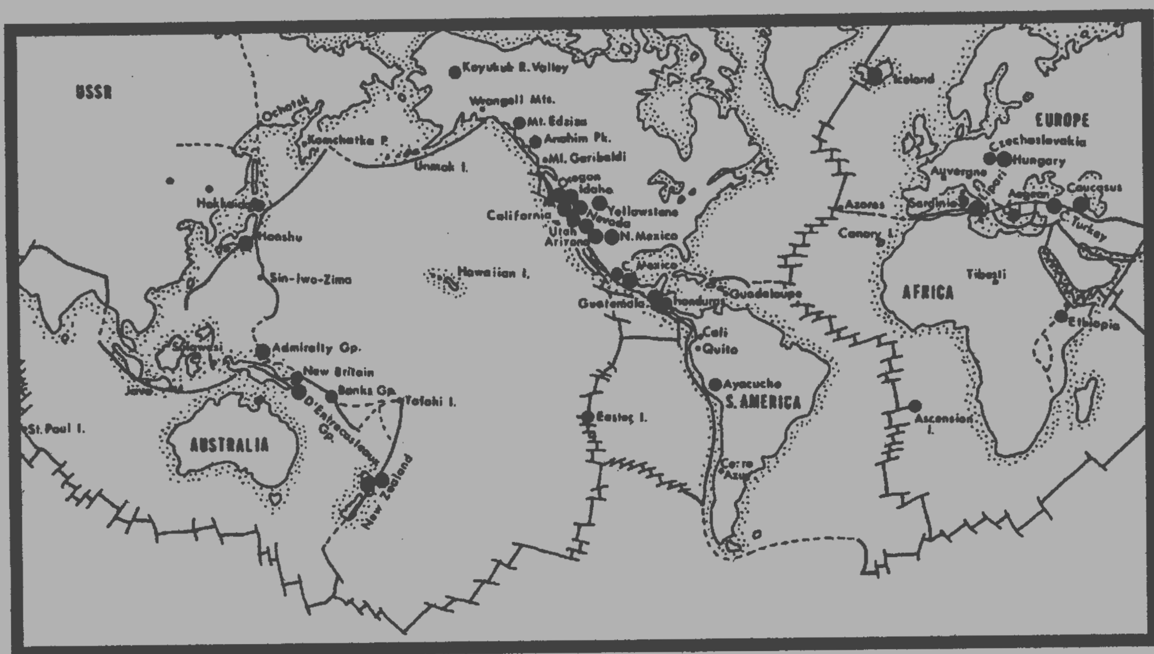
OBSIDIAN:
AN INTERDISCIPLINARY BIBLIOGRAPHY



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International Association for Obsidian Studies Occasional Paper No. 1

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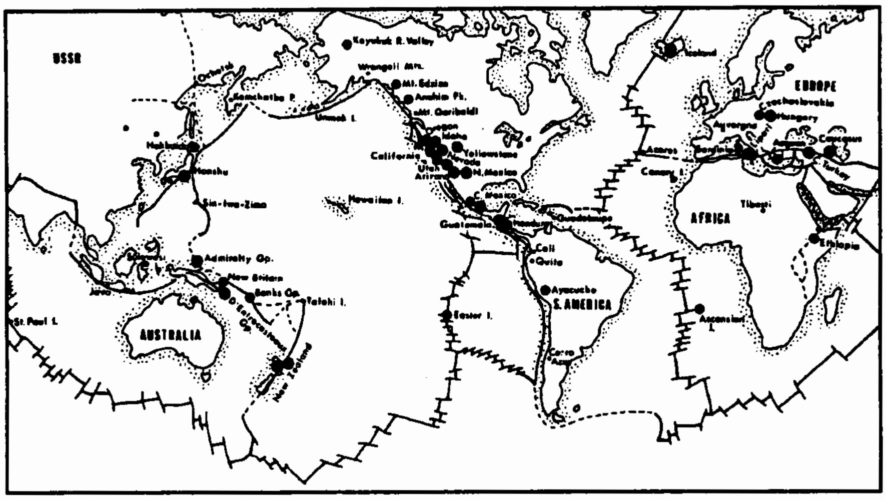

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Magmas cooled to freezing temperature and crystallized to a solid have to lose heat of crystallization. A glass, since it never crystallizes to form a solid, never changes phase and never has to lose heat of crystallization. Obsidian, supercooled below the crystallization point, remained a liquid. Glasses form when some physical property of a lava restricts ion mobility enough to prevent them from binding together into an ordered crystalline pattern. As the viscosity of the lava increases, fewer particles arrive at positions of order until no particle arrangement occurs before solidification. In a glass, the ions must remain randomly arranged; therefore, a magma forming a glass must be extremely viscous yet fluid enough to reach the surface.

The modern rational explanation for obsidian petrogenesis (Bakken, 1977:88)

Some people called a time at the flat named Tok'. They were going to hunt deer. They set snares on the runway at Blood Gap. Adder had real obsidian. The others made their arrows out of just anything. They did not know about obsidian. When deer were caught in snares, Adder shot and ran as fast as he could to the deer, pulled out the obsidian and hid it in his quiver. The obsidian was very powerful. The others would shoot too, but only sometimes would they kill a deer. Adder always killed them. He killed so many, the blood began running down both sides of the gap into the creeks. That is how the gap got its name. That night they carried the deer back to camp and had a big feast.

The next day the same thing happened. For three or four days this kept on happening. Adder always killed most of the deer. The others became jealous and talked things over among themselves. They decided that Adder must have some very powerful weapon. They told the fast runners like Humming Bird and Fox to watch Adder and race to the deer before Adder could get there.

On the following day the fast runners stationed themselves near Adder. One man called Puimeminbes was near. When Adder shot, all began running. Puimeminbes got there first. He put his hand in the wound and pulled the obsidian out and ran away. When Adder came he put his fingers in the wound and could not find his obsidian. He knew it had been stolen and he was very angry. He went right back to camp and got his things ready to go back down south from where he had come. He told the others his obsidian had been stolen and he as going to get even with the people who had taken it.

Meanwhile Puimeminbes ran up the ridge of Sandhill Crane Mountain. The other people all knew what was going to happen. They knew that Adder was going to set the world on fire. They all got ready to leave.

When Puimeminbes got to the top of the ridge Sandhill Crane was there, and so was Ground Squirrel who was to run with the obsidian. The obsidian was very large by now. Puimeminbes gave Ground Squirrel the pack and told him to run. Sandhill Crane told him to go right away because the fire had already started. He said he would stay on the mountain and watch the fire. He would call to him and tell him how near it was coming. He said, "When you hear my voice getting dim you will know that you are far enough away."

So Squirrel started going. He went north, and went north, and went north. He went past Mount Shasta. He could still hear Crane telling him about the fire. He kept on going until he could hardly hear Crane's voice, then he dropped his load. That is where Glass Mountain is today. That is why Ground Squirrel has a black mark on his back. The obsidian got hot and scorched him.

An alternative explanation of obsidian petrogenesis — a Wintu story about the origin of Glass Mountain, California (DuBois and Demetracopoulou, 1931:305-306)

Its discovery [Obsidian Cliffs] was the result of a hunting trip. Coming one day in sight of a magnificent elk he [Jim Bridger] took quick aim and fired. To his amazement the elk remained immobile, not even flicking an ear. He drew cautiously nearer and took a careful bead and again pressed the trigger. The same result met his effort. A third and fourth shot produced like results. Exasperated, he clubbed his rifle and rushed for the elk, but was brought up cold by a seemingly solid wall, which he discovered to be a mountain of prefectly transparent glass, on the other side of which the elk still grazed, undisturbed. On further investigation the mountain proved to be not only perfectly transparent, but was a veritable telescopic lens, and the elk was in fact twenty miles beyond the glass wall.

The real story of the discovery of Obsidian Cliffs, Yellowstone National Park, as told by Jim Bridger (Bright, 1951:5-6)

Preface and Acknowlegements

This obsidian bibliography would not have been possible without the help of the numerous individuals and organizations who contributed their time, references, comments, and careful editing. Our thanks to Michael Glascock, Foss Leach, Cathy Lindberg, Clem Meighan, Steve Shackley, Carol Winkler, and the University of Oregon (for funding an early version of the bibliography). The annotated bibliography developed by Elena Nilsson and Jan Finney (Nilsson and Finney, 1992) was also a particularly valuable resource (especially in the case of the California contract reports), in our search for elusive gray literature. The University of Oregon and Sonoma State University interlibrary loan departments have been of invaluable assistance over the years in locating countless obscure references.

Our special thanks go to Janet Scalise for the use of her initial extensive obsidian hydration and characterization bibliography (published in *Obsidian Dates IV* - see Meighan and Scalise, 1988).

The bibliography should be considered as a work in progress and, with this is mind, we have turned it loose in slightly ragged form. Not every reference has been located. Not every citation is complete in every detail. We considered this, however, and thought that it would be better that it sit on your desk in this condition than only on ours. If you would like to contact us about ideas, additions, information, errors, or omissions, please get in touch. We'd like to hear from you.

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Over the past three decades, obsidian studies have begun to draw increased attention in archaeological (and geological) circles throughout the world. Although the importance as a prehistoric raw material had long been recognized and the identification of the geologic sources of archaeological obsidian had been rather haphazardly used since early in the century to infer the existence of prehistoric exchange systems, the analytical techniques needed to reliably solve these problems were not applied to archaeological obsidian until the early 1960's. With the introduction of systematic obsidian trace element studies in the important papers of Cann and Renfrew and their associates (Cann and Ranfrew, 1964; Cann et al, 1970; Renfrew et al., 1966, and Renfrew et al., 1968, to list a few), the science of obsidian characterization entered its current modern era. Only a few years previously, Irving Friedman and his co-workers had introduced the obsidian hydration dating method to the archaeological community (Friedman and Smith, 1958; Friedman and Smith, 1960). When obsidian characterization and obsidian hydration techniques were combined, it became possible, at least in theory, to track the use of obsidian through time as well as space. The modern era of obsidian studies with all its attendant promises, pitfalls, and problems had begun.

Obsidian hydration dating, although presenting more methodological hazards than was initially anticipated, still holds considerable promise in the direct dating of archaeological and geological materials. Obsidian characterization (sourcing) research, just now moving out of its adolescence, shows great potential in the identification of prehistoric direct and indirect (exchange) procurement systems and procurement behavior. Additionally, the increasingly accessible trace element characterization studies have begun to be used to investigate other sociocultural factors such as ethnic boundaries, social stratification, and the existence of intergroup alliances. In thirty years, obsidian characterization and hydration studies in archaeological research have gone from the exotic to the commonplace. In many places, obsidian studies are now considered a routine and essential component of any well-developed archaeological research design.

Despite the promising beginnings of the 1960's through the 1990's, a great deal of geological and archaeological research remains to be done. Geologic sources of natural glasses, now known to be more widespread than was initially supposed, are still only very incompletely investigated. Archaeologists, lacking geologic training and being anxious to extract archaeological information from the obsidian data, have paid only spotty attention to the critical topics of obsidian source descriptions and processes resposible for the secondary areal distribution of the glass. Geologists, on the other hand, have focused on obsidian for its petrologic value and have rarely been interested in data which would be of specific interest to archaeological researchers.

Although interest in obsidian studies has rapidly grown, access to the widely-scattered literature has remained problematic. The literature related to obsidian research, particularly that related to contract archaeological research, is widely scattered and often buried deep in the *gray* zone of unpublished and limited-circulation reports. Under the auspices of the

International Association for Obsidian Studies, this bibliography was compiled to help address these problems of limited and difficult access to the literature.

Scope of the Bibliography

This obsidian bibliography is meant to be relatively comprehensive and represents an extensive sampling of the available literature. We have primarily limited our search to published materials, a liberal sampling of government agency and contract reports, Master's theses, and Ph.D. dissertations. These references were concerned with:

1. Obsidian hydration dating
2. Obsidian characterization ("sourcing") research
3. Lithic technology and obsidian
4. Ethnographic data concerning the procurement and utilization of obsidian
5. Geological, petrographic, or petrological studies involving obsidian
6. Physical chemistry of glass reactions
7. Geologic descriptions (however brief) of obsidian sources

To a much lesser degree, references were also included for some of the non-obsidian natural glasses (pitchstone, tektites, Libyan Desert Glass, and combustion or contact metamorphism glasses). The overall literature coverage is admittedly biased towards the Far Western United States, particularly when it comes to the "gray" literature that is endemic in archaeology.

Although most of the literature that we examined was in English, we have included numerous non-English references (with translated titles whenever possible). Our apologies in advance for misspellings and fractured grammar in the latter references. A small percentage of the references were also included in the bibliography without review because of their apparent relationship to obsidian. We hope to eventually review most of these for further versions of the bibliography.

Development of the Current Bibliography and On-Disk IBM PC Bibliography

The references compiled in this bibliography have been collected over the last thirteen years from a wide variety of sources.

The core of the bibliography was initially compiled primarily from conventional sources (*Anthropological Abstracts*, *Dissertation Abstracts*, *Chemical Abstracts*, and the *Bibliography and Index of Geology)* as part of the authors' graduate research (Skinner, 1983; Tremaine, 1989). In 1990, we merged these two bibliographies with those of Janet Scalise (Meighan and Scalise, 1989) and released the result as a searchable on-disk bibliography for the IBM PC. Since then, the bibliography has gone through several revisions, growing in size from about 1,500 citations to over 3,000 in the current version. The most current version of the on-disk bibliography is available through the International Association for Association Studies and is included at no charge to purchasers of the paper bibliography see the insert following the reference list). Version 1.55 of the on-disk bibliography is identical to the printed version compiled here.

Thanks to now widely-available CD-ROM databases, we've been able to recently locate many new obsidian-related citations. The GeoRef and Dissertation Abstracts databases proved particularly useful. References located **only** on the GeoRef and National Technical Information Services databases are designated in the bibliography, respectively, by [GEOREF] and [NTIS]. Papers listed in the NTIS database may be ordered from the National Technical Information Service. Many of the items cited in the Dissertation Abstract, NTIS, and GEOREF databases also include geographic keywords and abstracts. Consult the database of your choice for more information.

Several online library catalog systems, most of them in the U.S., were also searched remotely via the Internet system. The most productive of these computerized catalog searches was the University of California MELVYL system. References located only on MELVYL are followed with [MELVYL]. The University of Bradford, England [Bradford], was also an important source of European graduate theses and dissertations.

Internet Availability of the On-Disk Obsidian Bibliography

The on-disk version of the obsidian bibliography has been posted in a number of Internet-accessible locations. If you have access to the Internet system and are located at a site with FTP (file transfer protocol) capabilities, you can download a copy of the latest bibliography from several Internet Anonymous FTP sites. These sites include:

oak.oakland.edu	SimTel Software Repository primary mirror site (/pub/msdos/hypertext)
grv.dsir.govt.nz	Society for Archaeological Sciences File Depot (/SAS)

The bibliography is also available at SimTel secondary mirror sites wuarchive.wustl.edu, archive.orst.edu, ftp.uu.net, ftp.funet.fi, src.doc.ic.ac.uk, ftp.switch.ch, archie.au, NCTUCCCA.edu.tw, ftp.technion.ac.il, by Gopher from Gopher.Oakland.Edu, or by e-mail through the BITNET/EARN file servers. Other Anonymous FTP sites holding the bibliography can be located using the Archie database of Anonymous FTP files developed at McGill University. To interactively access Archie, telnet to an Archie server and enter **Archie** at the login prompt to log on to the system. Type **help** for additional and **quit** to leave. Archie servers include: archie.ans.net, achie.rutgers.edu, archie.sura.net, achie.uni.edu, archie.mcgill.ca, archie.funet.fi, archie.au, and archie.doc.ic.ac.uk.

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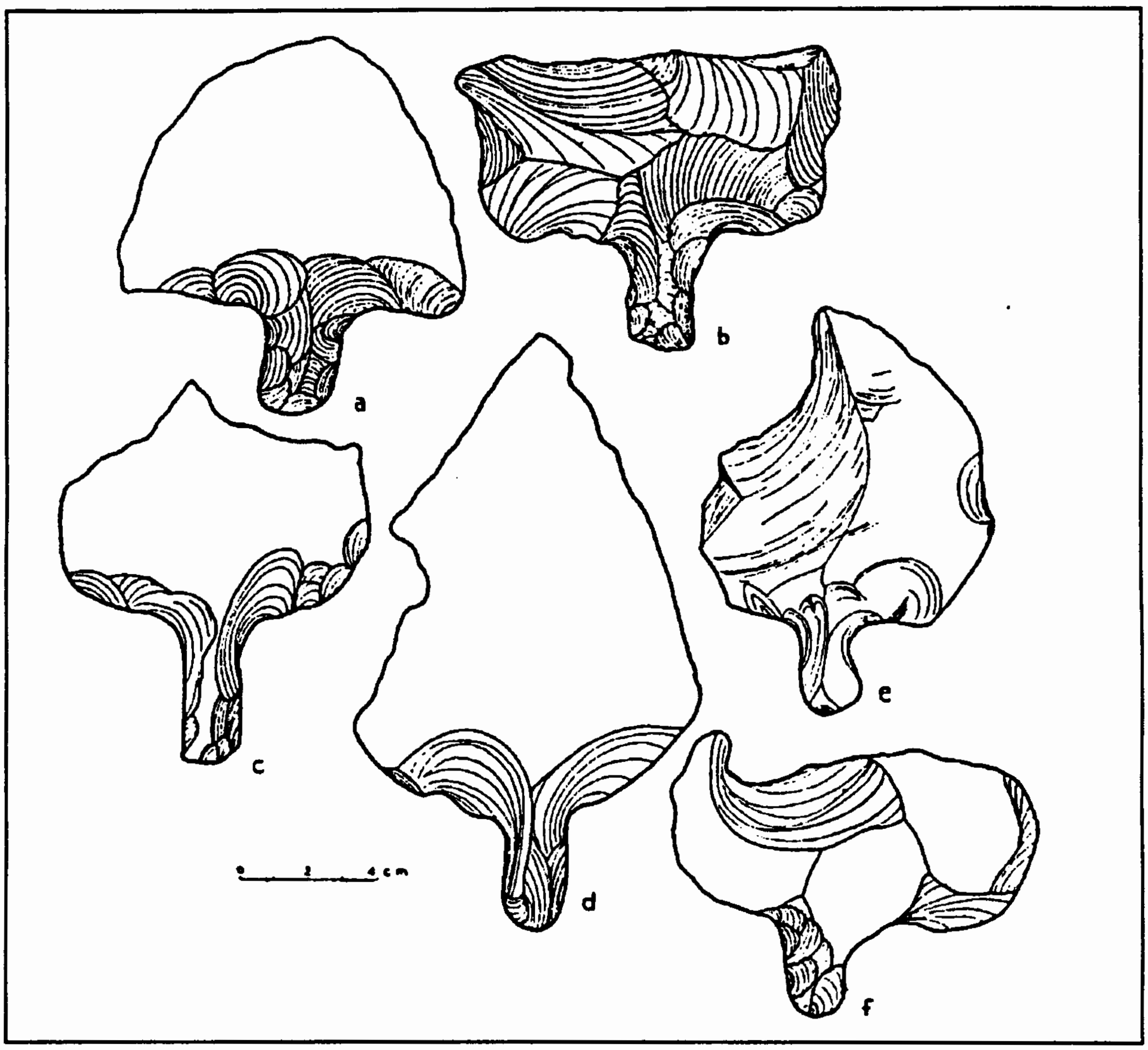

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Bracketed comments [ ] following some entries contain additional information concerning the reference:

[Language] Language of article if not English (if known)
[BRADFORD] Found in the University of Bradford, England, online database
[GEOREF] Found in GeoRef database
[MELVYL] Found in University of California MELVYL online database
[NTIS] Found in National Technical Information Service database

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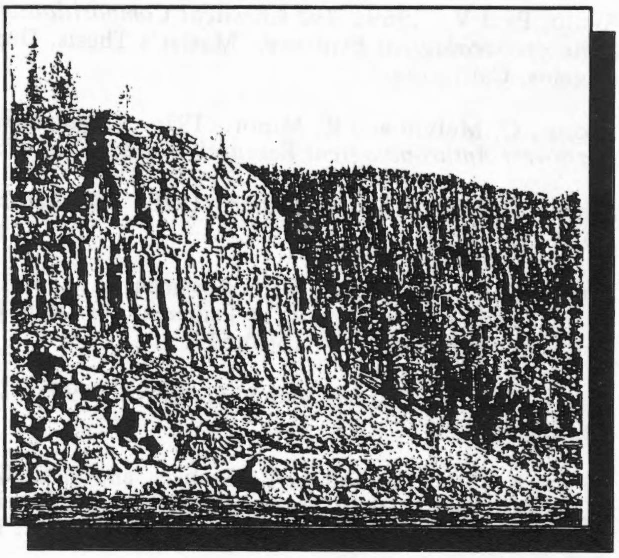

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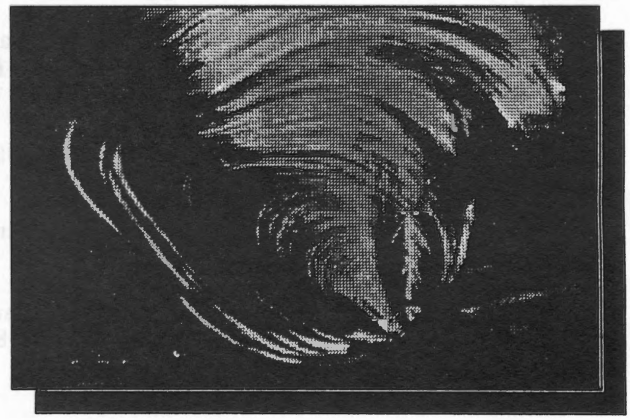

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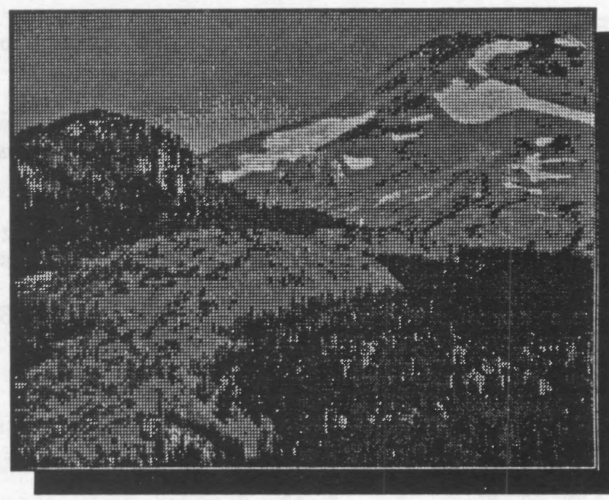

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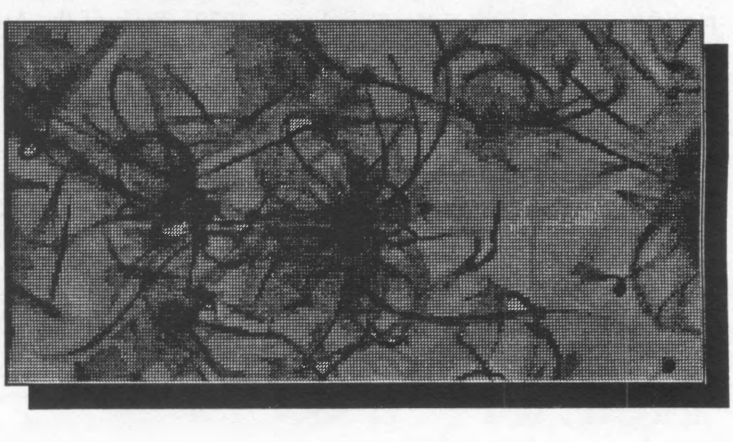

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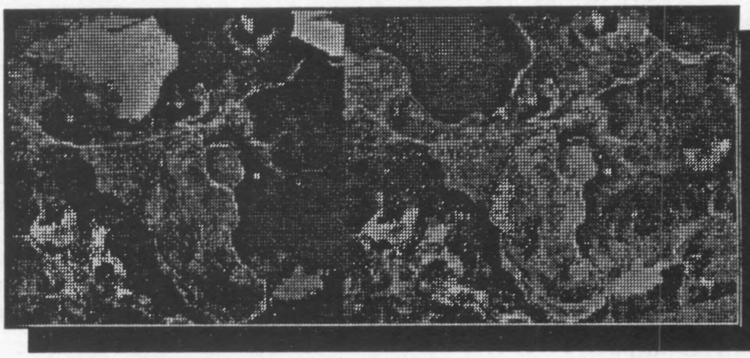

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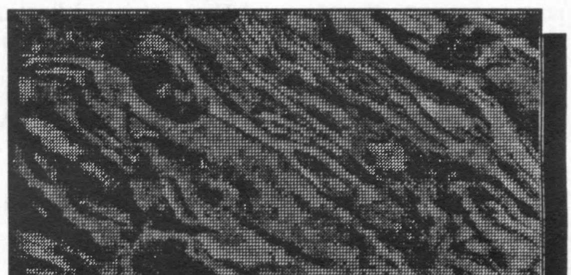

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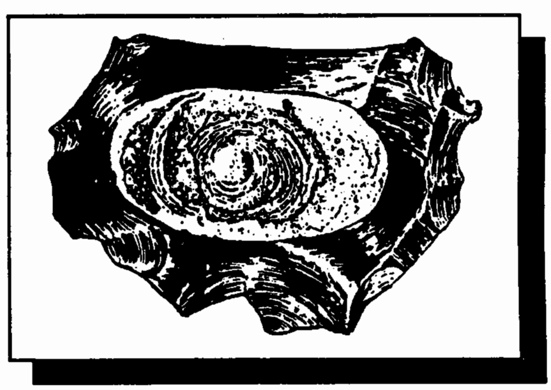

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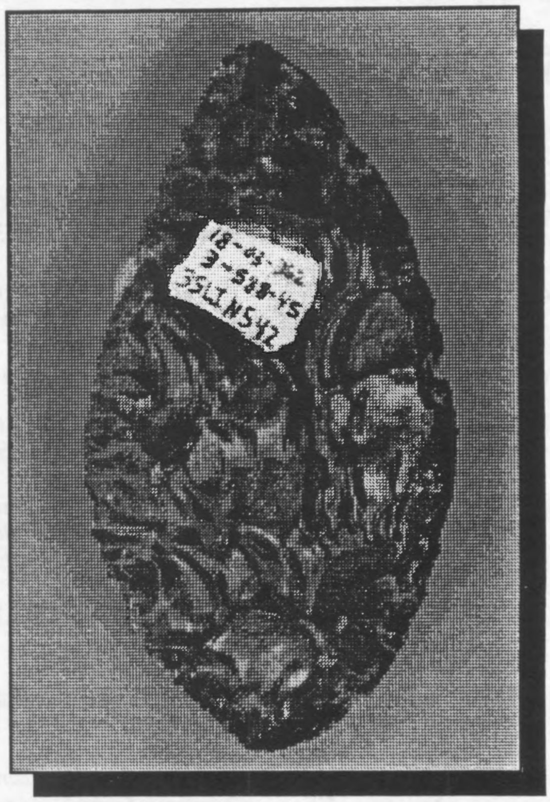

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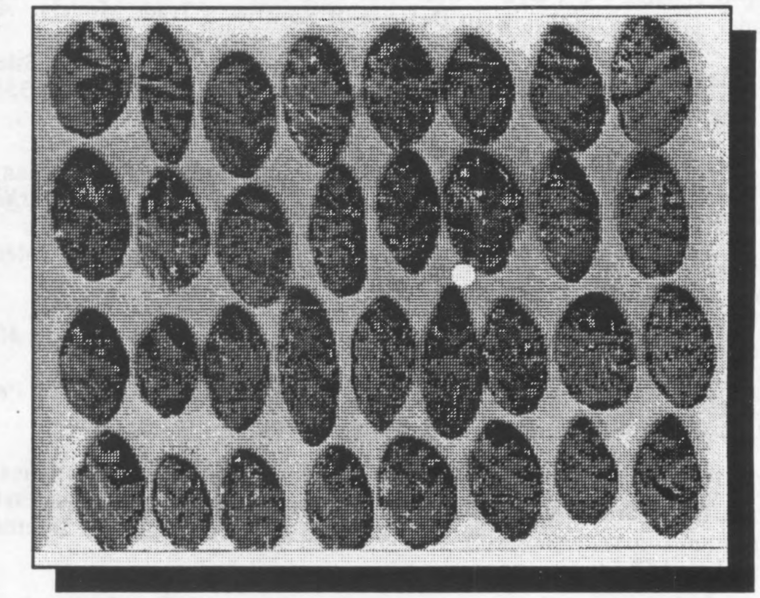

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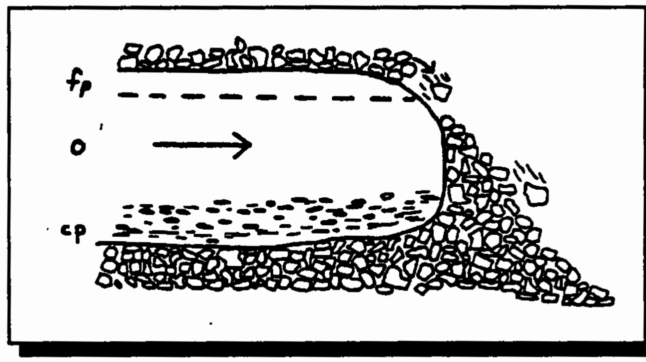

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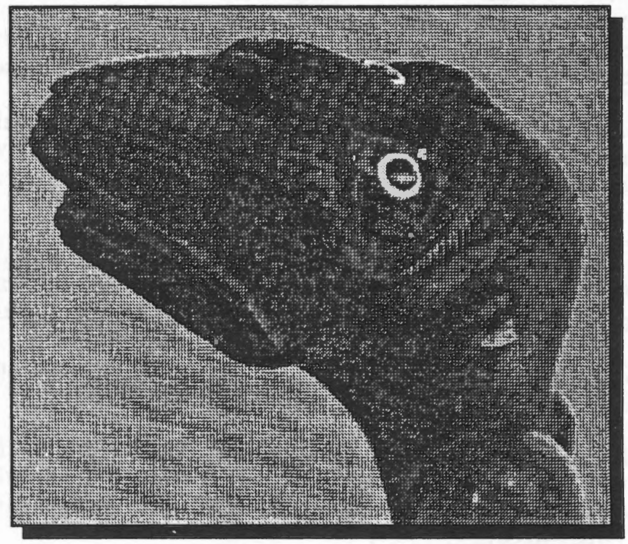

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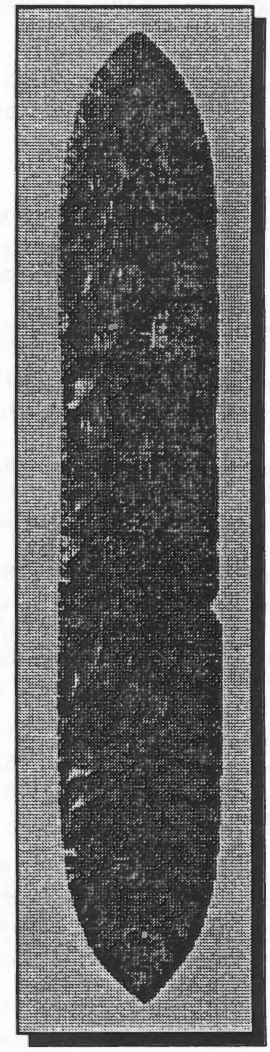

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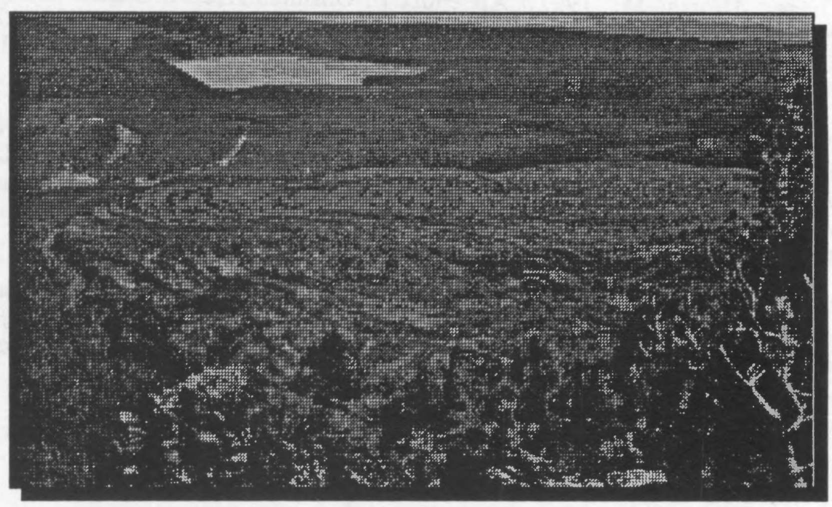

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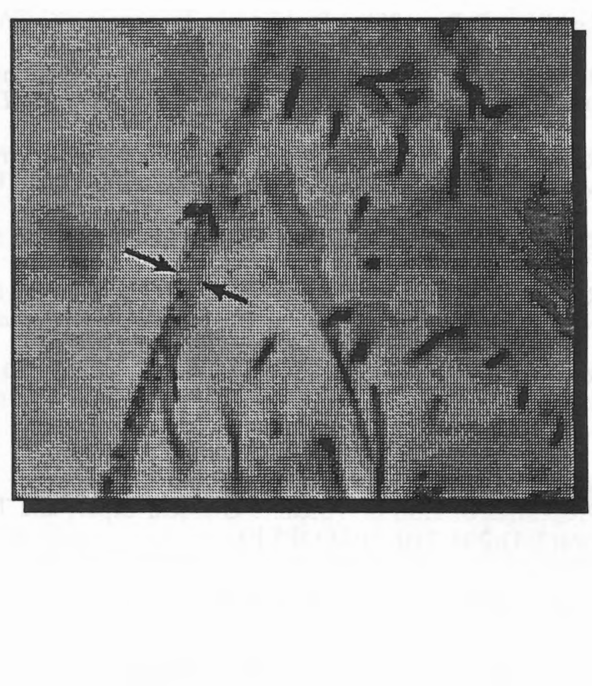

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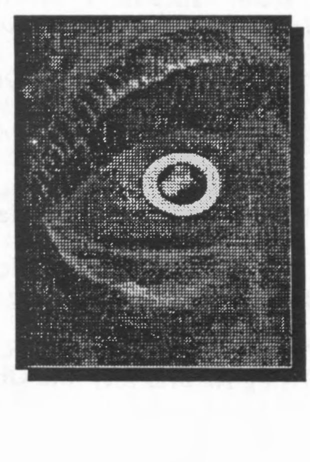

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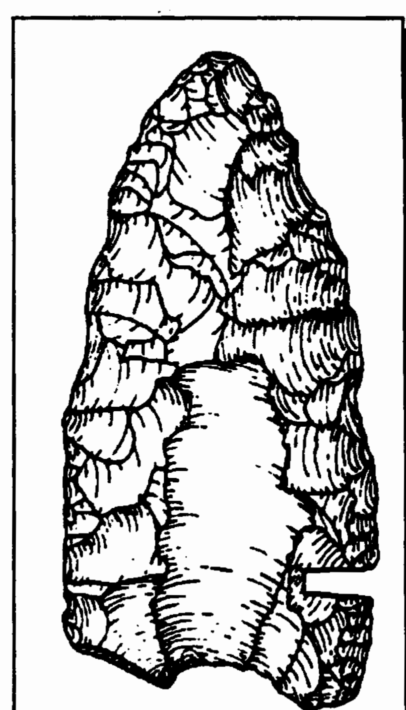

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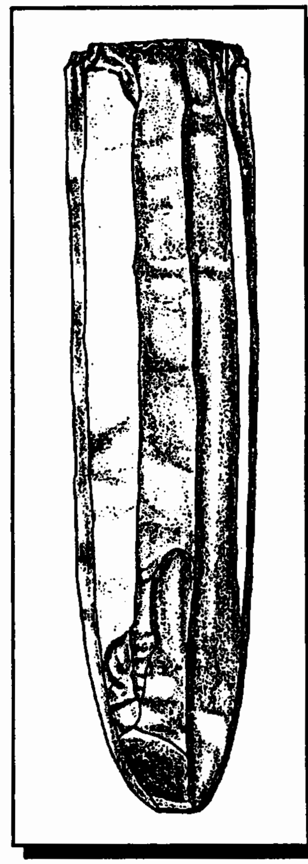

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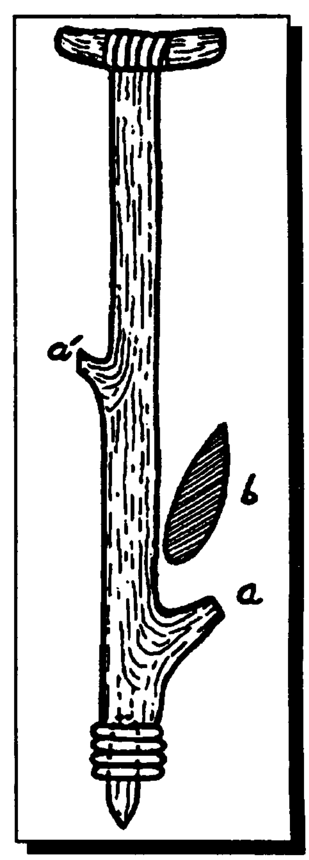

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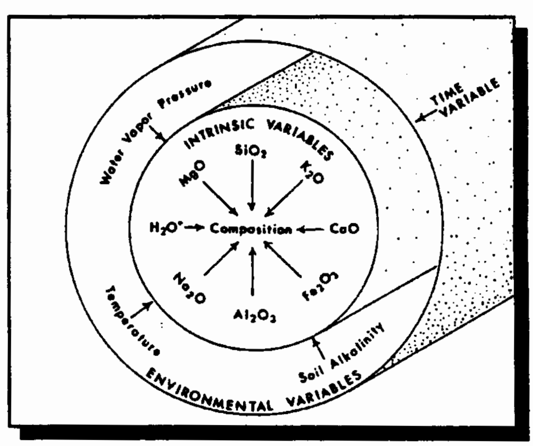

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