from Cleland (1966:102, and Appendix H) and while it is not absolutely infallible, it does give some impression of the variety of local environment. From the sample included in the Table, it is clearly evident that the deciduous forest and forest

Table VIIIa Classification of Deer Skeletal Elements Identified from the Draper Site, 1973.

FORELIMB		SKULL and MANDIBLE	
Scapula :	21	Skull :	32
Humerus :	21	Mandible :	30
Ulna :	15	Teeth :	125
Radius :	36	Antler :	58
Carpal :	34		
Metapodial :	51		
	178		245
HINDLIMB		**AXIAL SKELETON**	
Femur :	27	Vertebral :	36
Tibia :	35	Rib :	25
Fibula :	6	Pelvic :	11
Patella :	7		
Tarsal :	50		
Metapodial :	71		
	196		72

MISCELLANEOUS LIMB	
Unidentified Metapodial :	59
Phalanges :	178
Sesamoids .	18
	255

Table VIIIb Deer Distal Extremity Bones Identified from the Draper Site, 1973

LOWER LEG (front and hind)	
Carpals and Tarsals :	84
Metapodials :	181
Phalanges :	178
Sesamoids :	18
	461

Table IX Habitat Preference Chart for Selected Animals from Draper House Structure No. 2. (After Cleland, 1966.)

	HABITAT			
Species	Deciduous Forest	Deciduous Forest edge	Coniferous Forest	Aquatic
Snowshoe Hare			2	
Cottontail Rabbit		2		
Grey Squirrel	2			
Red Squirrel		2		
Woodchuck	2	1		
Chipmunk	1	2		
Beaver				2
Muskrat				2
Red Fox	1	1	2	
Grey Fox	2	1		
Black Bear	2	1	1	
Raccoon	2	1		
Mink				2
Marten			2	
Fisher	1		2	
Otter				2
Deer	1	2		
Elk		2		
Loon, Goose, Duck				6
Grouse	2		1	
Turkey	2	1		
Passenger Pigeon	2			
Robin		2		
	20	16	12	15

environments are of great significance, polling 36 out of 63 points tallied. Aquatic habitat is also important, as several bird species, beaver, muskrat and two mustelids are closely associated with water. The not unimpressive total of 12 points for the conifer forest habitat speaks of local invasion of needle-leaved trees more characteristic of the northern forests, but capable of growth under suitable conditions in the south. It is interesting to discover that the six mammalian species listed under conifer forest preference are more numerous in, and in some cases presently restricted to, the northern boreal forests. The cornfield at harvest time may have lured a hungry fauna including avian species such as the goose, grouse, turkey and pigeon, and mammals like the grey squirrel, chipmunk, and raccoon. At any rate, the area seems to have boasted abundance and variety of food resources.

Butchering, Skinning, and Related Activity Areas:

In a faunal sample of about 4100 items, it is remarkable that only 37 bones in house context were found to have suffered alteration through the processes of butchering and skinning (aside from the *bona fide* artifacts analyzed by Ferguson – this volume). Such marks were detected on bones of five mammalian species and one avian species. The former consist of deer, woodchuck, bear, dog, and otter; the latter is one of the teal bones. In addition, eleven bones are identified only as medium/large mammal. Figure 11 indicates the location of the modified bone.

One "concentration" occurs at 26–30N 60–66E, more or less. Two items are portions of woodchuck innominate (pelvis), one right (315:3) the other left (347:2). Since a skinning operation would be unlikely to produce the marks encountered on the medial surface of an ilium, it is considered good evidence that this particular specimen was destined for the stew pot. Likewise, the teal femur (350:6) was cut across the caput, and indicates that dismemberment of the leg was the object. In contrast, the otter mandible (376:1) was cut on the buccal or lateral surface of the corpus, and as such probably represents a slip of the knife during skinning. The remaining five bones are (m/l) mammal bone portions, some chewed by carnivorous teeth and two altered by exposure to heat. The nine specimens are adjacent to a fire pit but activities appear mixed, and thus are not amenable to specific labels. The general area will be called Cut Bone Activity Area No. 1 (see Fig. 11).

Another focus of attention re: cut bones occurs in 34–38N 50–54E where four of five items are deer. One of these is a proximal phalanx with cut marks appearing on the dorsal surface (586:1); this may be the result of extraction for toggle manufacture but could also be due to skinning procedures. A mandibular corpus (709:3) was cut along the inferior margin and probable butchering marks were also detected on the anterior surface of a hind metapodial (740:1) and the posterior margin of a humeral shaft (741:1). The fifth portion was miscellaneous mammal. Except for the phalanx, all of these examples could indicate food preparation; true, the nearest hearth is some distance away but this may not be significant. This is here referred to as Cut Bone Activity Area No. 2.

Three other deer bones may be linked by similar handling. A right talus (1175:1) cut medially, a left fibula (1183:2) cut laterally, and a metapodial shaft fragment (1198:3) cut transversely are located at a place on the leg convenient for removal of the hide, that is, the ankle joint or just below it. They are located in 40–42N 42–46E. That this joint was severed is not necessarily a signal that butchering took place away from the village, leaving the meatless lower legs behind; on the contrary, many metapodial slivers are turned into tools, since the cortical density of the metapodials (cannon bones) is adequate for many tool purposes, and thuse the entire leg skeletons were probably returned to the camp with the rest of the carcass. These squares define Cut Bone Activity Area No. 3.

Further, two nearby squares (48–50N 42–56E) outside the west doorway yielded five butchered deer bones, comprising portions of three hind metapodials, a tibial portion, and a shaft fragment of humerus (1617:3, 1660:5, 1707:3, 1666:1, 1688:5). However, since the two squares are running into a midden concentration, it is not possible to allocate those squares as a butchering area, the bones may have been discarded from a preparation area within the house. Thus, no Area label will be accorded. Ferguson (this volume) has imputed function to several areas nearby; notably, her Area V was considered a woodworking area, and while the presence of adzes weighs heavily in favor of such designation the utilized flakes may also have been used during butchering in the adjacent area.

Lacking any real concentrations of butchered bone, it is not feasible to designate butchering areas except as noted above. Possibly such work was done outside in better light, but this would not explain the lack of even a diffused collection of cut material. The easy explanation allows for consummate skill in dismembering and skinning such that little damage was suffered by the skeleton.

No other cut bone fell into a concentration detectable in the small collection. However, several individual items require a short note. A further woodchuck bone – a left femur (887:1) – was cut on the posterior surface at midshaft; this, coupled with the evidence of butchered pelvic elements above, confirms that woodchuck was being eaten and that not all of the remains of the species are intrusive, post-occupational debris. The sole dog bone on the list was the midshaft portion of a right femur (1343:1) featuring cut marks on the anterior surface; this might have been a sloppy butchering job or it may be linked with bead manufacture, since another identical portion (1339:1) from the same square was described as a bead-type artifact. Both items were recovered from separate features in the square (44–46N 46–48E) at depths of 30 and 33 cm. Altogether, six dog and *Canis* sp. bones were recovered from this last square and two were definite bead-type artifacts. The single bear element was a very young proximal phalanx (1386:1) with cut marks on the dorsal surface; as these are not likely to be butchering marks, we might suspect that skinning procedures were operative.

Since the west doorway would act as a focus of activity as far as human traffic is concerned, one should not be too surprised at the occurrence of waste butchered/skinned bone specimens, as a result either of housecleaning or of manipulation by dogs. Too, the proximity of a midden does not lessen the likelihood that waste material was liable to be scattered about the area. So, no serious thought is given to the fact that about ¼ of the total bone in the defined house area was recovered from five squares at the west end of the structure (although if future excavations reveal other bone concentrations such as this, in other house areas, attention should be directed towards possible social implications of such bone concentrations). Thus, the most striking concentration of butchered bone in the structure appears to be that which was first described as Cut Bone Activity Areas No. 1; interestingly, the *identified* bone in this area was otter, woodchuck and teal – no deer.

Cutbone examined was distributed among the species as follows:

Deer	18	Dog	1
Woodchuck	3	*Canis* sp.	1
Bear	1	Mam.sp.(m/1)	11
Otter	1	Teal sp.	1

Distribution of Phalanges:

One of several hypotheses put forth for testing in the faunal analysis concerns the value of furs and fur-trading. As Hayden has pointed out (this volume), fur was a commodity of prime importance to the Huron, particularly for warmth in the winter. While trade with Europeans did not begin until one or two centuries later, it is entirely likely that a fairly brisk trade was prosecuted with the northern Algonkian peoples from whom furs were purchased (amongst other things) principally for maize. Such business is recorded historically and probably existed in precontact time.

According to Hayden's postulate regarding the corporate base of longhouse occupants, there may have been one or two prestigious persons in whose association one might expect some degree of security and prosperity. One point that arose from discussion of this was that if this head man were to have controlled, say, the fur-trading interests of the house, then there would be:

> ". . . a possibility that this fellow of high prestige who was responsible for getting such furs and distributing them would have had more passing through his hands. If so, there is an outside chance that we should find a high percentage of phalanges of fur-bearing animals in the immediate vicinity of that hearth if phalanges were kept intact with the furs." [40–43N 48–52E] (Hayden, pers. comm.)

The test of this hypothesis produced negative results. In point of fact, reference to Figs. 12 and 13 shows that the eleven excavated squares surrounding that large hearth (38–44N 46–54E) contain eleven phalanges of an "in-house" total of 196. Of these eleven pieces, nine are deer phalanges and, of these, three are toggle artifacts or parts thereof. Thus, not only are animal toe elements not plentiful in the area of that fire pit, they are actually scarce compared to almost all remaining areas of the structure. (Note: the items thus mapped include modified bone and all portions recognizable as phalanges of deer; the actual number of whole phalanges may be considerably less.)

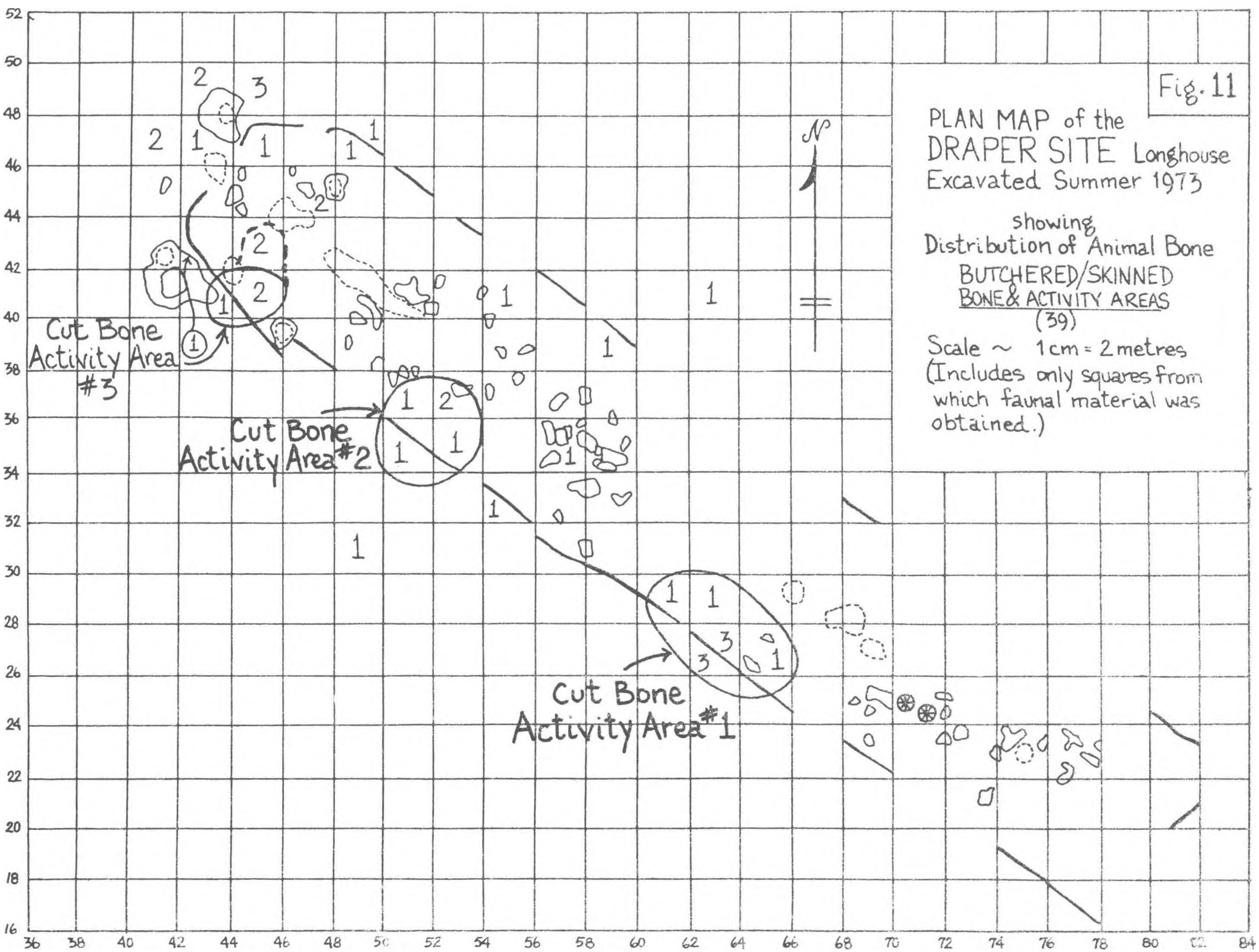


Fig. 11
PLAN MAP of the DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
BUTCHERED/SKINNED
BONE & ACTIVITY AREAS
(39)
Scale ~ 1cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N
Cut Bone Activity Area #3
Cut Bone Activity Area #2
Cut Bone Activity Area #1
52 50 48 46 44 42 40 38 36 34 32 30 28 26 24 22 20 18 16
36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84

On the topic of deer phalanges, toggle artifacts number forty in association with the structure. Significant here may be the fact that twenty-eight of them occur north of the 36N coordinate; they seem to cluster around the smaller hearth centred at 44N 46E, although nine occur in the two midden squares several metres north (Fig. 12).

Further, one may note that the seventeen bear phalanges form at least two loose concentrations, although the looseness may be entirely due to chance. Seven of the bones are distributed about the west end doorway (Fig. 13) and the pattern only suggests clustering. A second group of five phalanges in, and to the west of, the pit cluster at 34–36N 56–58E may also be a significant skinning area; this area corresponds well with Cut Bone Activity Area No. 2.

There are no hard distribution data, then, to support the hoarding of furs. Such is not meant to deflate the hypothesis of the prestigious head man in a longhouse composed of economically single-minded persons, since phalanges may not have been left in the fur (as indicated by transverse skinning cuts in the region of the "ankle" on deer). It simply means that the course of proof lies in a different direction.

Burnt Bone:

Although some ideas concerning the presence and distribution of charred and calcined bone are rather naïve, nevertheless, some interesting problems can be pinpointed and some resolved. For example, the presence of burnt bone is not automatic proof that meat was roasted (vs. boiling); much bone could find its way into a fire after the meat was consumed. Too, burning of bone is a recognized method of hardening the material for use in tool manufacture, such as projectile points, and in some cases such purposes can be detected by the charred, brittle nature of the bone.

The distribution of burnt bone in Structure 2 is not even, but it is fairly wide (Fig. 14). Several patterns are apparent, however, which may have been unexpected. Around hearth pits, there appear to be different rates of bone deposition, depending on factors unknown. The major evidence for the designation of hearth areas is the whitish ash, reddened earth beneath, and perhaps fire-cracked rocks; but are we justified in assuming that concentrations of burnt and calcined bone are valid signs of a hearth in absence of the more conventional clues?

At least three areas are of interest in this matter. One hearth, centred at 44N 46E and of average size, is itself void of burnt bone, and the four surrounding squares contain merely five burnt portions of bone. In the wider environs (16 2-metre squares) only 98 portions were deposited, but this greater area contains three other hearths, one of them the larger pit/hearth complex centred at 41N 50E. The scarcity of such bone in the first hearth is a mystery. Likewise, the paucity of burnt bone around the major hearth is puzzling. The third area coincides with the pit cluster in 34–36N 56–58E; that one square alone contains 62 burnt items and the nine surrounding units total 135 charred/calcined fragments. Excavation notes fail to describe any evidence of reddened sand or *in situ* hearth ash, although many of the pits in the vicinity contain white ash, and a major hearth may well be located under the nearby large maple tree, rooted in the centre of the house. The question remains: does the concentration of heat-treated bone imply hearth activity? Is there in fact a vague fireplace, not detectable by soil colour and texture variation? Certainly this last area is central (across the house) and spaced suggestively along the length of the house.

Bone Altered by Dogs – A Hypothesis:

Alluded to in the Preface, the assemblage of bone to be described here has undergone a certain set of modifications which strongly suggest that domestic canines were major factors in the rearrangement of waste bone in the house, and also in the processes of bone fragmentation which produced such a large amount of unidentifiable bone (rate of identification was about 35%).

Bones were found to have been subjected to many non-human alterations, and a very common mode of degradation involved medium-sized carnivores carrying off waste bone and chewing on it, leaving ample evidence in the cortical surface. A total of 651 bone portions from the house featured carnivorous tooth marks. Given that the east end of the house is not well-represented by *any* materials, the chewed bone is widely distributed (Figs. 15, 16), with the majority encountered again at the west end. Since most of the excavated squares in and about the structure possess a sample of this chewed bone, it seems likely that some mechanism of spread was operating in order to cause the "even" distribution; it is a simple step to conclude that dogs (the presumed tailors of the altered bone) indeed had a large part in the rearrangement of the material, nor need this proposition apply solely to osseous remains. Dogs were probably never restrained, and had full run of the house; in winter they likely slept amongst the Indians themselves to impart their warmth.

In further examination of canine manipulation of household debris and the implication of dogs in the fragmentation process, a type of "erosion" dissimilar to that observed in water-rolled bone was detected in the physical condition of 369 bone portions and fragments. The condition is difficult to describe but the effects are not readily mis-

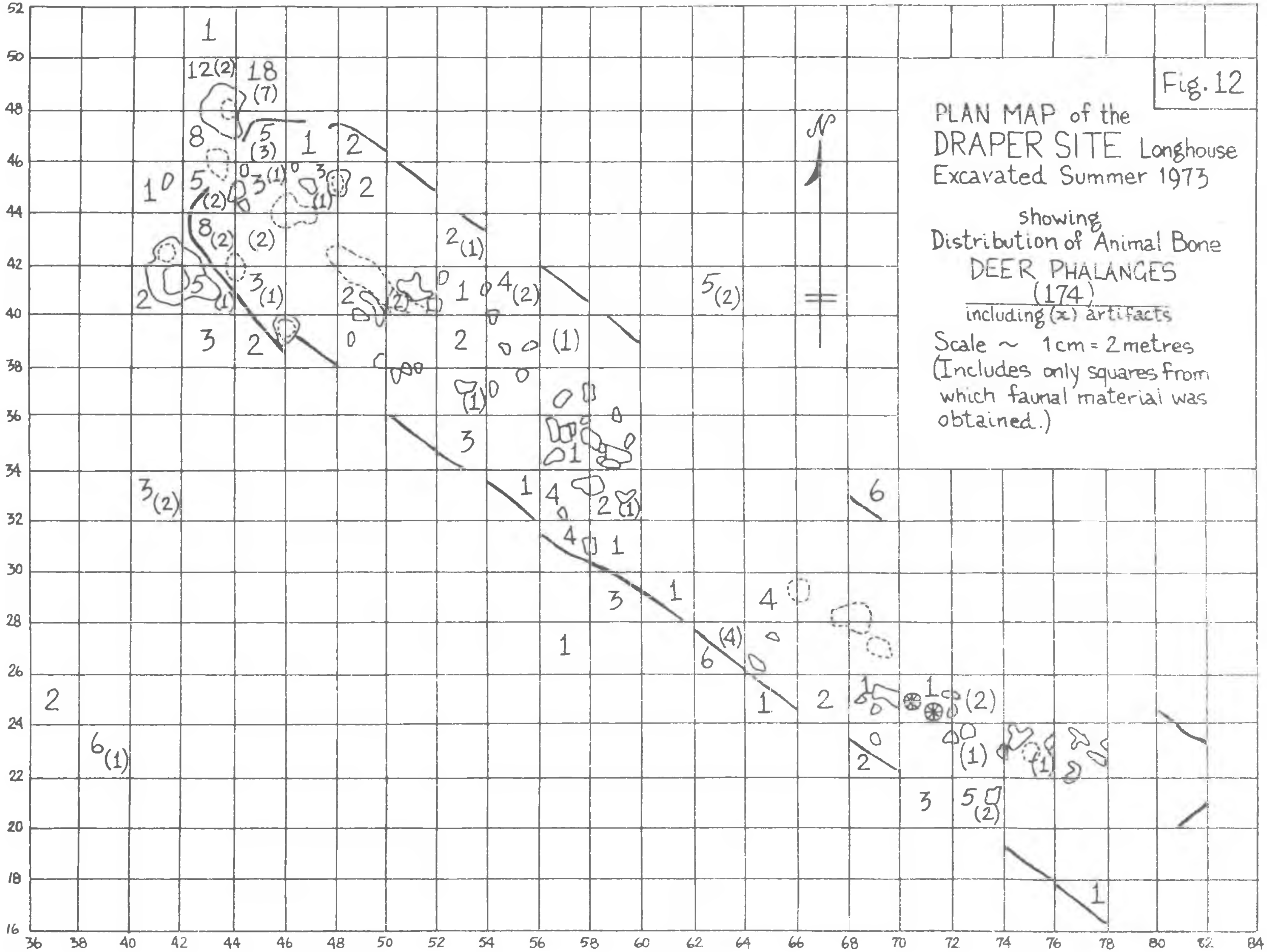


Fig. 12
PLAN MAP of the DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
DEER PHALANGES
(174)
including (x) artifacts
Scale ~ 1cm = 2metres
(Includes only squares from which faunal material was obtained.)
N

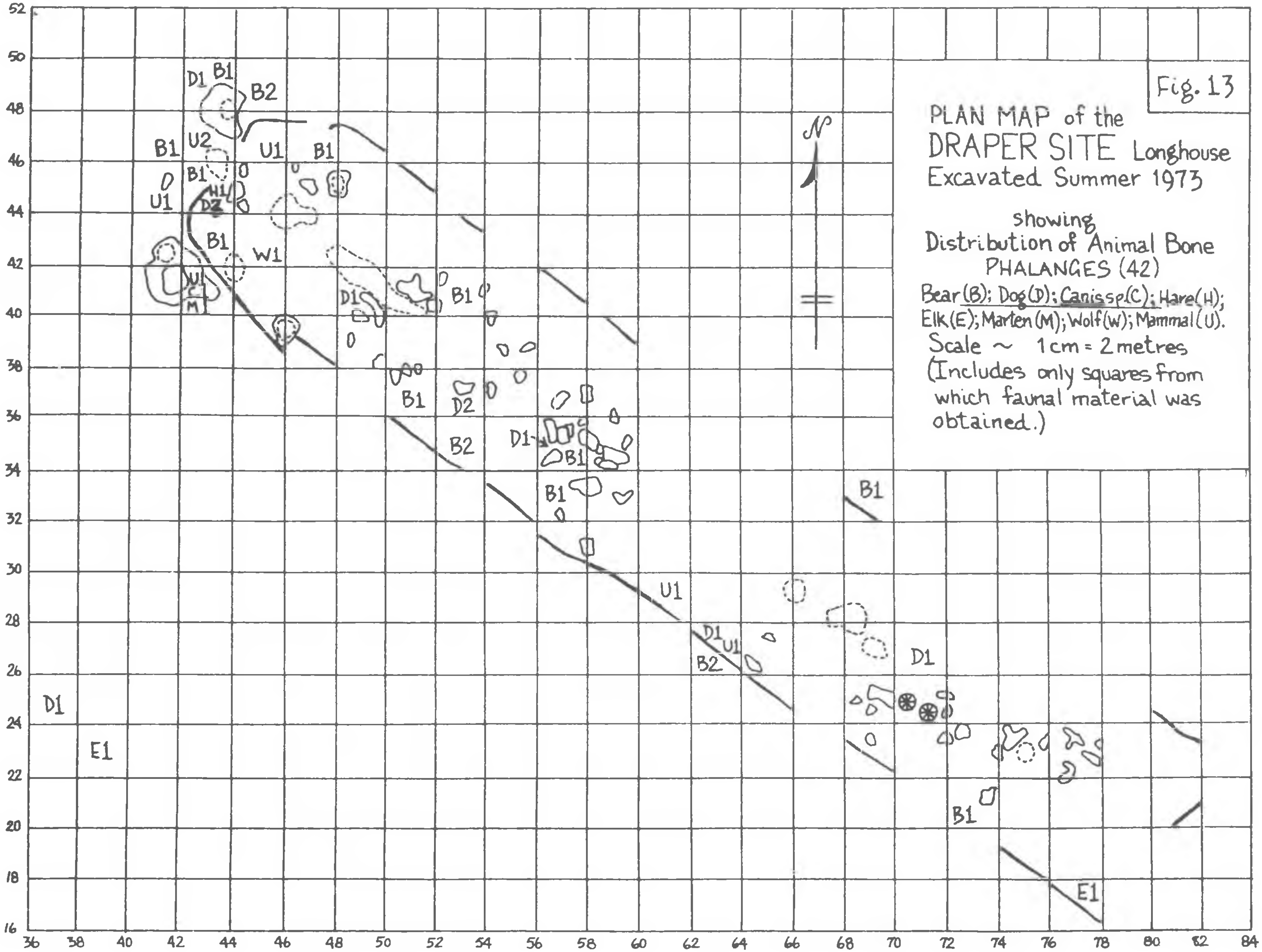


Fig. 13
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
PHALANGES (42)
Bear (B); Dog (D); Canis sp. (C); Hare (H);
Elk (E); Marten (M); Wolf (W); Mammal (U).
Scale ~ 1cm = 2 metres
(Includes only squares from
which faunal material was
obtained.)
N

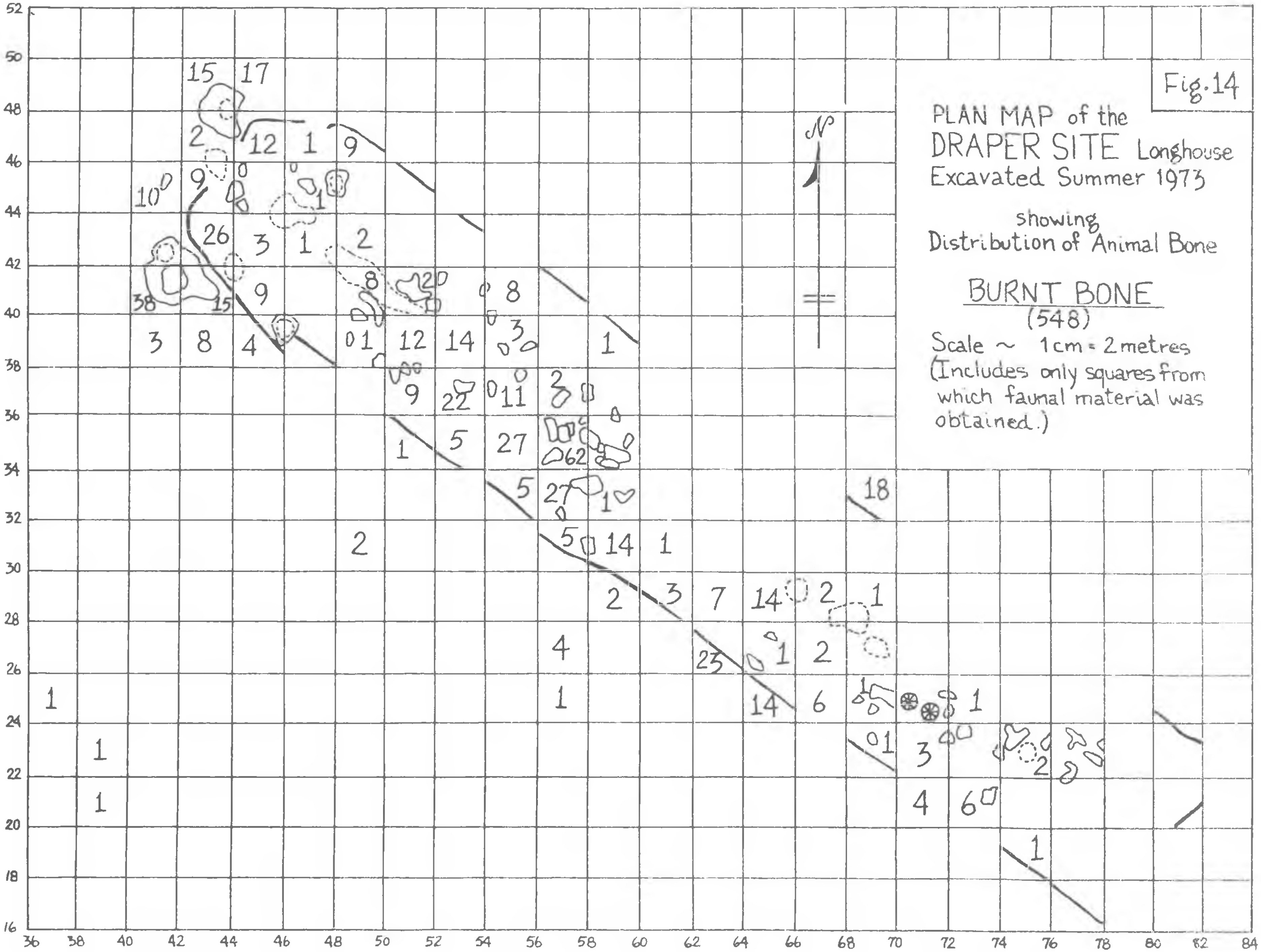


Fig. 14
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
BURNT BONE
(548)
Scale ~ 1 cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N

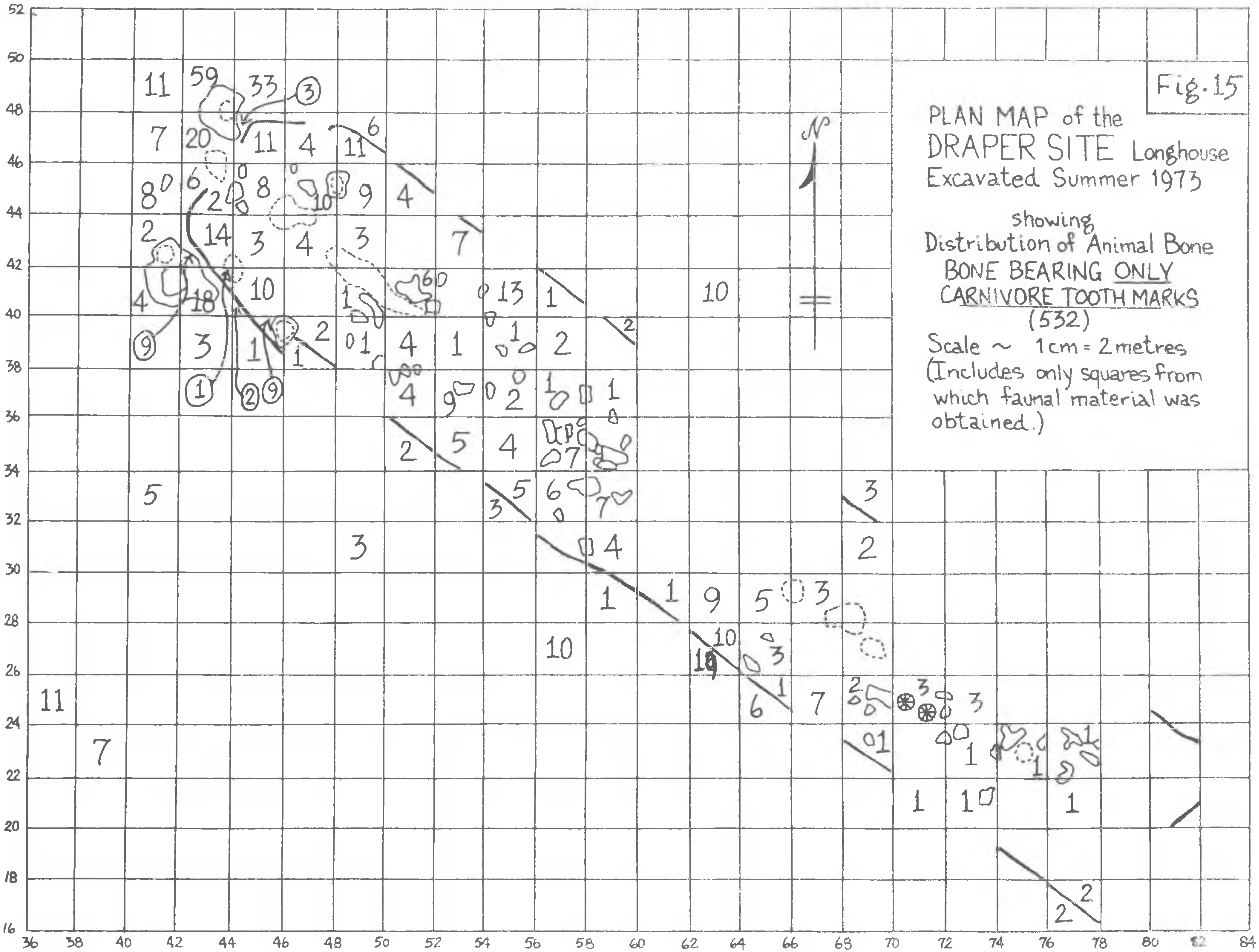


Fig. 15
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
BONE BEARING ONLY
CARNIVORE TOOTH MARKS
(532)
Scale ~ 1cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N

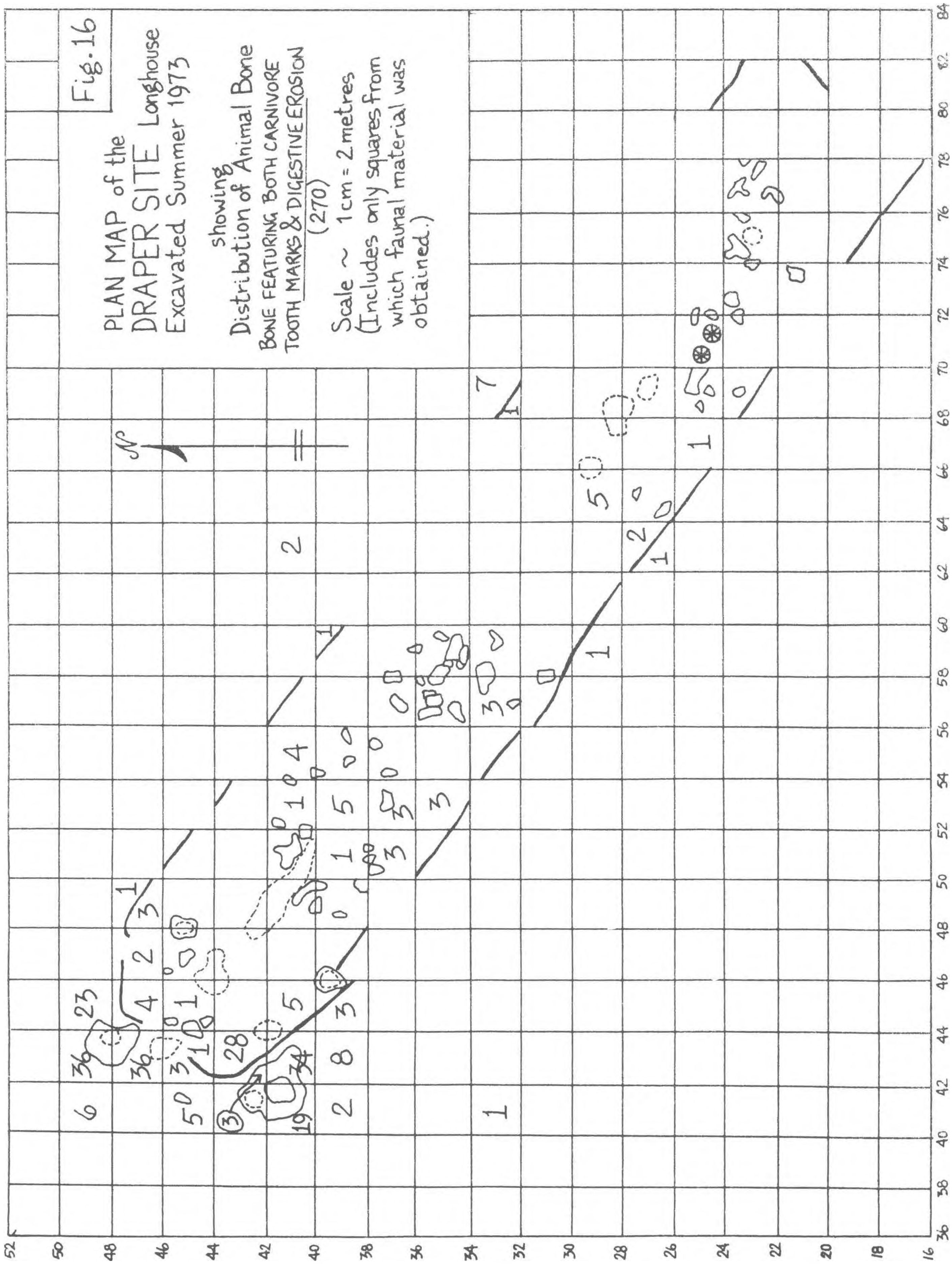


Fig. 16
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
BONE FEATURING BOTH CARNIVORE
TOOTH MARKS & DIGESTIVE EROSION
(270)
Scale ~ 1cm = 2 metres
(Includes only squares from
which faunal material was
obtained.)

taken. Prime examples were noted amongst the 267 or so items which were both chewed *and* "eroded" (Figs. 16, 17). It is postulated that these bones were chewed by dogs, were fragmented, and a number were actually ingested later to be disgorged in normal canine fashion. Digestive juices are then responsible for the erosion which smoothed off the bone surfaces but did not obliterate the tooth marks. (The inspiration for this explanation came from a discussion of the effects on bone of chewing and ingestion by African hyaenas. See Halstead and Middleton, 1973.) See Figures 15–18 for details of distribution.

By way of supporting the above postulate, it may be noted that erosion due to water-rolling or weathering was restricted to only a few portions. If a greater part of the collection had been water-eroded, one would be hard-pressed to explain how it had happened; it would be unrealistic to invoke creek overflow or similar catastrophe since the distributions of material would have been markedly different. Convincing is the fact that the 54 bones chewed by *rodents* featured no such digestive erosion.

Thus, to domestic dogs is imputed a capacity to confuse the archaeologist who attempts to reconstruct patterns of material deposition. How serious this disturbing influence is cannot be measured. Champlain mentioned the scavenging role of dogs in a longhouse at Cahiague: "Unreproved, they thrust their noses into any cooking pot, little foreseeing their own destiny: to end in such a pot." (Bishop, 1971: 220). Dogs have been implicated in another form of influence on bones; Lyon (1970:214) cites examples of dogs in a modern Peruvian village that devour table scraps in a deliberate way. Small birds and animals are easily consumed, but the bones of larger beasts, such as the tapir, peccary, and capybara are left largely intact. She concludes: "In any group that has domestic dogs, the dogs probably destroy a considerable proportion of the bone from smaller animals." *(ibid.).* As for the Draper site, such differential destruction may account for the low representation of such animals as the rabbit, squirrels, chipmunk, and mice.

WIDER IMPLICATIONS FOR HURON SETTLEMENT PATTERNS – A THEORETICAL DISCUSSION

In Hayden's treatment (this volume) of village settlement patterns two large questions arose to which he addressed several points. The questions concern (a) causes of village population increases during the Late Ontario Iroquois sequence, and (b) causes of settlement movement at varying intervals. As also stated, the current studies on Structure 2 are not expected to produce final convincing solutions to these and other problems. Rather, we hope to identify certain problems and direct further investigations of these in the future. The following sections will deal with the zoological basis of the above problems as presently conceived, and also with the ethnographic material relating to summer occupancy in Huron villages. To the problem of village population increases, it shall be said only that *inter*site comparisons may unlock the secret, at least in regard to faunal material; the bone is simply not intrinsically a diagnostic "tool" in the present context.

Site Movement:

In recognizing the concept of large-scale village movement as related by the primary documents, several persons have developed hypotheses to explain the reasons behind such behaviour. Heidenreich (1971:216) concludes that the reasons are multiple, not least of which was soil depletion which forced an unmanageable extension of corn plots; the limited female labour force could no longer tend the fields economically, and increasingly they were vulnerable to enemy attack – at least during the later stages. Another highly favored hypothesis invokes the process of game exhaustion by overkill as the primary force in periodic settlement shifts (see Hayden's discussion, this volume).

For the moment let us assume that this is so – that non-conservationist people will eventually reduce a population of animals to the extent that output in energy (hunting) is not equal to intake (meat retrieval). A vertically controlled deposit would probably reflect (by a skewed curve) the decline in the remains of the principal species. More specifically, one might expect to find a proportional displacement of hunting energy from larger, more efficient meat-producing species to other less desirable species, which are smaller and perhaps more difficult to capture, in order to fill the gap. If this be so, then the curves for these species (over time) should lag out of phase with the peaks of the original "staple" species. Hayden suggested that if such a decline in deer became apparent, then emphasis might very well shift to the consumption of dogs. This scheme has merit for we know that at the early contact Robitaille site in Simcoe Co., Ontario, the only significant mammalian species was domestic dog. The Robitaille director, Marti Latta, has suggested that the shift to eating dogs at this late date may be intimately related to the documented scarcity of wild game in Huronia during the first half of the

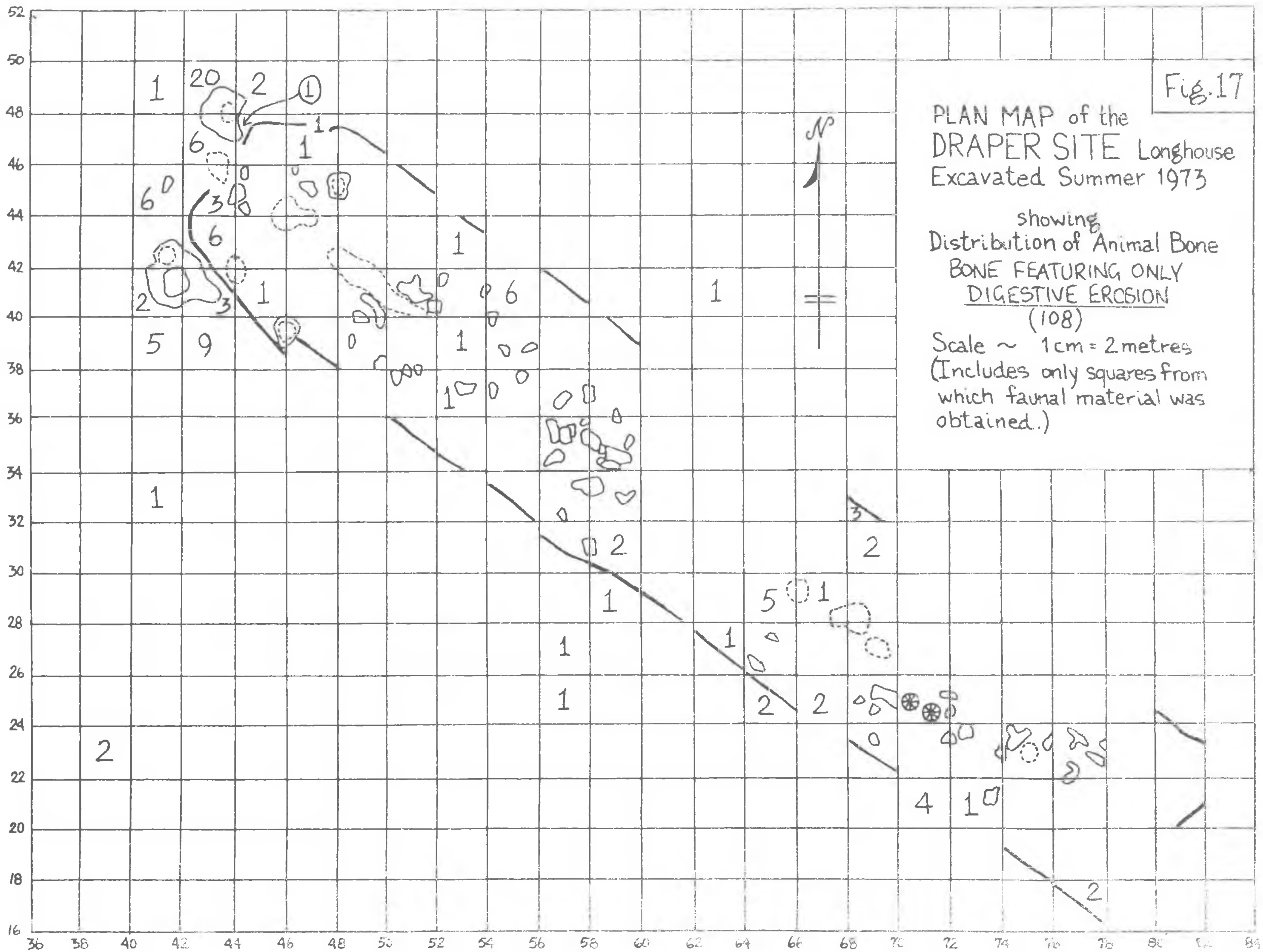


Fig.17
PLAN MAP of the
DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
BONE FEATURING ONLY
DIGESTIVE EROSION
(108)
Scale ~ 1cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N

17th century (Latta, pers. comm.). At any rate, statistics supportive of the game exhaustion theory do not obtain in the present study. Figure 19 clearly shows normal curves over time for all species represented by statistically significant remains; and the mode for all species is nearly identical. Thus, there is no evidence of a shift in hunting behaviour through the occupation levels, nor of a premature exhaustion of any given species.

Seasonal Population Fluctuations:

In the discussion of seasonal occupation of the Draper longhouse, it was concluded that it was used during the full cycle of the year, based on identified food sources which were exploitable during certain periods only. Too often in such studies, however, the conclusions rest at this point, without further recourse to the material.

According to the ethnographic literature on Huron seasonal site use, summer was a time of minimal activity in the principal villages. Women were often living in the fields they tended while the young men were off at war or on trading missions as far away as the lower St. Lawrence (Heidenreich, *op. cit.:* 216-18). A "skeleton" crew of men remained behind to defend as best they could against Iroquois raiding parties. With this in mind, a closer examination of the faunal assemblage gives indication that such practices also held for the Draper site. Of necessity, the evidence is vague, perhaps arguable, but clearly suggestive.

Firstly, avian species are suspiciously weighted towards capture during seasons other than summer. For example, considerable importance may have been attached to the Canada Goose and Bufflehead, and there may be a correlation between their low representation in the sample and the fact that neither occurs in the Pickering area during three months of the summer. Too, while most of the other species identified are not implicated here, the Passenger Pigeon adds strength to the argument. It was extremely abundant throughout southern Ontario from spring to fall, but the very poor showing of pigeon indicates that it was not very significant. Its abundance and comparative ease of capture (possibly, therefore, by women and children) should give it a primacy which is not reflected by the bones. The preferred implication is that the summer village population had been depleted to a level where manpower was concentrated on other tasks such as tending and harvesting corn.

Another small point concerning birds and seasons of capture is the almost total lack of immature avian bone. Although birds do not have epiphyses analogous to those of mammals, they do feature a coarse, porous cortical surface in juvenile bone. As the young appearance lasts for perhaps only 4–6 weeks after hatching (H. Savage, pers. comm.), it is evident that early summer capture can be eliminated.

The mammalian record is not so amenable to the support of the stated activity schedule. The majority source of kill data for deer rests in the frontal pedicles, and they all indicate fall capture. However, we cannot simply suppose that this was the case as a result of the return of traders and warriors at that time. That fine pelts of the major fur-bearers were collected in late fall and winter is, likewise, not because there were more men to prosecute such activities; both the deer and the furred animals were taken at that time of year because it was easier and because furs were prime in the winter.

Regardless of the uncertainty relating to the capture of some of the creatures, there is a vague notion generated that seasonal fluctuations in the village populace did occur, coincidental to the written record.

Summary:

The Draper Structure 2 faunal analysis indicates that the house featured a year-round occupation by people blessed with the abundance of a primarily deciduous hardwood forest; summer may have been a time of minimal occupancy. Little activity involving butchering and skinning was detected. One area at approximate house centre may have been a hearth as it contains a good sample of burnt bone, despite the absence of many other hearth characteristics.

In dealing with problems of wider significance to Ontario Iroquois studies, it is yet early to make statements about processes of change on the basis of the faunal remains. For example, the pressures causing population "explosions" in the 15th century AD, and those relating to settlement shifts may not have had a biological foundation that is detectable in the Draper house faunal assemblage. At any rate, intersite comparisons would appear to be the best source for further study; the data from one house in one site are frankly inconclusive.

Dogs are firmly implicated as prime agents in the rearrangement and fragmentation of waste bone. Their tooth marks are present in a widely distributed assemblage of bone which also features the effects of digestion and regurgitation.

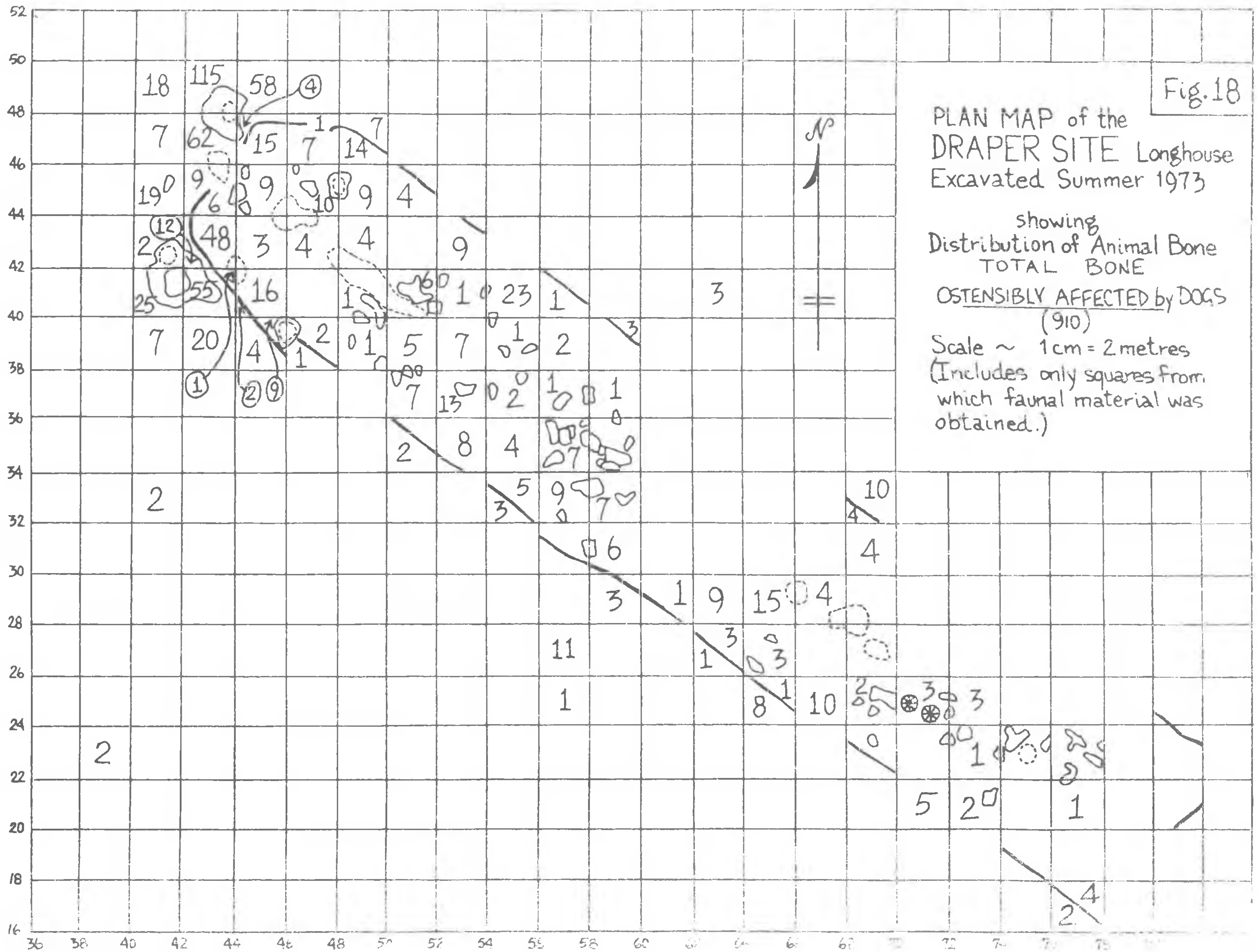
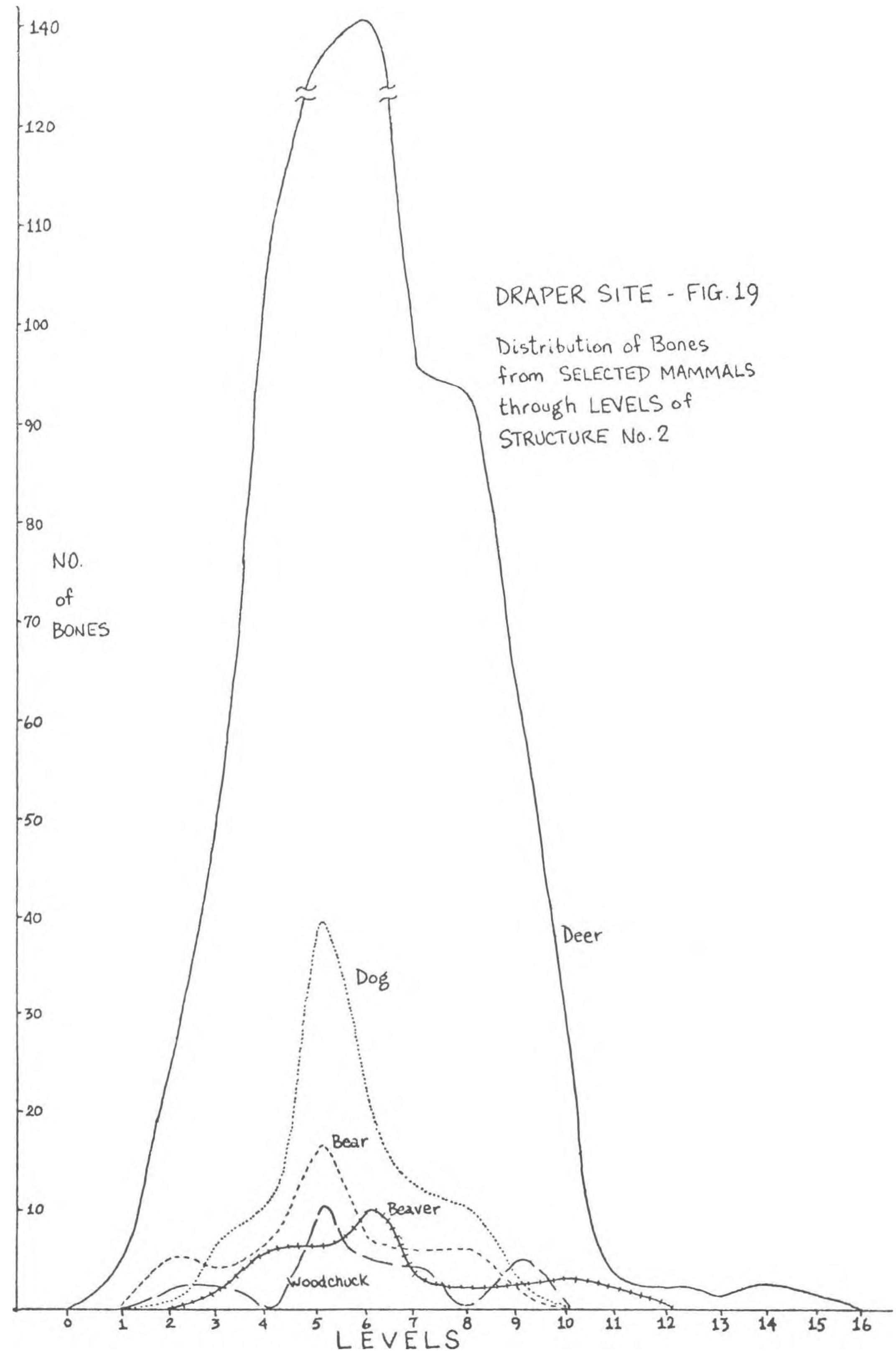


Fig. 18
PLAN MAP of the DRAPER SITE Longhouse
Excavated Summer 1973
showing
Distribution of Animal Bone
TOTAL BONE
OSTENSIBLY AFFECTED by DOGS
(910)
Scale ~ 1cm = 2 metres
(Includes only squares from which faunal material was obtained.)
N


DRAPER SITE - FIG. 19
Distribution of Bones from SELECTED MAMMALS through LEVELS of STRUCTURE No. 2
NO. of BONES
140
120
110
100
90
80
70
60
50
40
30
20
10
Deer
Dog
Bear
Beaver
Woodchuck
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
LEVELS

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Avian bone was identified in the Dept. of Ornithology, Royal Ontario Museum, Toronto; Dr. Jon. C. Barlow, Curator, gave kind permission to avail myself of the skeletal collections of the Department, and for this I thank him.

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Faunal Analysis of the White Site

JAMES A. BURNS

INTRODUCTION

While the archaeology at the White site was not extensive (more in the nature of test exploration), the 1756 items of zoological material represent a varied fauna. It might be more prudent to await further work at the site, however, since interpretation of the present material is limited – mostly by the lack of field data on habitation features. All we know for certain at this stage is that the squares in the NE quadrant (40–44N 3–7E) are in a midden area, and that no aligned post moulds were discovered during excavation.

The figures in Table I would indicate a heavy reliance on fish resources, but one is cautioned to play down the importance of fish to some degree because a great proportion of the fish bones were ribs and spines which are not placeable in the skeleton and cannot, therefore, yield data on individual numbers of fish. It is felt, however, that fish did play a significant role in the diet.

Avian sources of bone are also important, the more so considering the abundance of passenger pigeon bone from at least 7 individuals (see Table II). Of some surprise is the number of frog and/or toad bones. One reason for the unusually good amphibian representation is that some samples were subjected to flotation treatment. Unfortunately, control was erratic during this phase, and volumetric data are scarce, so that the relative value of the process cannot be judged. Crawford was similarly impressed by the paucity of field data relating to the collection of floated seed samples (Crawford, pers. comm.).

Human material was also recovered – bone representing at least three individuals was found primarily in the NE midden squares. The manner of deposition of this bone is the subject of further discussion. Material used for this analysis included all worked and unworked faunal remains.

ZOOLOGICAL DESCRIPTION OF THE FAUNAL REMAINS

Mammalian Remains:

Rabbits and Hares:

Seventeen bones were ascribed to the Order of rabbits and hares, only one of which was definitely hare. Since both are difficult to distinguish osteologically and may both be found in the Pickering area, it was felt prudent not to attempt any further separation; the one undoubted identification of hare was a maxillary portion with palate and teeth. Cleland (1966) notes that several York County sites, to the west of Pickering, contained snowshoe hare remains (see Cleland's map, p. 260).

Squirrels, Woodchuck, and Chipmunk:

The squirrel suborder of the Rodentia was not well represented here. The whole sample is small but this often cited group boasts only seventeen bones. Woodchuck is known from 8 of the items.

Beaver:

Beaver remains identified number 17, ranking 4th on this basis. However, a minimum number of individuals indicates at least three specimens, based on selection of the lower left incisor; this last computation may be somewhat skewed by the fact that 9 of the portions identified as beaver were incisor teeth or portions thereof, of which three were *worked* lower right incisors.

Mice and Muskrat:

Since the small mice are not considered of great

Table I Distribution of Faunal Remains by Classes

Class	No. of Bones		%
Identified Mammal	216		
Unidentified Mammal	298	514	29.9
Identified Avian	123		
Unidentified Avian	112	235	13.7
Identified Fish	53		
Unidentified Fish	812	865	50.3
Identified Turtle	10		
Unidentified Turtle	10	20	1.2
Unidentified Amphibian	75	75	4.4
Indeterminate	9	9	0.5
Identified Snail	14	–	–
Unidentified Snail	8	–	–
Unidentified Clam	16	–	–
Total	1756	1718	100

importance in the human diet, they will not be treated at length here; their bones can be found in just about any field situation and probably signify intrusions.

The muskrat, a more substantial member of the mouse suborder of rodents, was recognized from 8 items representing at least 2 individuals. They can be found on most waterways.

Porcupine:

Seemingly uncommon in southern Ontario archaeological sites, this creature was identified by 5 bones in a single feature – Feature 3, 38–40N 0–2W (Bag #99). Three incisors and two limb bones derive from a single animal, in all probability, perhaps supporting the notion that they were scarce in the region. The two limb bones, a femur and an ulna, had had their articular ends removed; yet the method seems to be neither cutting nor chewing.

Domestic Dog:

Thirty-nine portions were ascribed to the category *Canis* sp. cf. Dog, relying almost entirely on the criterion of size to separate dog from larger, possible wolf remains. In fact. two bones were of dimensions greater than those of an Indian dog recovered from the 16th century Huron village at the Fournier site, Midland, Ontario (Burns, n.d.a.). One item (302:1) from the NE midden consisted of a left maxilla and palatine with all the teeth except the incisors. While it retained some "youthful" characters, including several open tooth roots and signs of alveolar resorption, the dental pattern was adult, if only slightly attrited; it compared well in size with the Fournier dog, "Woofie".

It may also be here noted that dog bone was quite popular as a medium for bone tools and adornments. Beads, tubes, a possible projectile point, and a scraping instrument are examples; ten of thirty-nine dog remains were artifacts. (See T. Ferguson's report on bone artifacts.)

Red Fox and Fox sp.:

Only three bones were definitely labelled Red Fox, while seven others were left as unidentified Fox sp. The confusion arises from the difficulty in distinguishing the postcranial remains of the sympatric Red and Grey Foxes. Since the latter species has been found in many Ontario middens, it is reasonable to entertain the occurrence of both; however, the White site material did not lend itself to fine distinctions.

Bear and other Carnivores:

Very little bone was recorded for the carnivores, other than dogs. The Black Bear was identified from a single phalanx; a sacrum from a marten and part of a baculum *(os penis)* from an otter were the only other identifiable carnivore remains. Two portions were assigned to the Order Carnivora as the lowest reliable taxon.

Deer:

Slightly less common than dog bones were the remains of deer (35 items, 2.04% of the total assemblage) representing at least one individual. The poor showing of deer in our sample gives support to the notion that the site was a short-term occupation of a specialized nature. In accord with the paucity of deer and the indication of a short habitation period is the fact that, as with dog bone, many of the items referable to deer are also artifacts. "Toggle" type deer phalanges number 10, "cup-and-pin" type only one, with just 17 pieces *not* worked, including several phalanges.

Human:

The most numerous species in the mammalian sample was *Homo sapiens*, yielding 53 portions from at least three persons. The distribution in the site is not especially patterned although 43 items do occur in three contiguous squares of the NE midden. Some definitely juvenile (less than 2 years old) material occurred in 0–2N 18–20E (vertebral arch) and in 42–44N 3–5E and 5–7E (vertebra, ribs, skull vault portions, hyoid, and humerus) with adult bone in all the latter three squares as well as possibly 0–2N 30–32E. Subadult bone, aged roughly between 2 and 17

Table II Distribution and Frequency of Occurrence of Faunal Remains

Species	No. of Bones	%	No. of Indiv.
MAMMALS			
Snowshoe Hare *(Lepus americanus)*	1	0.06	2
Hare/Rabbit (Leporidae sp.)	16	0.93	
Grey Squirrel *(Sciurus carolinensis)*	4	0.23	1
Red Squirrel *(Tamiasciurus hudsonicus)*	3	0.17	1
Woodchuck *(Marmota monax)*	8	0.47	1
Chipmunk *(Tamias striatus)*	2	0.12	1
Beaver *(Castor canadensis)*	17	0.99	3
Mouse (cf. *Peromyscus)*	4	0.23	2
Vole *(Microtus sp.)*	3	0.17	1
Muskrat *(Ondatra zibethicus)*	8	0.47	2
Porcupine *(Erithizon dorsatum)*	5	0.29	1
cf. Dog *(Canis familiaris)*	39	2.27	3
Canis sp.	2	0.12	
Red Fox *(Vulpes vulpes)*	3	0.17	1
Fox sp. (Vulpinae)	7	0.41	
Black Bear *(Ursus americanus)*	1	0.06	1
Marten *(Martes americana)*	1	0.06	1
Otter *(Lutra canadensis)*	1	0.06	1
Carnivora sp. (m)	2	0.12	–
Deer *(Odocoileus virginiana)*	35	2.04	1
Deer/Elk/Moose (Artiodactyla)	1	0.06	
Human *(Homo sapiens)*	53	3.08	3
Unidentified Mammal	297	17.29	–
AVIAN			
Canada Goose *(Branta canadensis* cf. *maxima)*	1	0.06	1
White-winged Scoter *(Melanitta deglandi)*	1	0.06	1
Duck (Anatidae sp.)	1	0.06	1
Ruffed Grouse *(Bonasa umbellus)*	4	0.23	2
Wild Turkey *(Meleagris gallopavo)*	6	0.35	1
Sandhill Crane *(Grus canadensis)*	1	0.06	1
Passenger Pigeon *(Ectopistes migratorius)*	108	6.29	7
Pileated Woodpecker *(Dryocopos pileatus)*	1	0.06	1
Unidentified Avian	112	6.52	–
FISH			
cf. Trout *(Salvelinus)*	1	0.06	1
Pike *(Esox* sp.)	5	0.29	1
Sucker (Catostomidae sp.)	14	0.81	2
Catfish (Ictaluridae sp.)	32	1.86	3
cf. Perch *(Perca flavescens)*	1	0.06	1
Unidentified Fish	812	47.26	–
REPTILE (Turtle)			
Painted Turtle *(Chrysemys picta)*	6	0.35	1
Blanding's Turtle *(Emydoidea blandingi)*	2	0.12	1
Snapping Turtle *(Chelydra serpentina)*	2	0.12	1
Unidentified Turtle	10	0.58	–
AMPHIBIAN			
Frog/Toad (Anura sp.)	75	4.37	5
INDETERMINATE	9	0.52	–
GASTROPODA (Snail)			
Triodopsis albolabris	(9)	–	–
Anguispira alternata	(4)	–	–
Horotoma gracilis	(1)	–	–
Unidentified Snail	(8)	–	–
PELECYPODA (Clam)			
Unionidae sp.	(16)	–	–
Total	1718 (1756)	100	57

years, is found at least in 40–42N 3–5E and 22–24S 0–2W, in the form of a fibula shaft and a femur shaft, respectively. On the basis of distance between some of these squares, we might postulate more than three individuals but on the bones *per se*, regardless of provenience, we can count three persons by age assessment alone, being one of each of juvenile, subadult, and adult.

As for ages of specific items, the infundibulum (term used to indicate fused left and right mandible halves) in 42–44N 3–5E (267:1) is considered to be older than 17 years for the reason that the traces of alveolar resorption indicate pre-mortem loss of all three lower right permanent molars and the first and third lower left molars; eruption of M3 is thought to occur at 17–25 years (Anderson, 1969). A right maxilla from the same square as the mandible (240:1) possesses both deciduous molars; while the "bud" of the permanent M1 is visible, it is embedded well within the alveolus. Thus, according to Anderson's eruption schedule *(op. cit.)*, the child was between 2 and 6 years of age. Another item – paired right and left maxillae – possesses no teeth and the alveolus is broken posterior to the socket of P2; it is thereby inferred that the individual had reached an age *exceeding* 10 years, the average date of eruption for second (permanent) premolars. Juvenile material, being difficult to assess for age, can only be described as extremely young. Several vertebral portions, again from 42–44N 3–5E (250:2,3) featured no signs of arch fusion with centra, and the accompanying rib (250:1) was very small and the caput quite indistinct, with porous cortex. The same square yielded a portion of cranial vault (247:3) which was devoid of sutures and was composed of very thin, porous, unlayered bone. A similar occurrence of such juvenile skull material was revealed in 42–44N 5–7E (285:5–7). According to Anderson *(ibid.)*, the right and left neural arch portions fuse to each other at some time from birth to 2 years; so the above-mentioned vertebral arches represent a very young child, perhaps even a newborn. The remaining juvenile material includes a humerus shaft with no epiphyses and having a porous-looking cortex, this might well belong to the same individual as the skull portions.

No determination of sex was possible with the material at hand. One other condition of some of the human bone is noteworthy: 4 portions were burnt, being a right 3rd metacarpal (247:1), the vertical, periorbital portion of a left zygomatic (248, 249:1), the paired maxillae of a probable adult (272:1), and a miscellaneous longbone cortical portion (272:2). The uneven blackness of the charred maxillae argues for burning subsequent to fracture of the skull. Taken in tandem with the fact that the adult mandible (267:1) lacks coronoid and condylar portions of the ramus due to the ravages of carnivore teeth, the burnt bones incline one to accept that some cannibalistic ceremony took place at the White site. Two points militate against this suggestion, one being the complete lack of cut marks which generally result from the process of dismemberment and butchering. The other apparent flaw in the argument rests on the presence of extremely young bone, perhaps newborn; and superficial recourse to the ethnographic literature yields no observations of infant consumption.

The deposits of human bone are centred upon the midden squares in the NE quadrant of the site. During excavation, the crew were generally unaware of the presence of human material except for occasional pieces, and no impression of a burial was recorded. The location of the majority of bones in a midden does not suggest a purposeful interment; no pattern of deposition was noted, at any rate. If the site was occupied for very short time periods (single seasons or less) as indicated by various statistics both archaeological and biological, then it is less likely the scene of ceremonial burial. More appealing on the basis of data at hand, is the notion of a human feast, perhaps either as a finale to a mission into enemy territories or by successful enemy raiders at the White site (note the infant and juvenile material). The question is by no means answered and further collection of human remains should help to clarify this problem.

Avian Remains.

Geese and Ducks:

Poorly represented is this family of geese and ducks, with a Canada Goose radial portion, an ulnar portion of White-winged Scoter and an unidentified duck coracoid. What is remarkable about the goose radius is its size which compares favorably with the skeleton of the large subspecies, *Branta canadensis maxima,* in the Royal Ontario Museum collection. Caution is advised, however, as a single specimen is not sound basis for speculation. Godfrey (1966) places this subspecies in southern Manitoba, but it may also have found its way into southern Ontario from time to time (H. Savage, pers. comm.).

Grouse and Turkey:

The Order Galliformes is known from the site by the remains of Ruffed Grouse and Wild Turkey. These were not uncommon residents of the Pickering area in prehistoric times and while grouse is still present, the turkey was extirpated from all of southern Canada. Clarke (1948) records that the turkey was found marginally as far east as Durham County, just east of Oshawa. It was identified in both the Draper and Boys sites, not far from White.

Sandhill Crane:

It is now well established that cranes were at least regular migrants through southern Ontario. A number of crane bones have been identified from Huron sites on the Penetang Peninsula (Savage, 1971) and at the Van Besien and Cleveland sites near Brantford, Ontario (Burns, 1973; n.d.b.). Closer to home, crane remains were recorded from the Boys site (Burns, n.d.c.).

Passenger Pigeon:

Now extinct, this pigeon turns up in a great number of Ontario archaeological contexts. It has been shown to have inhabited all of the southern counties and to have been present even along the shores of Hudson Bay (Mitchell, 1935). The bones of this bird account for 46% of the avian collection and over 6% of the total faunal assemblage; it is obviously a prime food source, and perhaps one of the chief objects of specialized exploitation at the site. Their phenomenal numbers made them easy to capture – even by youngsters with clubs.

Pileated Woodpecker:

Woodpeckers are generally uncommon in Ontario sites but the Iroquois did make use of them for food (Waugh, 1973). This is our largest woodpecker and it inhabits rather densely wooded areas (Godfrey, *op. cit.*).

Fish Remains:

Just over 50% of the faunal bone is derived from fish, but this material is, in large part, weighted by the presence of rib and spine fragments which were counted but which, in reality, are unsuitable for quantitative calculation – as for numbers of individuals. Therefore, the economic significance of fish may be considerably less than the above figure represents.

Another problem not dealt with was the number of *identifiable* fish bones which remain unnamed due to the inavailability of adequate reference collections. The few skeletons in the Faunal Lab's collection, coupled with some prior experience in fish bone identification, enabled the writer to recognize at least five species or families. Much can still be accomplished with access to good skeletal materials.

Trout:

The occurrence of trout is not surprising. Bowman's account (see Bowman: this volume) of the white pine forest near the Draper site detailed two early accounts of salmon, trout and several other types of fish being caught in Duffin Creek and in the Niagara River. The inclusion of a single trout(?) bone in Table II was means as an indication that the trout/salmon/whitefish family, Salmonidae, was present. Its proper recognition would significantly reduce the category of "unidentified fish".

Pike (Esox sp.):

This group includes at least the Pike and Muskellunge, but for the present, skeletal resources limit the identification to the genus level.

Suckers:

At the best of times it is difficult to separate the many species of suckers from osteological material alone. Familial characters are fairly distinct, however, and the easily recognized elements have been recorded.

Catfish:

Again, specific characters are hazy in this family, as with the suckers, but the remains so assigned are mostly of a size which excludes the large Channel Catfish. The easy recognition of catfish bone renders the statistics generally reliable and proportionate to their importance.

Perch:

As with the trout/salmon bone, a single item was recorded for perch, simply to indicate its presence. No idea of its actual occurrence is available (lacking adequate reference) but it is felt to be slightly more numerous than the present figures imply.

Turtle Remains:

Three species of turtles are included in the White faunal inventory – Painted, Blanding's, and Snapper. All well within their current range, they attract little attention as turtle bone comprises just a little over 1% of the total sample.

Amphibian Remains:

A total of 75 bones were ascribed to the Order Anura which comprises the frogs and toads. While specific identification must await access to complete reference material it is certain that large members of the order are included, such as the bullfrog. There may also be large remains of American Toad *(Bufo)*, but no firm statement can yet be made. Based on the presence of recognizable elements, the minimum number of individuals is 5, using the urostyle as indicator. The relatively high frequency of amphibian bone is no doubt aided by a certain amount of flotation processing. Unfortunately, not all floated samples were designated as such so that we cannot quantify the success. One sample (254) was the bony component of floated material after Crawford removed seeds, it obtained from 35–40 cm in 3 subunits of 42–44N 3–5E, and contained 34 amphibian portions. Another sample (303) is not labelled "floated" but contains 14 frog/toad bones; it comes from 24–27 cm of subunit 13, 42–44N 5–7E. Note that both samples are in the NE quadrant.

Indeterminate:

Only nine bones were not classified within the vertebrate phylum; this amounts to a shade over one half percent.

Snails and Clams.

Gastropoda:

With the aid of a shell hobbyist – Dr. E.E. Watson, of Toronto – several species of snails were identified. The commonest was the terrestrial species *Triodopsis albolabris.* One specimen included in this group may be a related species, *T. notata* (66:4). Another very common snail species encounted was *Anguispira alternata.* None of these is of any great interest here; their small size virtually eliminates them from the list of preferred foods, but no doubt they might provide a stop-gap against hunger. That they are on occasion found in small bunches in the soil may often be attributed to their habit of grouping together during aestivation.

A fourth species – specimen donated to Dr. Watson for his assistance on both the Draper and White site molluscs — was identified as a Tertiary gastropod called *Horotoma gracilis*, a fossil washed out of the limestone deposits occurring through eastern Ontario. Its value lies in its rather good preservation, but one may wonder if such things fascinated the Indian mind which revelled in trinkets and beads.

Pelecypoda:

Most of the clam remains are quite fragmentary but retain enough character to be classified as members of the large, principal family of freshwater bivalves, the Unionidae. The scant evidence would be unreliable grounds for pushing the identification further.

SEASON OF OCCUPATION

With as little data as are presented here, a statement about habitation period is not indicated. One must recall that the White site excavation was primarily an exploratory venture. Seasonal data are best gleaned from the avian remains and the birds are fairly well represented except that nearly half of the bird bone derives from a single species, the passenger pigeon. The pigeon and the sandhill crane would have had the most restricted seasons of availability, being roughly spring to fall; turkey and grouse are non-migratory, and the goose and scoter, given appropriate conditions, may be found on Lake Ontario even in winter; the woodpecker is unpredictable in its migratory patterns and is felt by some to be uncommon (Robbins *et al*, 1966). Thus, seasonal habitation cannot truly be predicted. All of the species could be taken in the warm months and it is worthy of repetition that no sign of any housing structure was recorded, so that summer transience may well explain the evidence. However, all of this is premature speculation.

MODIFICATION OF BONE MATERIAL

Under this heading are discussed such topics as butchering, firing, and erosion of bone (by several agencies). The basic data are presented in Table III. While the actual artifacts are not reported upon (Theresa Ferguson's report covers these), the various other modifications are considered.

A fair number of bones and fragments have been subjected to the effects of heat — total 158, or 9.2%. The other categories of note are "chewed" and "eroded" — particularly "chewed" by carnivores and "eroded" by digestive juices. In fact, about 26 portions of mammal bones were recorded as bearing evidence of both forms of modification. The digestive erosion is deemed to have resulted from the process of assimilation, primarily by dogs; in eating a bone, a dog may crack it open, thus leaving teeth marks on it, but the dog may also swallow portions of bone which are later regurgitated. The writer postulates that such ingestion allows digestive juices to erode the surfaces, thus smoothing edges, rounding out declivities caused by teeth and other agents, and producing a generally shiny surface. This idea was extrapolated from statements by Halstead and Middleton (1973) concerning bone cracking habits of African hyaenas.

Such data on chewed/eroded bone may be useful in settlement pattern discussions as comparisons of house interiors and middens are projected for the Draper site; the indications are that it is a phenomenon of the house

Table III Types of Modification on Vertebrate Bone and Frequency of Occurrence in White Site Faunal Material

	Mammal	Avian	Fish	Turtle	Amphibian	Indeterminate
CHEWED (50)						
Carnivore	44	1	—	—	—	—
Rodent	5	—	—	—	—	—
BURNT (158)						
Charred	17	—	2	2	—	1
Calcined	126	6	1	2	—	1
ERODED (44)						
Digested	39	—	1	—	1	—
Other	3	—	—	—	—	—
BUTCHERED (10)						
Cut Marks	8	1	1	—	—	—

because a very high proportion of the affected bone was recovered from the house dug in 1973. Further data are required from the White site to expedite comparisons.

Almost all of the butchered bone (i.e. those with cut marks) are from the NE midden squares; at least two of the suspected butchered pieces may in fact be portions of, or waste products from, artifacts. Many of the bones eroded through ingestion were also located within the NE midden, but these samples are weighted because a great proportion of the total collection was recovered from the three midden units. Two concentrations of burnt bone were not, however, in refuse areas. Thirty-eight calcined fragments, including eight identified as fox, were recovered from Feature 9, 0–2N 18–20E (63). Further, a sample of 17 mammalian bone fragments obtained from 20–22S 10–12W, subsquare 15 Level 2; single elements of catfish, pigeon, and snail – all unburnt – were taken from the same provenience (126).

DISCUSSION

The White site presents an enigmatic group of data. A sizeable pottery and lithic sample along with many and varied botanical samples combine with the bone assemblages to produce a fascinating puzzle. The latter lot of material is not overwhelming in extent but the variety and distribution within the animal kingdom are unusual. Too, that human remains, seemingly out of burial context, should outnumber the normal food species complicates the designation of site function.

Large game does not figure prominently, since bear and deer contributed only 2.16% of all the bone. The avian component appears quite significant. The botanical samples examined by Crawford indicates significant exploitation of local flora, including several berry varieties, as well as the cultivation of Indian corn. This, surficially suggests a small hamlet maintained for the purpose of exploiting specific seasonal sources of food in the area. If this hamlet were convenient to corn plantations, further evidence might be sought for designating it as a corn-tending headquarters, since the abundance of seeds of other plants would argue for tracts of largely uncultivated land. That big game species are minimally represented may indicate either a scarcity of deer and bear, or a lack of emphasis on this resource. The writer is uncommitted in this regard.

Additionally, the interesting yet complicating data on the human bones make little sense at present. The age variations (newborn to full adult), the state of burnt bone, and the lack of cut marks do not yield a pattern entirely consistent with burial or cannibalism, but a strange mixture. Now that we are aware of the presence of considerable amounts of dissociated human bone in the NE quadrant, we may be able to distinguish the original method of deposition, given careful excavation.

CONCLUSION

Based on a small sample of bone, we are inclined to believe the White site to be a small, seasonal village supporting families engaged in a local foraging economy. By Cleland's (1966) definition, it is a "diffuse" economy which is dependent upon hunting, trapping, fishing, gathering of floral species, and possibly of corn horticulture. The presence of human remains of wide age range might be explained by postulating a burial of convenience, contrary to the Huron ossuary customs; it does not make sense to ascribe the death of an infant to human hunger, especially in the midst of such seeming abundance of other food. Hopefully, future excavations will assist in the elaboration of the problem.

ACKNOWLEDGEMENTS

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The faunal Osteology Lab, Dept. of Anthropology, of the University of Toronto was headquarters during the analysis; to the Supervisor of the Lab, Dr. Howard Savage, and to the Department, I owe a debt of thanks for permission to use the facilities and collections of the Lab. The avian material was to some extent identified in the Faunal Lab, but many were confirmed with reference to the avian skeletal collections housed in the Dept. of Ornithology, Royal Ontario Museum, and thanks are due for the permission to examine the collection to the Curator, Dr. Jon C. Barlow.

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Paleoethnobotany of the Draper and White Sites

LARRY KING and GARY CRAWFORD

Plant remains from the Draper and White sites were submitted to the authors for analysis at the University of Toronto in the fall of 1973. Samples were in the form of flotation residue (flotation according to Struever, 1968) and plant remains recovered directly from excavation units.

A total of 2,755 cc of carbonized material was recovered from 33 flotation samples from Draper. Flotation at the White site procured 2,805 cc of similar remains from 16

Table 1A Flotation Samples from the Draper Site

			WILD PLANT REMAINS												CULTIGENS								
															Zea mays						nut		
Square N. E.	Subsq.	Feature	Rubus	Sambucus	Rhus typhina	Crataegus	Chenopodium	Prunus pens.	Prunus nigra	Cycloloma	Cyperaceae	Gramineae	Unknown	TOTAL	Kernel	Kernel frag.	Cob frag.	*Cucurbita*	*Phaseolus*	*Helianthus*	*Fagus*	Cu. cm sorted	Liters floated
27–74	13	2	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	100	—
30–64	11	1	—	1	—	—	—	—	—	—	—	—	—	1	—	5	—	—	—	—	—	75	—
32–60		1	1	—	3	—	1	—	—	—	1	—	—	6	—	1	—	—	—	—	—	50	—
34–60	11	1	—	—	—	—	—	—	—	—	—	—	—	—	3	10	—	—	—	—	—	75	17.6
34–70	8	4	—	—	—	—	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—	500	—
36–58	4	4	—	—	1	—	—	—	1	—	—	—	—	2	—	24	1	—	—	—	—	100	11.7
38–60	2		—	—	—	4	—	—	—	—	—	—	—	4	2	24	4	—	—	—	—	225	17.6
38–60	9	2	1	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	25	8.8
42–42	16	1	—	—	—	5	425	—	—	—	2	3	—	435	—	—	1	—	—	—	—	55	17.6
42–44	15	2	2	—	—	—	—	—	—	—	—	—	1	3	—	—	—	—	—	—	—	175	17.6
42–50		3	2	—	1	—	—	—	—	—	—	—	—	3	4	30	2	—	—	—	—	50	—
42–52	11	1	—	—	—	—	—	—	—	—	—	—	—	—	—	4	2	—	—	—	—	200	—
42–52		2	—	—	—	—	—	—	—	—	—	—	—	—	1	3	—	—	1	—	—	150	—
42–52		4	1	—	—	1	4	—	—	—	—	—	—	6	—	33	15	—	—	1	—	125	—
42–52		9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	—
42–52		18	—	—	—	—	—	—	—	—	—	—	—	—	6	39	11	—	—	—	—	100	—
44–44	7		—	—	—	—	—	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—
44–44	11	3	—	—	2	—	—	—	—	—	—	—	—	2	—	—	1	—	—	—	—	—	—
44–50	1		—	—	—	—	—	—	—	—	—	—	2	2	—	3	—	—	—	—	—	175	—
44–52		1	—	—	2	3	22	—	1	—	—	—	1	29	—	3	—	—	1	—	—	—	—
46–44		1	1	—	2	—	11	—	1	—	1	—	—	16	—	1	—	—	—	—	—	—	—
46–44	8	2	—	—	1	3	—	—	—	—	—	—	—	4	—	13	—	—	—	—	—	100	—
46–44	12	2	—	—	—	—	1	—	1	—	—	—	—	2	—	—	—	—	—	—	—	—	—
46–46	1	3	—	—	—	1	—	—	—	—	—	—	1	2	9	60	17	—	—	—	—	125	—
46–46	13	4	—	—	—	—	—	—	—	—	—	—	—	—	—	8	8	—	—	—	—	125	17.6
46–48	1		—	1	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	30	17.6
46–48	13	3	1	—	2	—	—	—	—	—	—	—	—	3	—	6	—	—	—	—	—	35	17.6
48–44	11	1	1	—	—	—	—	—	—	—	—	—	—	1	1	11	—	—	—	—	—	30	8.8
48–42	16		—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	100	—
48–44		1	—	—	1	—	—	—	—	—	—	—	1	2	—	2	—	—	—	—	—	50	—
50–44	4	1	1	—	2	—	—	—	—	—	—	—	—	3	—	2	—	—	—	—	—	350	23.5
54–30	15		—	—	—	—	—	—	—	1	—	—	2	3	—	2	—	—	—	—	—	—	—
Midden			4	1	35	1	—	3	1	—	—	—	5	50	10	112	164	2	1	2	3	500	—
Total			15	3	52	18	464	3	6	1	4	3	14	583	37	429	226	2	3	3	3		

Table 1B Miscellaneous Samples from the Draper Site

			CULTIGENS						
			Zea mays						
Square N E.	Subsq.	Feature	Kernel	Kernel Frag.	Cob Frag.	*Cucurbita*	*Phaseolus*	*Helianthus*	*Juglans cinerea*
26–70			—	—	1	—	—	—	—
26–72	5		—	—	1	—	—	—	1
28–64	8	1	—	—	2	—	—	—	—
28–64	12	1	—	—	1	—	—	—	—
28–64	14		—	—	3	—	—	—	—
28–64	15		—	1	—	—	—	—	—
28–66	13	1	—	2	1	—	—	—	—
34–60		1	—	6	7	—	1	—	—
36–58	10		—	—	2	—	—	—	—
38–54	6		—	—	1	—	—	—	—
38–54	2		—	1	—	—	—	—	—
38–54	9		—	—	1	—	—	—	—
40–52	4		—	1	—	—	—	—	—
40–52			—	1	—	—	—	—	—
40–46	1		—	1	—	—	—	—	—
42–50		1	—	4	4	—	—	—	1
44–44	2		—	1	—	—	—	—	—
44–44	3		—	—	1	—	—	—	—
44–44	6		—	—	1	—	—	—	—
44–44	13		—	1	—	—	—	—	—
48–46	10		—	—	1	—	—	—	—
50–42	9		1	—	—	—	—	—	—
50–44	8		—	1	—	—	—	—	—
50–44	12		1	—	—	—	—	1	—
50–44	14		—	5	3	—	—	—	—
44 - 7	13	4	—	—	—	—	—	—	—
Misc.			11	44	53	8	—	—	—
Total			13	70	82	8	1	1	2

samples. Tables 1A and 2A present a breakdown of the volume of charcoal recovered and (where available) the soil volume floated per sample.

To facilitate sorting of the flotation samples, each was separated into four size classes using three sieves of 2 mm, 850μ and 250μ aperture. Fossil seeds and nut fragments were then picked from the concentrate with a fine brush and forceps. The remaining volume of concentrate was measured and sieved through a 9.5 mm screen to remove identifiable wood charcoal.

Identifications were made with a binocular microscope at magnifications of 10x or 30x, and were assisted by the reference collections of the Geology Department at the Royal Ontario Museum.

Although there is no *a priori* basis to assume prehistoric connection of the peoples between the two sites in question, the data from the sites have been presented together to allow for convenient reading and to minimize redundancy.

Wild Plant Remains

Draper Site:

Tables 1A and 1B summarize the data from the Draper site. A total of 583 carbonized seeds of wild plants were recovered. One non-carbonized seed of *Echinocystis lobata* was present in a sample from 44N 7E, subsquare 13 but its context is questionable. In the samples studied, nine taxa of wild plants are represented.

The largest quantity of carbonized seeds present are those of the genus *Chenopodium*, making up 79.6% of the wild plant seeds. This figure does, however, place an exaggerated importance on this taxa since it has such limited distribution in the samples. *Rhus typhina* (staghorn sumac) is the second largest taxa represented, accounting for 8.9% of the total. *Crataegus* (Hawthorn) is 3.1% of the remains, and *Rubus* (raspberry or blackberry) is 2.6%. The remaining taxa in descending order of abundance are: *Prunus nigra* (Canada plum) 1.3%; *Cyperaceae* (sedge), 0.7%; *Sambucus* (elderberry) *Gramineae* (grass), *Prunus pensylvanica* (pin cherry) and *Cycloloma atriplicifolium* (winged pigweed) each represent 0.5% or less of the samples. Unidentified seeds accounted for 2.4%.

Nut fragments from Draper occur in only four samples. One partially carbonized and one half uncarbonized nut of *Juglans cinerea* (butternut) were found, but data regarding their context is not sufficient to warrant giving definitive significance to them. Three well-preserved carbonized beech nuts *(Fagus grandifolia)* were recovered from the midden sample. All of these nuts become mature in the fall.

White Site:

Tables 2A and 2B summarize the White site data. A total of 536 carbonized seeds of wild plants were recovered.Eight taxa of seeds are represented in this section.

Rubus being 54.7% of the total has the largest representation. *Sambucus* is the second largest taxa represented (24.6%). Two other genera, *Rhus* (4.0%) and *Prunus nigra* (3.9%) are the next most common. The remaining taxa in descending order of abundance are: *Chenopodium* (1.3%) *Vaccinium*, and *Crataegus*, each constitute 0.6% of the seeds. One seed of *Cornus* and one of *Prunus pensylvanica* were recovered, each representing 0.2%. Unidentified seeds accounted for 13.3% of the samples. Table 5 presents known uses, habitat and seasonality for those plants represented in the samples.

Cultigens

Draper Site:

Zea mays (maize), *Phaseolus vulgaris* (common bean),

Table 2A Flotation Samples from the White Site

			WILD PLANT REMAINS												CULTIGENS					
														Zea mays						
Square	Subsq.	Feature	*Rubus*	*Sambucus*	*Rhus*	*Crataegus*	*Vaccinium*	*Chenopodium*	*Cornus*	*Prunus nigra*	*Prunus pen.*	Unknown	Total	Kernel	Kernel Frag.	Cob Frag.	*Cucurbita*	*Phaseolus*	*Helianthus*	Cu. cm sorted
S. W.																				
0– 0		1	9	3	11	–	3	3	–	–	1	27	57	–	45	23	–	–	–	200
18– 2		3	–	–	1	–	–	–	–	–	–	2	3	–	2	3	–	–	–	125
18– 8		1	7	7	–	–	–	–	–	–	–	–	14	1	14	38	–	–	1	200
20–10		2	31	7	–	–	–	1	–	–	–	3	42	2	103	182	1	1	–	150
20–10		3	177	75	–	–	–	–	1	1	–	3	257	–	–	–	–	1	–	100
20–10			19	8	1	–	–	2	–	–	–	7	37	2	81	89	–	2	1	600
28– 0		1	2	–	–	–	–	–	–	–	–	1	3	–	9	1	–	–	–	100
36– 0		4	–	–	–	–	–	–	–	–	–	–	0	–	–	–	–	–	–	50
38– 0		4	1	8	–	–	–	–	–	–	–	3	12	–	4	–	–	–	–	125
N. E.																				
2–20		9	–	–	–	–	–	–	–	–	–	1	1	–	1	–	–	–	–	25
2–20			–	–	–	–	–	–	–	–	–	3	3	–	–	–	–	–	–	230
42– 5		1	9	16	2	1	–	–	–	–	–	7	35	1	10	30	–	–	–	425
44– 5	Midden		15	–	1	1	–	1	–	–	–	2	20	6	42	30	–	1	1	75
S. E.																				
7–47			2	–	–	1	–	–	–	1	–	4	8	–	7	–	–	–	–	125
N. W.																				
21– 0		13	7	3	5	–	–	–	–	–	–	5	20	2	23	2	–	1	–	150
40– 0		3	–	–	–	–	–	–	–	–	–	–	0	–	–	–	–	–	–	125
Total			279	127	21	3	3	7	1	2	1	68	512	14	341	398	2	6	3	2805

Cucurbita pepo (squash), and *Helianthus annus* (sunflower) were found in the Draper remains. Distributions of the cultigens encountered in the samples is presented in Tables 1A and 1B.

Maize represented the greatest quantity of these plant remains. Whole kernels totaled 50, kernel fragments 499, and cob fragments (mostly cupules) 308. Measurements of 67 kernels averaged 9.7 mm in width (range 8.0–12.0) and 5.9 mm in thickness (range 3.4–6.8). The dimensions of the kernels along with the generally crescent shape are indicative of a Northern Flint variety (Winter 1971).

Two uncarbonized peduncle fragments of squash were recovered in the midden sample. Five bean seed fragments were recovered from 5 samples. Four of the fragments each represent ½ of a complete seed, usually separated along the horizontal axis. The average length of the fragments is 9.4 mm (range 7.7–11.0), width 5.1 mm (range 4.0–5.8), thickness 2.3 mm (range 1.8–2.8).

Three sunflower seeds were recovered from 2 samples, 2 well-preserved specimens had average measurements of 4.8 mm in length, 1.9 mm in width, and 1.5 mm in thickness.

White Site:

Zea mays, *Cucurbita pepo*, *Phaseolus vulgaris* and *Helianthus annus* are present in the White Site samples. Tables 2A and 2B contain a summary of the domesticated plant remains from the White Site.

Maize is represented by 167 whole kernels, 477 kernel fragments and 422 fragments of cob. Measurements of 156 kernels averaged 9.4 mm in width (range 4.0–13.0) and 6.6 mm in thickness (range 4.0–11.0). Large numbers of corn remains, along with the presence of beans and squash indicate a strong reliance on domesticates for a major portion of the vegetable diet.

The recovery of non-carbonized and partially carbonized remains, both domestic and wild is very unusual. Further studies of the conditions for the preservation of organic material at the sites must be carried out before the signi-

Table 2B Miscellaneous Samples from the White Site

			WILD PLANT REMAINS				CULTIGENS					
							Zea mays					
Square	Subsq	Feature	*Rubus*	*Prunus nigra*	Unknown	TOTAL	Kernel	Kernel Frag.	Cob Frag.	*Cucurbita*	*Phaseolus*	*Helianthus*
S. W.												
0– 0	9		–	–	1	1	1	1	–	–	–	–
0– 0	13		–	–	–	–	1	–	–	–	–	–
18– 2		6	–	–	–	–	1	1	–	–	–	–
20–10		2	–	–	–	–	22	20	4	–	–	–
20–10	3	–	–	–	–	–	1	–	–	–	–	–
20–10	11		–	–	–	–	1	1	–	–	–	–
20–10			–	–	–	–	5	13	6	–	–	–
28– 0			–	–	–	–	1	1	–	–	–	–
N. E.												
2–20	8		–	–	–	–	–	2	–	–	–	–
2–20	10		–	–	–	–	–	2	–	–	–	–
44– 5	Midden		–	16	3	19	107	82	11	1	1	–
44– 7	Midden		–	1	–	–	8	4	–	–	–	–
44– 7	9		–	–	–	–	2	–	–	–	–	–
N. W.												
32– 0			–	1	3	4	1	2	3	1	2	–
38– 2	10		–	–	–	–	–	7	–	–	–	–
38– 2		1	–	–	–	–	2	–	–	–	–	–
40– 0	Post		1	–	–	1	–	–	–	–	–	–
Total			1	18	7	24	153	136	24	2	3	–

Table 3 Wood Charcoal Identified from the White Site

												Gymnospermae	
Square S.W.	Feature	Level	Acer (maple)	Fagus (beech)	Ulmus (elm)	Ostrya (ironwood)	Betula (birch)	Carya (hickory)	Fraxinus (ash)	Juglans (walnut)	Prunus (cherry)	Partially carbonized	Uncarbonized
2– 2		10	X		X	X						X	
20–10	1	9–12	X	X	X	X						X	
22–12	2		X	X	X			X		X	X		
22–12	3		X						X				
22–12		3– 6	X	X		X	X						X
22–12		9–12	X	X	X			X					X
S. E.													
2–40	1												X
N. W.													
32– 2		9–12											X
N. E.													
42– 5	1		X		X		X						
42– 5	1	21–45	X				X						
42– 5		17–23	X	X	X			X					
42– 5		25–30											X
Total			9	5	6	3	3	3	1	1	1	2	5

ficance of these remains can be interpreted.

The Draper and White sites have a great potential for paleoethnobotanical studies, as is indicated by the remains recovered. Flotation of soils from the sites should continue during future excavations. With adequate supporting data the outcome should add greatly to our knowledge of prehistoric Iroquoian subsistence.

Table 4 Charcoal Identified from the Draper Site

Square N. E.	Feature	Level	Acer (maple)	Fagus (beech)	Ulmus (elm)	Juglans (walnut)	Ostrya (ironwood)	Betula (birch)	Carya (hickory)	Tilia (basswood) Populus (aspen)	Fraxinus (ash)	Prunus (cherry)
30–64	1	33–45	X	X	X	X	X		X			
36–58	4	27–47	X		X	X						X
42–44	2	24–27	X	X	X	X		X				
42–52	2	24–28		X		X						
42–52	4	24–28	X									
42–52	18	30		X	X				X			
44–42	1			X			X	X		X		
44–44	3	33–42	X	X			X				X	
44–46	3	30	X		X							
46–46	4	30	X									
46–48	3	30	X					X				
Midden			X	X	X					X		
Total			9	7	6	4	3	3	2	2	1	1

Table 5 Seasonality, Habitat, Use (Yarnell 1970, Soper 1949)

PLANT NAME	KNOWN USES	HABITAT	SEASON
Rubus (blackberry)	food	thickets, clearings borders of woods	July– August
Sambucus (1) *S canadensis* (2) *S. pubens*	food, medicine	(1) damp rich soils (2) woods, clearings	June—August
Rhus typhina (Staghorn sumac)	food, medicine, smoking, technology	dry, rocky or gravelly soils; waste ground	June—July
Chenopodium (Goosefoot)	food greens collected in early summer	waste ground	August—October
Crataegus (Hawthorn)	food, medicine smoking technology	thicket, open ground	September—October
GRAMINEAE (Grass family)	food(?)	varied habitat	June—August
CYPERACEAE (Sedge family)	food, medicine, technology	varied habitat	June—August
Vaccinium (blueberry)	food, medicine	varied habitat	July—September
Cornus (Dogwood)	food, medicine	wood, thickets, damp openings	August—October
Prunus nigra (Wild or Canada plum)	food, dyes	rich alluvial soil, thickets, border of woods	August—September
Prunus pensylvanica (Fire cherry)	food, medicine	dry woods, clearings hillsides, sands	July—August

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Draper Site Burials
Structure 2

MIMA KAPACHES

During the excavation of features 3 and 5 of square 24–26N, 70–72E inside the longhouse two infant burials were exposed, described, photographed and then reburied. Burial 1 (feature 3) was located 34 cm below the surface in a shallow basin-shaped pit with dimensions 37 cm long by 16 cm wide. There were no grave goods, nor were there any artifacts in the fill. The individual was articulated and semi-flexed with the lower limbs flexed close to the pelvis (Fig. 1). The head was resting on the left side with the face inclined upwards. The orientation of the burial was aligned with the long axis of the house, with the head directed to the northeast.

The remains were in good condition. It is not possible to estimate the sex of the infant. The age at time of death was less than 6 months since no teeth had erupted (Bass 1971).

Burial 2 (feature 5) was located about 1 metre northwest of Burial 1. It was in a shallow basin-shaped pit 34 cm below the surface. Dimensions of the remains were 24 cm long by 14 cm wide. The body was articulated, the face turned up, and the head directed to the north (Fig. 2). Soil pressure, not trauma, is apparently responsible for the depression on the skull. There were no grave goods, nor artifacts noted in the fill of the pit.

Sex of the infant cannot be established. Age can be estimated between birth and six months of age as no teeth were erupted. The bones present were in poor condition. This individual lacked a pelvis, lower limbs, and hands. It is possible that these bones may be absent because of destructive rodent activity, however there was no other indication of such disturbance. It seems more likely that the infant was partially disarticulated at interment. This may be an instance of the ritual sacrifice of infants reported by the Jesuits (JR 19:71). The data is inconclusive for the latter interpretation, unless similar burials are found on other sites.

The location of the burials within the house is presented on the site map. They were in the southeastern segment of the house, just west of the longhouse central line and well within the area of the central floor. Burial 1 is east of an internal support post, while Burial 2 is west of this post. The burials are situated about equidistance between two hearths. There were post moulds around the burials but no pattern was discernible.

The occurrence of two infants of similar ages, in close proximity in one longhouse of the village leads to the question of whether the individuals were twins. Without the skeletal remains not even superficial treatment of the question is possible.

The location of the burials inside the longhouse is interesting since according to the Jesuits the usual mode of infant burials was to:

> inter them on the road – in order that, they say, if some woman passes that way, (the infants) may secretly enter her womb, and that she may give them life again. (JR 10:273)

The belief in spirit rebirth may be the conceptual basis of the practice; burial within the house would insure rebirth. Of further interest is the fact that this does not appear to have been an isolated practice for the Draper site. In-house infant burials are known from several sites of the Ontario Iroquois, viz. Bennett (Wright and Anderson 1968), Crawford Lake (a young child, Wm. Finlayson, pers. comm.), Mackenzie-Woodbridge (J.N. Emerson pers. comm.), Roebuck (J.V. Wright pers. comm.), Stewart (Wright 1972), and Cahiague (Tyyska pers. comm.). Many variables must be taken into account when studying these occurrences, viz. period during which the site was occupied, mode of interment during this period, and exact nature of the burials. The data from these sites will not be outlined in this paper. However, with all the above variables considered, a proposition has been developed from the analysis. It is suggested that the interment of infants (and young children) inside longhouses is a definite pattern and an alternative to burial outside the village. Whether or not this is due to some specialized ritual or to more practical considerations such as frozen ground outside the structures, cannot be assessed with the information available at the moment.

The discovery of infant burials at the Draper site adds


DRAPER 73
BURIAL 1
26N 72E
FEA 3 34 CM BS

Fig. 1


DRAPER 73
BURIAL 2
26N 72E
FEA 5 34 CM BS

Fig. 2

to the definition of a previously unreported burial custom. With the analysis of the material from the sites listed above and the future discovery of similar remains, the nature and the frequency of the pattern will be clarified for the Ontario Iroquois sequence.

ACKNOWLEDGEMENTS

This paper is being expanded to discuss all aspects of non-ossuary Iroquoian interments. The research on infant burials is one small aspect of the range of material being studied. Since much of the material referenced in this paper is unpublished, I would like to thank those individuals who gave ideas and data freely: J.V. Wright, J. Pendergast, J.N. Emerson, Wm. Finlayson, Wm. Noble, A. Tyyska, J.F. Melbye, and J. Reid.

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Scarborough Excavations

MARTI LATTA

Scarborough College held two field schools at the Draper Site (A1Gt-2) during the summer (July 9–20) and fall (Sept. 29–Oct. 21) sessions of 1973, under the direction of Martha Latta, assisted by Helga Esche and Mima Kapches. Both classes concentrated on the north-western edge of the occupation area, in a ploughed field. A total of 69 2-metre squares were excavated.

During the summer, three 2 m trenches were excavated at 10 m intervals, extending 30 m west of the base line at 110, 120, and 130 m north of datum, respectively (Fig. 1).

Since these extended to the area where surface finds had ceased, as noted in the initial surface survey by the permanent crew, it was expected that the trenches would show the edge of the village and yield some information about Draper defenses. In laying out the trenches, we noticed a shallow (mean depth 20 cm) ditch which crossed the trenches in the westernmost squares. This gully did not appear to be due to erosion, having gently rounded sides and bottom. It was nearly filled with brush, and almost invisible.

Alternative explanations include a ditch outside the prehistoric palisade, drainage, or a more recent fence line, although none is known for this area.

The students worked 10 partial days in the summer session, and eight full days in the fall. They maintained 10 cm levels, and bagged and noted each quadrant of the 2 m square separately. As excavation proceeded, it became apparent that the four westernmost squares in the north two trenches were cutting through midden, with much blacker soil and markedly higher artifact counts. Depth of deposit also increased, although the surface was levelled by repeated ploughing. Square N120W26 was 32 cm deep on the east side, with about ten centimetres of undisturbed deposit below the plough zone.

In the B horizon, several additional features appeared: A double row of fairly large (10–15 cm) posts were observed clearly in the west ends of Trenches 130 and 120, and less clearly in Trench 110. The relation of these posts to the surface ditch and to the midden suggested that this was, in fact, a double palisade. Two house walls were clearly observed in Trench 130 located almost exactly 8 m apart, and running exactly north–south. They did not appear to extend south to Trench 110.

In the fall session, work was concentrated around Trench 130, to clarify these features. The palisade extends clearly for 16 m, and appears to reach its westernmost extent at the end of Zones 122–130. The house picture was confused, however, by the appearance of a third wall, lying between and parallel to the first house and the palisade. In addition, four deep pits were found, on a line running exactly E–W across the house(s). The pits were identical, in being about 30–40 cm in diameter, 30–45 cm deep, round, with straight sides and rounded bottoms. All four contained reddened soil, ash, charcoal, and considerable quantities of artifacts,ceramics, stone and bone. The soil from these pits was saved, and is presently being floated for recovery of micro-flora. The pits appear to contain hearth refuse, although no hearth was found.

Analysis of the artifacts will be carried out during the coming year.

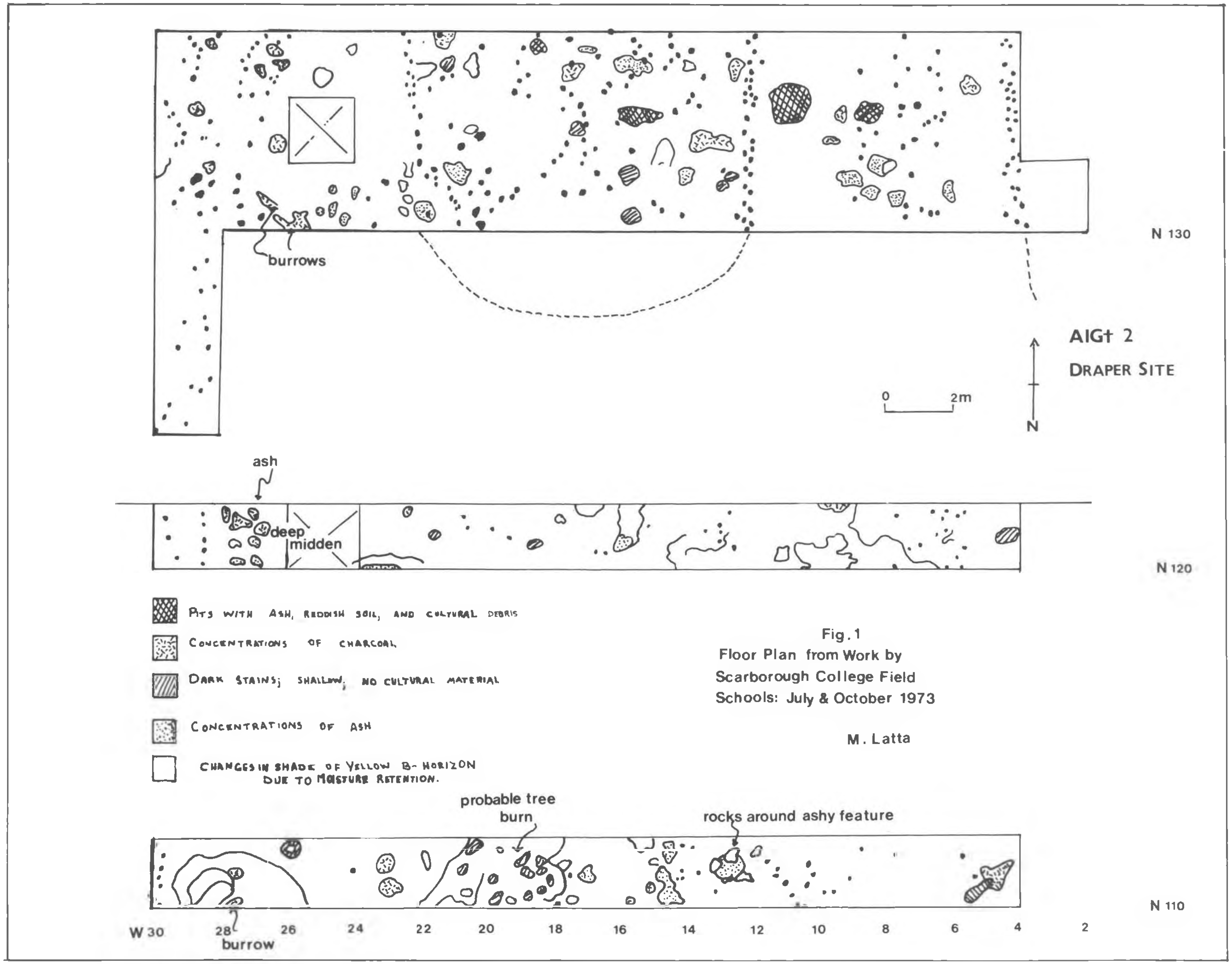

Fig. 1
Floor Plan from Work by
Scarborough College Field
Schools: July & October 1973

M. Latta

Summary and Conclusions

BRIAN HAYDEN

In the "Preliminary Considerations" at the beginning of this report, I attempted to explore some of the more probable theoretical formulations which could be used to explain a number of observed phenomena at Draper, including its large size as a site, its relatively lengthy longhouses, and the differential use of the interiors of longhouses. These ideas were formulated and written before any of the detailed analyses which followed, and if nothing more, they were meant to serve as a structuring device for the analysis and presentation of the data recovered. They were not being proposed as definitive conclusions or even major probabilities. Rather, they were probings of the possible and the probable, given current information. Nevertheless, at this point a brief assessment and resumé is in order; the detailed analyses will be compared to the questions initially asked. It should be *clearly* understood that these assessments are very preliminary, for we only have the analysis from one structure to go on, and many more are really required before anything can be said with any degree of confidence. I would also emphasize that these interpretations are my own and that some of the participating analysts may disagree on specific points.

Site Location

From the excellent ecological studies by Bowman and Mulstein, it is clear that Draper and White site locations were largely determined by the location of preferred horticultural soils. Other determinants were proximity to streams, areas of high game density, and very probably defendable positions on the landscape. Defense was most obviously a consideration at Draper where there is sharp relief and palisade-like lines of postholes at the boundaries of the site. On the other hand, the White site appears more "hidden" in its position. Its approximate contemporaneity with Draper and its location within, but close to the periphery of Draper horticulture clearings seems to confirm it as a specialized activity site. The high proportion of fish remains and human remains, the scarcity of other mammalian remains, the high proportion of bird remains, and differences in the floral assemblages between White and Draper, all indicate a special activity nature of the site. As Burns notes, only 2% of the faunal remains at the White site represent large game, and of the deer remains, fully 50% were worked, while 25% of the beaver and dog remains were worked. Thus, in contrast to Draper, there seems to have been very little large game taken or consumed at the White site.

The discovery of a number of structures at the White site during subsequent excavations is extremely interesting. It will be very valuable to compare their contents and intra-structure stylistic patterning to the contents and nearest neighbor analysis of sweeping middens of structure 2 at Draper. The presence of structures at White seems to indicate that the site may have been occupied for extended periods of time: perhaps the entire summer growing season. They may also have been much more open along side walls; thus architectural comparisons between Draper and White should also prove interesting.

Village Patterning

Although few structures have been excavated at Draper, their positions and orientation so far largely adhere to the general pattern noted for the Late Ontario Iroquois, i.e. northwest/southeast orientation of the long axis, resulting in roughly parallel structures, (Norcliffe and Heidenreich 1974) with occasional perpendicularly oriented structures near the site peripheries. Thus far, the only exceptional characteristic of Draper structures appears to be their unusual length. Because so much is known about structure positioning and orientation, and because Draper provides essentially redundant information to data from other sites, this was, and is considered to be the least important aspect of the settlement pattern information at the site. Of much greater value was the settlement pattern information found within structure 2. One unusual non-structural feature we uncovered appeared to be a large open air activity area involving great quantities of ash.

Intra-structure Patterning

One of the most unexpected and significant results of

Ferguson's spatial analysis of structure 2 debris was the striking fashion in which activity areas and tool kits segregated out – usually into areas approximately the size of nuclear family residential areas. Even more surprising was the general lack of redundancy of activities and tool kits within the structure: it appears as though every family was engaged in a different specialized activity, with only a minimal number of activities common to all hearth living areas. The immediate implications of this data are equally striking. Aside from one or two possible group activity areas, one must face the relatively high probability that there was considerable economic specialization occurring within the confines of structure 2, and that this specialization was effectively orchestrated. This, in turn, tends to imply someone in a managerial capacity, directing economic activities and undoubtedly serving as representative of the group in intra– and inter-site relationships. Thus, one of the most probable inferences which emerges from the analysis concerns the essentially economic corporate nature of the structure 2 residential unit.

Both Burns' analysis of faunal remains and Arthurs' ceramic analysis bring out important lines of evidence to support Ferguson's identification of activity areas and tool kits. The former identifies 3 areas of bone with cut marks on them; these areas are for the most part identical to areas Ferguson isolated as bone working or butchering locations. Arthurs documented an important lack of ceramics in an area designated by Ferguson as a play or recreation area.

In further support of the above inferences, it is possible to cite the clustering of post holes and pits, the large hearth and a concentration of pipe fragments in the northwest end of the house. Although pipes appear to have been commonly used throughout the house (as were post holes and pits), these concentrations all suggest a relatively important resident at this location with feasting responsibilities. We can probably equate these data with someone acting as a representative of the group, and as a managerial person of relatively high social power and authority.

As for the source of such power and authority, and ultimately, probably the underlying cause of the development of longhouses and their resident corporate groups, I am increasingly coming to believe that economics (in the form of needed or highly desired trade goods) provided the underlying welding and ranking force.

It is worth noting that at least one previous excavator at Draper observed that adzes were very abundant at the site, and postulated that they might well have been manufactured at Draper for trade and export (Latta: personal communication). This seems possible, and if it should be demonstrated by future excavations, it is highly significant that the adze manufacturing area was in close proximity to the residential location of the hypothetical high-status individual in structure 2 – power keeping closest to itself what is most important for maintaining power.

What were the compositions of these corporate groups? In structure 2, Arthurs has developed an excellent argument, with due reserve, that the occupants formed a core lineage, with many women staying with the group after marriage; although the group also incorporated other females apparently more distantly related, if related sanguinally at all. Here, we tread on very dangerous ground and our assumptions may not be entirely justifiable although I think in this case they are reasonable. In particular, Stanislawski (1973) has shown that there are other sources which may determine ceramic styles besides kinship ties; e.g. neighborhood teaching situations, or other "ad hoc" working groups. On the other hand, David and Henning (1972) show that at least in some cultures, common archaeological assumptions regarding the social contexts of ceramics are relatively accurate. Even granting that potential masking factors may exist, there is still reasonable ground for justifying Arthurs' interpretations. For instance, even granting Stanislawski's other sources, there is fairly clear indication that someone not sharing the pottery mini-tradition of the west end was brought in, for in the east, differences are fairly pronounced. The west end, on the other hand, holds together as a cluster, and there is little indication of substantial change from the bottom to the top of the deposits. This long term homogeneity at one end of the structure, it seems to me, is more readily explainable as due to kinship bonds, (or something equally as strong as kinship bonds). Especially significant are the very strong similarities of debris from a number of hearth-residential areas. In this context, anomalous or relatively unrelated debris can only be seen as intrusive (possibly women brought in by important or high ranking sons of the dominant family), i.e. patrilocality of sons with important economic stakes in the household; for, economic determination of residence appears to be the dominant reason for non-adherance to prescribed residence rules among other primitive societies.

Thus, around a core lineage it would appear that other, perhaps even unrelated nuclear families attached themselves, particularly in the east end, where ceramic variability within the structure is at its greatest. It is also interesting to note that there is a difference between lithic point types in the west and east ends, although the sample is very small, and this may be illusory.[1] Nevertheless,

[1] Ferguson raises an important point when she suggests that these "points" may have actually served as knives within the structure. Knife functions for points have been demonstrated elsewhere (Ahler 1971), and the fact that readily identifiable knives at Draper occur in the same general size and shape range tends to support the interpretation. The number of points – broken or

these slim indications are consistent with the relatively loose residential practices sketched for the Late Ontario Iroquois in the introductory remarks of this report. The patterning which emerges from the nearest neighbor analysis of hearth related debris fits well with the notion expressed by Sahlins that physical distance reflects social distance. The corollary that differences in ceramic styles also reflect social distance might be restated as well.

The character of the hearths in the east end reflect much more ephemeral residents than those in the west end and thus reinforce the notion of peripherally linked and less permanent families taking up residence with a stable core lineage. That these hearths were regular residence localities is evident from the associated sweeping middens, and the identical sherd sizes and size distributions in the east and west ends (see page). Thus I think we can at least make a good argument for the structure 2 residents consisting of a lineage core, which attempted to keep as many of its female (and male) offspring in the house as possible to provide the loyal corporate core. In addition, peripherally related other families, including possibly closely related sublineages, and/or miscellaneous nuclear families, which because of real or fictive kinship ties, friendship, or simply want of a better place to go, were attached to given corporate groups and longhouses. The choice would have been mutual, the corporate group gaining productive and therefore trading potential, and individual families sharing benefits from successful head men.

Of interest is the hypothetical position of a hearth area immediately to the west of the large trees occupying the centre of the structure (ca. 34–6 N/56–58 E). No evidence of a hearth was reported in the field notes or noted by myself, but numerous other indications all point to the existence of a hearth at this location at one time. In the first place, following the spacing of other hearths there should be a hearth at this location. In addition, numerous ash-filled pits occur in the immediate vicinity. Moreover, Burns and Arthurs both independently postulated the existence of this "invisible" hearth on the basis of concentrations of burned bones and the occurrence of sweeping middens perpendicular to this location (these features are associated with all other hearths). It seems that indeed there was a hearth at this location which we failed to record. The reasons for this failure may be numerous: use of low temperature fuels at this location resulting in little if any sand reddening; obliteration of fire-reddened sand and ash due to pits dug in the area after the residents moved away (pits were numerous in the area); housecleaning and obliteration of hearth traces by sweeping after the hearth residents moved elsewhere; carelessness and neglect by excavators. It is interesting to note, that despite such accidents of preservation or excavation, adequate field and analysis records permit one to establish the existence of such features.

As a minor point, it should be noted that Arthurs is convinced that hearth A does not belong to structure 2 occupation on the basis of its location in the wall line. Although I agree this positioning is most peculiar, all other excavation evidence indicates that it was, in fact, contemporaneous with the other house hearths: its spacing, central alignments, position beneath the surface, the undisturbed nature of its ash layers and the undisturbed large sherds left on top of the ashes, together with the very high similarity of hearth A and B ceramic debris, all argue for it as an integral part of structure 2 life. There is virtually no other evidence of an earlier or later occupation. I am inclined to view it as a seasonal hearth, perhaps used in the summer when end wall posts may have been removed to increase ventilation. The smaller than average sherd sizes along the axis line of the structure and on either side of this hearth, lend considerable credence to this spot as a passageway where trampling activity was more intense than elsewhere (see page). The alternative is to assume an addition was made on the northwest end; we found absolutely no other evidence for this.

Site Size

One of the most prominent features of settlement patterns is the size of sites. In the introductory pages of this report, I summarized a theoretical context for explaining the jump in site size which occurred at the beginning of the Late Ontario Iroquois, as exemplified by the Draper site. Two models were initially developed and a third was hinted at. The first model was of inherent population and settlement growth whenever the possibility presented itself. The second model was of coalescing groups due to external pressures, such as warfare. The analyses produced only a few, rather inconclusive results regarding the "testing" of these models. For instance, Arthurs did note stylistic differences between structure 1 at the north end of the site and structure 2 at the south end. In addition, even more pronounced stylistic differences have been tentatively identified in an area immediately to the south of structure 2. These differences are more consistent with a model of coalescing groups, although the sample is so small that the presumed implications may turn out to be illusory. Also of interest is the tendency, documented by Arthurs, for

whole — is certainly in no way proportional to the rich faunal remains, and one may legitimately wonder if the vast majority of Iroquoian arrows were not merely tipped with hard wood, in the fashion of New Guinea arrows.

ceramic variability to decrease over time in structure 2. Below level 6, there were 15 different types; maximum occupation intensity occurred at level 5. One explanation, although by no means not the only one, of such a trend is that when different groups coalesce, the combination of styles creates a greater number of styles than were present in either group previously. As time goes on, one would normally expect this variation to gradually be reduced. Thus the trend toward reduction of variability in ceramic types is at least consistent with what one would expect under constructs of the second model. More excavation and comparisons are definitely needed at Draper before this issue will be resolved.

The third model, which because of its complexity was not fully developed initially, involved increases in settlement size due to the development of trade and locally intensified centres of wealth (in the form of head men, big men, lineage heads, chief traders, corporate group managers, or whatever else one wishes to call them). These localized concentrations of wealth attracted people interested in material, status and/or leisure, thereby creating larger total aggregates. Competition between corporate groups (or corporate managers) for manpower, skills, and/or trade routes may well have led to the internicine conflict characteristic of the era and region; and this in turn conceivably accelerated settlement nucleation and increases in size.

At the present, this model has not been fully developed or tested for the Iroquois region. However, it is the one which I now tend to favor as being most useful and explanatory. It is at odds with the traditional view of the importance of trade in the area.

Furthermore, I think we are in a good position to discard model number one on the basis of comparative data from upper New York State. There, during the equivalent of the Middle Ontario Iroquois Period (1400–1500), maize, beans and squash were introduced, as they were in Ontario. However, in spite of this, there was little or no population increase in New York, and settlements stayed small (Noble 1968:310–11). Obviously, something besides the inherent tendency of groups to increase in size was responsible for the changes in Ontario at this same time.

Site Relocations

In the introductory sections of this report, it was hypothesized that settlement movements have occurred primarily because of the exhaustion of game resources in the vicinity of settlements. Burns' analysis of the change in hunting patterns over time in structure 2 indicate a relatively unchanging pattern of faunal exploitation, inconsistent with the exhaustion of major faunal resources and subsequent intensive exploitation of less desirable game. It would therefore appear that the traditional assumption of land exhaustion as a principle cause for settlement movement is more likely correct. Of interest, it also appears that Draper was occupied, at least by some people, during the entire year as inferred from faunal, floral and ceramic data.

Techniques

In our excavations, we adopted relatively refined data recording techniques, both vertical and horizontal. In retrospect, the vertical controls provided us with important data in terms of changes in faunal exploitation (or the lack theref), and on changes in ceramic styles during the occupation of the structure, as well as indications regarding relative contemporaneity and lifespans of the various hearths excavated inside the structure. Further refinement of the vertical controls, both in terms of recording and in terms of statistical adjustments, is feasible and would probably be profitable. For the most part, we employed unadjusted correlations.

The use of horizontal controls was equally, if not more rewarding. The entire spatial analysis was remarkably productive, and in particular, Ferguson's delineation of activity areas, supported at various points by faunal, ceramic and floral distributions. There is obviously great potential for the application of spatial analysis to future data from Draper, and probably White. However, it must be stressed, that we were only able to scratch the surface. In all of our analyses, only the rather "loose" two metre square units were used. This was largely because with the time and resources available, we were simply not able to create or adopt any computer programs which would adequately deal with spatial analysis, and we were thus forced to rely on manual techniques. The vast size of the subsquare data matrix was totally unmanageable using manual techniques, and we were thus forced to use larger recording units. When satisfactory programs are developed for use with small cell grids, I am sure that even more detail will emerge from the debris patterning in structure 2. However, that is the work of another project and another year. As an excavation technique, it should be mentioned, that the use of subsquares in dealing with midden material was much more satisfactory than traditional techniques. The technique permitted detection and recording in the field of localized differences in material, which probably reflect changes in debris content of the various baskets of refuse that were thrown on the midden. And in fact, a square about .5 metres on a side is about the area one might expect refuse dumped from a basket to cover.

Epilogue

Draper and White are both relatively uncommon phenomena of preservation in the realm of Ontario archaeology. Opportunities exist in their contents for studying culture change and for constructing the social fabric of prehistoric Ontario groups which simply are not available anywhere else. Given a stimulating theoretical context, the informational yield from both of these sites is potentially tremendous. I hope that in some part, we have been able to generate such a context and demonstrate the unusual theoretical importance of these sites; that we have been able to retrieve a small portion of their detailed data before all context is lost; and that we have been able to begin to fit some of the detailed data into a meaningful conceptual matrix. The information in these sites, is incredibly varied, and it is obvious that as much of it should be recovered as possible. Looking back at the project, irrespective of how successful we have been in achieving these goals, it has certainly been exciting making even this small attempt at a contribution, and I wish to thank everyone, again, who joined in the intellectual fracas and made it possible.

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