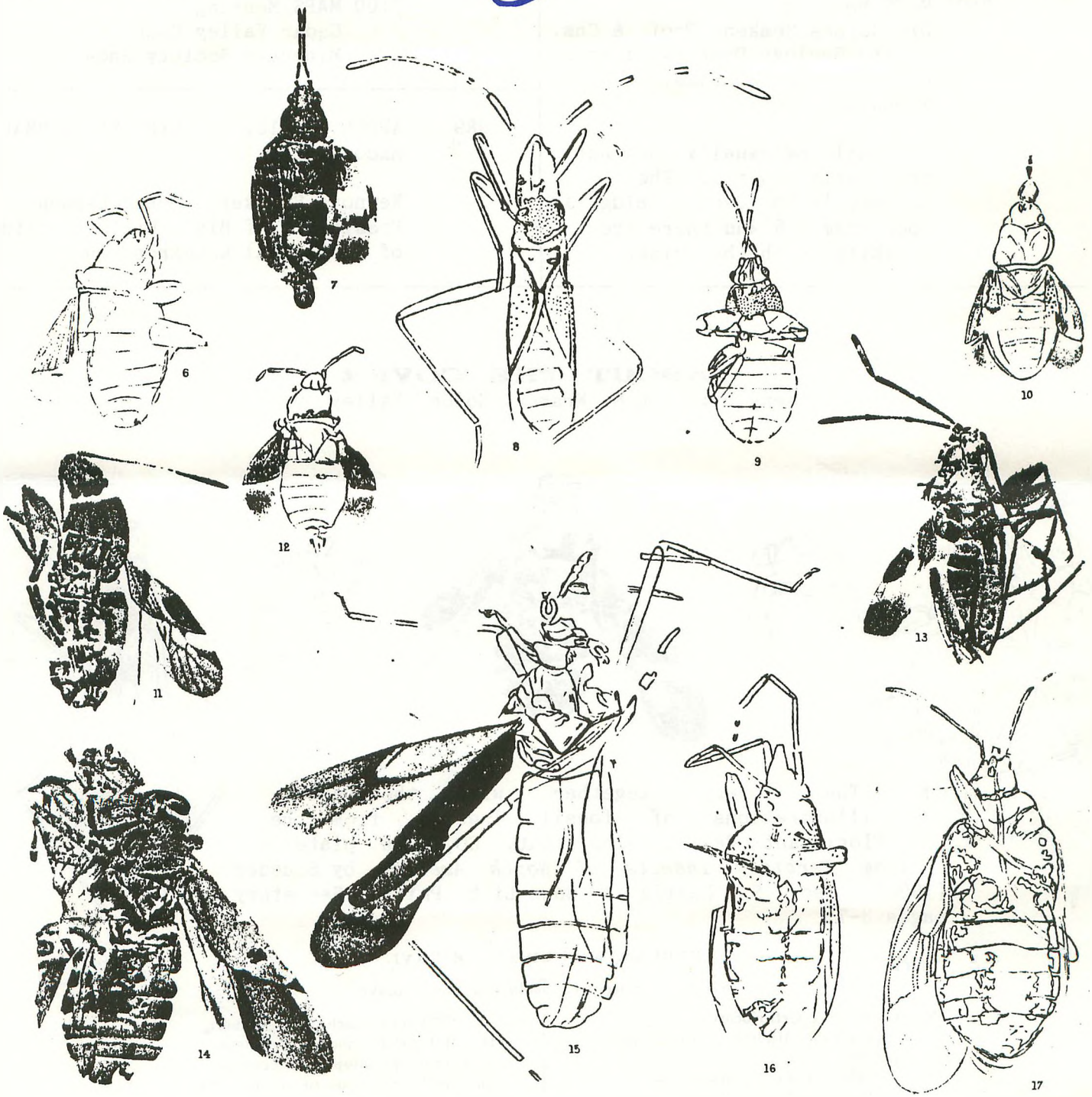
# M·A·P·S Digest

Official Publication of
Mid-America Paleontology Society

Volume 12 Number 2
February, 1989




## THE FLORISSANT BASIN

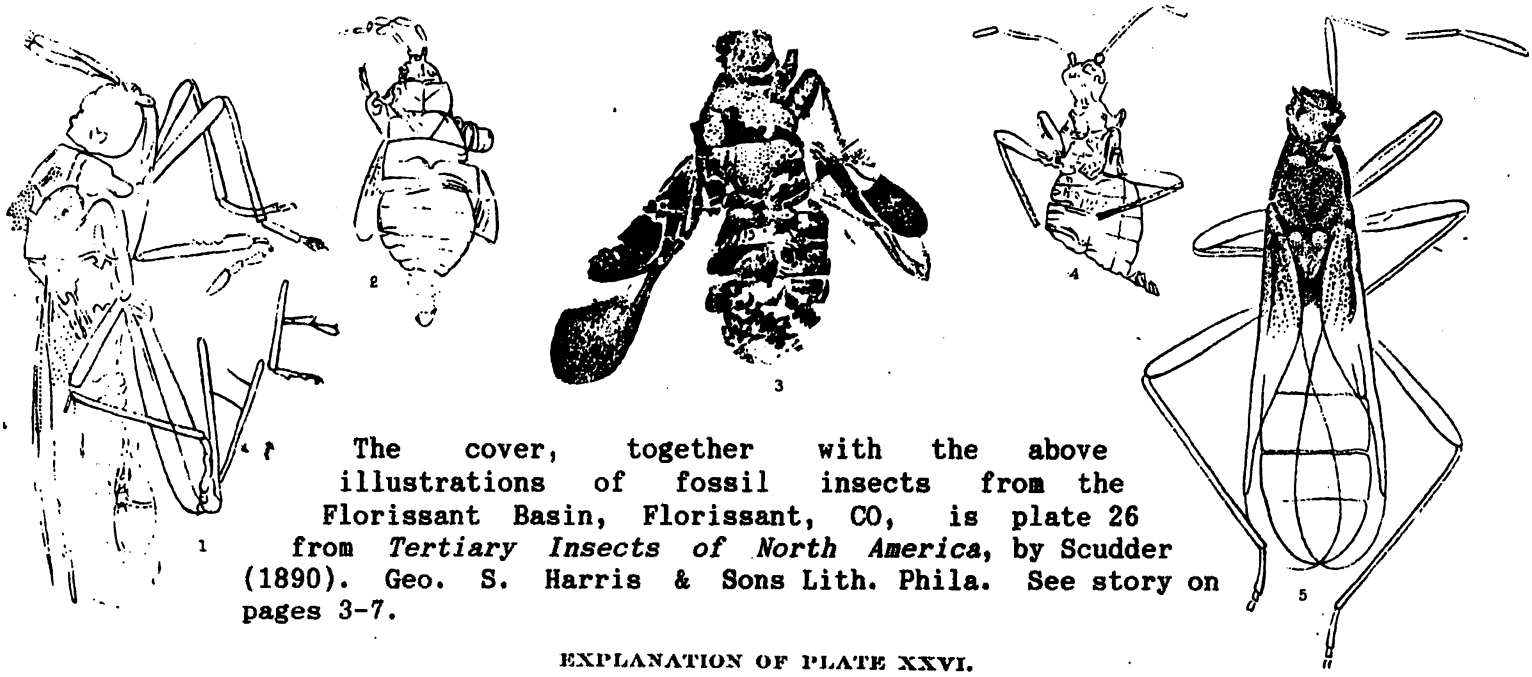
HEMIPTERA. (HETEROPTERA - COREIDAE)

# MARK YOUR CALENDARS

| | |
|---|---|
| 11 FEB MAPS MEETING at Room 231, Trowbridge Hall, University of Iowa, 123 N. Capital St., Iowa City, IA<br><br>1:00 Board Meeting<br>2:00 MAPS Meeting<br>Dr. Holmes Semken, Prof. & Chm. of the Geology Dept. will speak on "Interpreting Fossil Mammals"<br><br>The building usually does not open until about 1. The Library in the Geology Bldg. is open from 1-5 and there are exhibits in the building. | 18 MAR MAPS MEETING at IBEW Hall<br>1211 Wiley Blvd. S.W.<br>Cedar Rapids, IA<br><br>1:00 Board Meeting<br>2:00 MAPS Meeting<br>Cedar Valley Rocks & Minerals Society Show |
| | 1989 APRIL 14, 15, 16--EXPO XI--MAMMALS<br>Macomb, IL<br><br>Keynote Speaker: Peter Larson<br>President of Black Hills Institute of Geological Research, Inc. |

# ABOUT THE COVER

sent by: Jon M. Kramer, Golden Valley, MN




The cover, together with the above illustrations of fossil insects from the Florissant Basin, Florissant, CO, is plate 26 from *Tertiary Insects of North America*, by Scudder (1890). Geo. S. Harris & Sons Lith. Phila. See story on pages 3-7.

EXPLANATION OF PLATE XXVI.

All the drawings were made by J. Henry Blake.

Fig. 1. (8604) (♀) Orthriocorisa longipes.
2. (4644) (♀) Lithochromus mortuarius.
3. (7856) (♀) Cydanus robustus.
4. (14207) (♀) Corizus abditivus.
5. (12469) (♀) Eothes elegans.
6. (13660) (♀) Lithochromus extraneus.
7. (7037) (♀) Phrudopamera chittendeni.
8. (10391) (♀) Protenor imbecillis.
9. (11232) (♀) Phrudopamera chittendeni.
718

Fig. 10. (9837) (♀) Lithochromus gardneri.
11. (2431) (♀) Rhepocoris prævalens.
12. (14236) (♀) Catopamera bradleyi.
13. (8467) (♀) Rhepocoris propinquans.
14. (5633) (♀) Piezocoris? peremptus.
15. (2696) (♀) Tagalodes inermis.
16. (9253) (♀) Etirocoris infernalis.
17. (6370) (♀) Phthinocoris lethargicus.

## EXPO XI--MAMMALS

Karl Stuekerjuergen, Show Chairman for EXPO XI, reports that table reservations are coming in at a good pace - about half of the tables are taken. Don't wait too long to reserve yours if you are planning to attend EXPO. Reservation information was in last month's *Digest*.

Karl also says that Gary Lane, Indiana University, Bloomington, IN, will be at EXPO with information on and applications for the Paleontological Society, so look for him if you are interested in joining.

Madelynne Lillybeck, EXPO *Digest* editor and newly appointed Historian, is looking for pictures of past EXPOS. If you have pictures and would be willing to get copies made, bring them to EXPO this year. Be sure to include the year and any other pertinent information. Madelynne is planning to make a display. She also notes there will be a second speaker, probably Saturday afternoon. Look for more information next month.

Remember that there are tables available for display, so if you would like to exhibit your mammals and/or related fossils, send your reservations to Karl. Display space is free, and exhibits are an important part of the show.

## JANUARY COVER

Franklin Hadley, author of last month's cover article called my attention to a deletion under DIAGNOSIS, line 4, page 1. It should have read: *Hinge line straight; cardinal extremities angular; cardinal area high, either slightly concave, flat or even convex.* In the second column "nargin" should have been "margin".

Franklin also suggested the following sources for further information:

--Living and Fossil Brachiopod Genera 1775-1979, Lists and Bibliography, Doescher, R.A. 1981, Smithsonian Contributions to Paleobiology No. 42.

--Bibliography and Index of North American Carboniferous Brachiopods (1898-1968) Carter, J.L. and R.C. 1970, The Geological Society of America. Inc. Memoir 128.

## DUES ARE DUE
## DON'T MISS ANY ISSUES OF THE DIGEST

Just a reminder that dues were due by the end of December. If you haven't paid yours yet, there should be a sticker on your *Digest* indicating that you are overdue, and this will be your last issue unless your dues are received before the March issue goes out. If we receive your dues after the March mailing you will be reinstated the month following your payment but will not receive back issues.

Label information should reflect payments made to within a week of the mailing date. Occasionally "the computer" makes a mistake, but I try to control it. (Actually I'm still learning how to use it.)

Please make dues ($10.00; overseas members and Libraries/Institutions see back page for options) payable to MAPS and send to the Treasurer:

Sharon Sonnleitner
4800 Sunset Dr.
Fairfax, IA 52228

## SEDIMENTARY NOTES

Betty Speirs, Red Deer, Alta., CAN., writes:

> My 3 fossil sites keep me busy here all year round with excellent new Paleocene material showing up every year. Unfortunately because of restrictive government regulations, I'm unable to trade specimens any more or invite anyone to my sites to dig. All fossils found in Alta. since 1978 are government property and can't leave the province. I just went through the hassle of registering my pre-1978 collection with the gov't., which meant photographing (in triplicate!) every fossil I wanted to claim ownership for my own collection. Our provincial government and institutions will be the losers. They've lost the co-operation and help of rockhounds and amateur fossil collectors who are extremely upset over all this mess. Don't let it happen to you in your State!

# FLORISSANT REVISITED

**by Jon M. Kramer**
**Potomac Museum Group, Box 27470, Golden Valley, MN 55427**

*"That creatures so minute and fragile as insects, creatures which can so feebly withstand the changing of seasons as to live, so to speak, but a moment, are to be found fossil, engraved, as it were, upon the rocks or embedded in their hard mass, will never cease to be a surprise to those unfamiliar with the fact.*

Samuel H. Scudder, 1890. Opening for "The Tertiary Insects of North America"

While completing requirements for a geology degree at the University of Maryland, during the summer of 1983 I attended a wonderful Rocky Mountain Field geology camp offered by Waynesburg College of Pennsylvania. Base camp for the course was a small, single-level, three room, windowless building in the "heart" of downtown Florissant, Colorado. There, for eight weeks, I and 11 other geology undergraduates took classroom ideas and translated them into real-world geologic interpretations.

Florissant is located on the southern extremity of the Front Range mountains and takes its name from Florissant, Missouri, no doubt being borrowed by its not-so-original settlers. Once a thriving crossroads serving the gold tycoons of Cripple Creek (a mere 25 km. away) in the 1890's, the miners have all gone now, and with them left the prosperity Florissant then enjoyed. What remains are a few struggling businesses that rely primarily on "drop-in" traffic. Ironically, Florissant's situation as a crossroads still fuels its economy. Now, instead of gold miners clambering up to Cripple Creek or over the pass to Leadville, tourists complete with cameras and historical guidebooks, retrace their steps.

A relatively "new" attraction open to the public is the Florissant Fossil Beds National Monument - "new" only in its status as a national monument, which occurred in 1969. The true geologic age of the monument is generally accepted as early to mid Oligocene (about 35 million years), supported primarily by evidence of its fossils. It represents what was once a flourishing lake community surrounded by active volcanoes.

## GEOLOGY

The Florissant Lake sequence unconformably overlies Precambrian Pikes Peak granite (see figure 1 and 2). A once southward-draining valley, complete with large *Sequoia* redwoods along its streams, was dammmed by violent "lahars" (pyroclastic mud flows) of the Thirty-nine-mile volcanic series in early Oligocene time. The volcanic origin appears to have been 30 km. southwest of Florissant, an area commonly referred to as the Guffey Volcanic Center (Reinhard, 1978). As is often the case with volcanoes, early lahars are only the beginning. Subsequent eruptions periodically showered the region with varied tuffs (ash; volcanic dust) and additional lahars. These events played important roles in the eventual preservation of Florissant Lake. Although formation of lakes in such a manner may seem unusual by today's standards, they were quite common in central Colorado during the Oligocene, especially in South Park, an area less tha 40 km. from Florissant (De Voto, 1971).

Overlying the basal arkosic breccia and andesitic tuff of the lower lahars, are alternating layers of the Florissant Lake beds, these lacustrine (lake) sedimentary deposits, composed of fine pumiceous tuffs and lake shales, are primarily four-layered laminae varves (cyclical annual deposits) up to 17 m. thick. Anyone who has studied a bulk rock specimen originating in the lake bed layers can immediately see four distinct, although sometimes noncontinuous, laminae.

Generally they are divided according to their primary constituents (Carnein, 1983):

Diatomite Laminae - Average grain

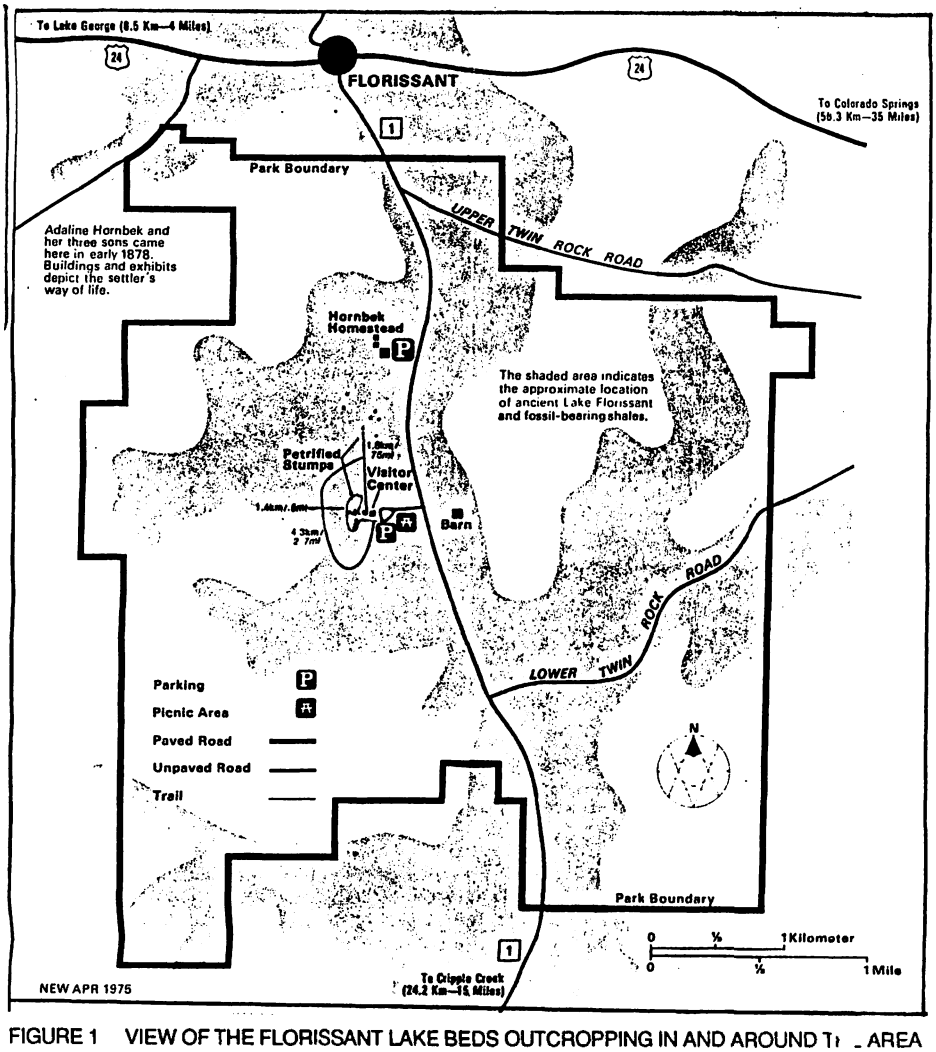



FIGURE 1 VIEW OF THE FLORISSANT LAKE BEDS OUTCROPPING IN AND AROUND TI _ AREA OF FLORISSANT, COLORADO. NOTE THE AREAS THAT ARE EXPOSED OUTSIDE THE MONUMENT BOUNDARY. COLLECTING IS NOT ALLOWED IN THE MONUMENT ( MAP REPRINTED FROM *FLORISSANT FOSSIL BEDS* FLYER.

sizes .01-2.0 mm. Composed almost entirely of frustules (diatom shells), lending a color of light grey to white. Some fish remains (primarily scales).

Sapropel Laminae: Grain sizes .05-2.5 mm. Primarily organic and rhyolitic ash silt. Abundant faunal and floral remains (insects prolific). Light brown to black in color.

Pumice Laminae: Grain sizes 1-30 mm. Pumice with fragments of rhyodacite glass, usually showing inverse grading (finer elements below). Wood fragments common. White to yellow in color.

Tuff Laminae: Grain sizes 6-10 mm. Vitric ash (tuff) showing normal graded bedding (finer elements on top) with leaves and small wood fragments. Medium grey in color.

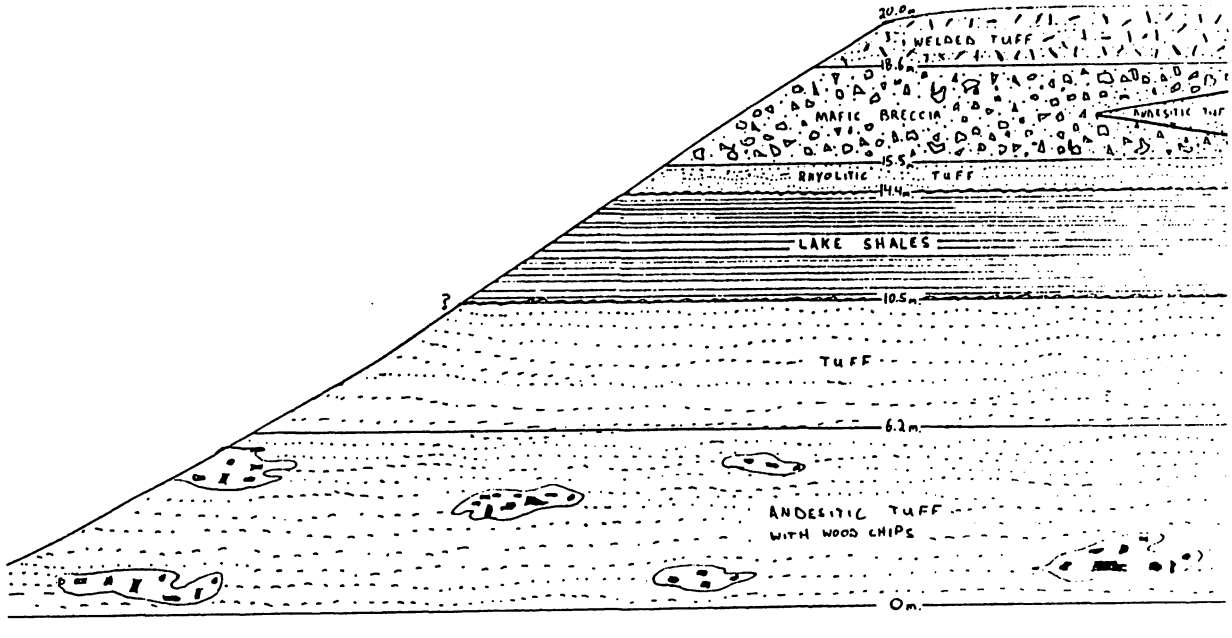



FIGURE 2 SECTION OF OUTCROP 1km. EAST OF TELLER ROUTE 1, ALONG NORTH SIDE OF LOWER TWIN ROCK ROAD IN FLORISSANT FOSSIL BEDS NATIONAL MONUMENT, FLORISSANT, COLORADO ( J. KRAMER, 1983).

The Diatomite and Sapropel Laminaes make up what is known as the "paper shales". Although they contain the bulk of insect fossils, they are sometimes frustrating to excavate. At times the layers are so exceddingly thin (1 mm.) they curl up and crack while drying, and are sometimes blown away by the wind, carrying away what was once a beautiful beetle or fly!

Unconformably overlying the Florissant Lake bed sediments is a unit of rhyolitic tuff up to 8 m. thick. Above that is a pumiceous andesitic tuff and a unit of mafic breccia (coarse volcanic conglomerate).

Finally, the last unit present in the Florissant Lake sequence is a welded trachytic-crystal, vitric tuff. Its source was probably the Guffey Volcanic Center, and it may have been upwards of 20 m. thick. This important layer of volcanic "glass" formed as a glowing avalanche of pyroclastic flow driven by gravity, and settling as a thick deposit over the mafic breccia in the Florissant Valley. Once cooled, it provided a protective cap above the Florissant Lake layers.

## GEOGRAPHY AND CLIMATE

Once drainage channels were blocked by Guffey Volcanic Center lahars, establishment of a thriving lacustrine environment did not take long. A sizable lake 20 km. long and 5 km. wide filled Florissant Valley. At points, the lake may have reached a depth of 50 m. or more. The geographic setting of Florissant Lake appears to have been similar to northern Mexico mountains today, with an elevation of about 1 km. above sea level and moderate topographic relief (Brown, 1983). The climate was probably warm-temperate with a limited amount (50-75 cm.) of annual rainfall. Flora and fauna groups were consistent with the environment described, with expected seasonal variations. Periodic fluctuations in populations are attributable to random geologic catastrophies (volcanic eruptions, earthquakes, mud slides, etc.) experienced by this setting.

## FLORA

The floral environment encompassing Florissant Lake contained a wide variety of xerophytes (dry climate plants) in the surrounding hills and mesophytes (medium moisture plants) along the shores and tributaries. It appears broad-leafed deciduous trees (maple, poplar, hickory) and ferns flourished along the waterways, while conifers (pine, spruce) and grasses occupied the dryer uplands. At least six floral classes are represented as fossils (Lesquereux, 1883):**

Dicotyledoneae: Plants with double-leaf embryos: Trees.

Monocotyledoneae: Plants with single-leaf embryos. Includes some trees and others.

Filices: The ferns.

Musci: Mosses.

Coniferae: Conifers.

Lycopodiae: Club mosses.

As with the case of other Tertiary flora, the dicots presented the overwhelming majority of specimens at Florissant Lake. Undoubtedly, the monocots, being more advanced, were in the minority, as they are yet today.

**Note: for the ease of identification, the classifications are based on seed-bearing habit. This is opposed to others which emphasize possession of vascular tissue as the primary classification criteria.

## FAUNA

Florissant Lake faunas followed suit with the existing food sources. Unfortunately the terrestrial vertebrates which may have populated the areas around Florissant Lake are poorly represented in its fossil record. However, terrestrial invertebrates, primarily insects, are very abundant. Also found are aquatic vertebrates (fish) and invertebrates.

Of the known North American fossil insects, a large portion are described from Florissant. In fact, at the turn of the century, Florissant contributed the overwhelming bulk of fossil insects regardless of origin.

From the literally thousands of fossil insects removed since the mid 1800's, the most numerous are of orders Hymenoptera and Diptera (Scudder, 1890).

## FOSSIL COLLECTING AT FLORISSANT

As is the case with other national monuments, removal of any plant, animal, or rocks from Florissant Fossil Beds is strictly forbidden. The lake sediments do, however, occur outside the monument boundaries outcropping on public and private lands (see figure 1).

Before the north entrance to the monument itself on the west side of Teller Route 1 there was once a small fossil shop with a public fee-digging area nearby. I collected this site extensively in 1983 and found virtually the entire Florissant Lake bed sequence represented there. Literally scores of insects were found at that time. The owners were, as I recall, unaware of any fish having been found at their site. They did, however, have two wonderful butterflies in their private collection (butterflies are very rare at Florissant; see Lepidoptera in TABLE 1). Unfortunately, during my subsequent visits in 1985 and 1988, I found no one at the shop or the house. It may be that theirs is a seasonal business and they are not there during the off-season, which is when I visited. It did, however, appear that no one had been there for some time.

The lake shales also occur along road cuts starting east of town about 1 km. and continue west past Lake George (10 km.). I have collected these sites several times. There is a question as to the legality of such excavation. While digging at one roadcut in 1983 my associates and I were informed by a shefiff's deputy that digging in the area adjacent to the highway was "discouraged". He then proceeded to tell us that we could continue until dark but asked that we move our operations the next day, which we did. I would not suggest any collecting be done in the roadcuts until securing permission from the proper authorities.

I have also collected other spots on private property west of town on the north side of Twin Creek. Numerous leaves and insects came from this area. Neighboring properties also looked promising, although I was not able to collect as many as I would have liked.

Probably the best strategy for finding collecting sites at Florissant is to ask around town for permission to access private property. The local folk are friendly and often will be amiable to surface sampling by a few persons. If you roll into town with a large busload of rockhounds, just hope the fee area is operating! The town is not unfamiliar with the rockhound zest. It has been the site of numerous excellent mineral crystal finds in past years, notably smokey quartz with amazonite.

The most useful tools for collecting in the paper shales are a shovel, geology hammer, small chisels and several thin blade knives. Fillet-type knives are ideal for peeling apart the fine laminae. While digging, look for the Sapropel laminae in the lake shales. The varves are usually .5-2 cm. thick and easily recognizable in the cyclical layering.

Always use proper collecting technique by numbering and documenting each specimen or group. Remember, **the only fossils without proper documentation should be those not yet collected!**

## SPECIMEN CONSERVATION

Very little preparation is needed with most Florissant specimens. Indeed, excessive cleaning is likely to damage the specimens. Once the layer has been split and contains a suitable specimen, be sure it is immediately removed from the collecting site. Allow it to dry slowly so as to limit curling of the laminae. Once completely dry the specimen should be coated with a suitable preservative such as diluted clear varnish, butvar 76, or even thin white glue. Avoid brushing the specimen excessively. Remember that most

specimens at Florissant are fragile carbon films only microns thick. If a brush-on preservative is not used, try a spray-on matte finish or fixer. If necessary to lend support, add a layer of epoxy along with a patch of fiberglas cloth to the backside. Avoid excessive transport of unprotected specimens. When you do transport Florissant specimens, they are best stacked on edge, well wrapped and **loosely packed.**

## REFERENCES CITED

MacGinitie, H.D., 1953, Fossil Plants of the Florissant Beds, Colorado; Carnegie Institute Washington, Pub. 599, Contr, to Paleon. p 1-198.

Reinhard, Wobus A., 1978, Geologic Map of the Florissant Quadrangle; U.S.G.S., Denver, Colorado.

DeVoto, Richard H., 1971, Geologic History of South Park, Colorado; Colorado School of Mines Quarterly, vol 66, no. 3.

Carnein, Carl R., 1983, Personal communication; Waynesburg College Rocky Mountain field station.

Brown, F. Martin, 1983, Personal communication; Colorado Springs, Colorado.

Lesquereux, Leo, 1883, The Cretaceous and Tertiary Floras; U.S.G.S. report of the Territories, vol VIII, p 127-213.

Scudder, Samuel H., 1890, The Tertiary Insects of North America; U.S.G.S. Report of the Territories, vol XIII, p 1-723.

| *ORDER* | *MEMBERS* | *% at FLORISSANT* | |
|---|---|---|---|
| COLEOPTERA | beetles | 13 |  |
| DIPTERA | flies, ticks, mosquitos | 30 |  |
| HEMIPTERA | true bugs | 11 |  |
| HYMENOPTERA | ants, bees, wasps | 40 |  |
| LEPIDOPTERA | moths, butterflies | <1 |  |
| NEUROPTERA | snake flies, lace wings | 5 |  |
| ORTHOPTERA | grasshoppers, roaches | <1 |  |

TABLE 1. FREQUENCY OF FOSSIL OCCURRENCE OF VARIOUS INSECT GROUPS AT FLORISSANT, COLORADO (GENERAL OUTLINE BY SCUDDER, 1890). NOT SHOWN ARE SPIDERS (*ARACHNIDA*) OR OTHER NON-INSECT ARTHROPODS WHICH MAY BE REPRESENTED AS FOSSILS.

# ADVERTISING SECTION



**DIRECTORY INFORMATION:** If you want to make any changes to your directory information, that information must reach the editor by March 1. Please don't wait. With 600+ members, it could be a big job. Members who were new in the past 2 years and did not fill out membership forms should send nodule information; otherwise, all we have for you is a name and address.

Please ADD the Following NEW MEMBERS to Your Directory:

Polly & Max Borden
c/o T.R.A. #594
710 West Main
Arlington, TX 76013

Retired. Will trade. Have for trade trilobites, fish, insects & leaves. Want to learn more about fossils & meet others who are interested. Full time RV'ers; travel mainly in the Western States; spend winters in AR & NM.

Susan Celestian
6415 N. 183rd Av.
Waddell, AZ 85355

David W. Grabda
802 Geddings Dr.
Myrtle Beach, S.C. 29577

Vice President, Myrtle Beach Fossil Club.

Kevan G. Murphy
26 Morton St.
Waltham, MA 02154

Associate Professor, Middlesex Community College. Will trade. Major interest vertebrates. Has for trade invertebrates, mostly brachiopods, rugose corals, some trilobites, etc. Member New England Paleontological Society, Barre, MA.

Gerhard W. Richter
8132 Candlelight Ter.
Westchester, OH 45069

Manager Manufacturing Engr'g. May trade. Major interest personally finding and building a trilobite collection; general collecting. Has for trade a collection of relatively common Ordovician fossils. Member Dry Dredgers, Cincinnati, OH. Wants to increase general knowledge of paleontology & make contacts with other fossil collectors.

Michael Schempf
730 2nd St.
Tawas City, MI 48763

Minister. Will trade. Wants to learn some good locations for fossil hunting & know of other collectors in the area.

Bob Walker
3401 Eric Ln.
Edmond, OK 73034

Student/social worker. Will trade. Beginner. Wants to learn the skills needed to locate fossils and their collection.

Ron Wankel
Rt. 2 Box 175
Jonesborough, TN 37659

Psychologist. Will trade. Major interest vertebrate, sharks teeth, mammal teeth and jaws, etc. Limited stock for trade.

Goeff Thomas
c/o ANZ Bank, P.O. Box 21
FORSTER NSW
AUSTRALIA

Bank accountant. Will trade. Major interest all fossils, especially trilobites, echinoids, crinoid calyxes & fish.

Please Note the Following CHANGES OF ADDRESS and CORRECTIONS.

Mr. & Mrs. Saul Bloom
111 E. Maria Lane
Tempe, AZ 53284

Larry French
6310 W. Conley
Peoria, IL 61604

Susan Bucher/John McLeod
425 Rodgers, A
Downers Grove, IL 60515

Leslie H. Heinzl
129 Sandalwood Ct.
Walkersville, MD 21793

Robert W. Burmeister
P.O. Box 2338
Northbrook, IL 60065

Larry Oliveria
4817 Paseo Padre Pkwy.
Fremont, CA 94555

The Mid-America Paleontology Society (MAPS) was formed to promote popular interest in the subject of paleontology; to encourage the proper collecting, study, preparation, and display of fossil material; and to assist other individuals, groups, and institutions interested in the various aspects of paleontology. It is a non-profit society incorporated under the laws of the State of Iowa.

Membership in MAPS is open to anyone, anywhere who is sincerely interested in fossils and the aims of the Society.

Membership fee: One year from month of payment is $10.00 per household. Institution or Library fee is $25.00. Overseas fee is $10.00 with Surface Mailing of DIGESTS OR $25.00 with Air Mailing of DIGESTS.

MAPS meetings are held on the 1st Saturday of each month (2nd Saturday if inclement weather). October & May meetings are scheduled field trips. The June meeting is in conjunction with the Bedford, Indiana, Swap. A picnic is held in August. November through April meetings are scheduled for 2 p.m. in the Science Building, Augustana College, Rock Island, Illinois. One annual International Fossil Exposition is held in the Spring.

MAPS official publication, MAPS DIGEST, is published 9 months of the year--October through June.



CYATHOCRINITES

MID-AMERICA PALEONTOLOGY SOCIETY

Mrs. Sharon Sonnleitner
MAPS DIGEST Editor
4800 Sunset Dr.
Fairfax, IA 52228

Dated Material - Meeting Notice

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