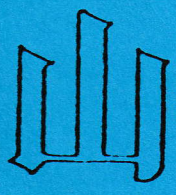
INTERNATIONAL SUBCOMMISSION ON JURASSIC STRATIGRAPHY

Newsletter No. 15

Copenhagen, April 1987



A SUBCOMMISSION OF THE INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)

Newsletter 15

Response to the last newsletter, especially to the new guidelines, was rather poor. We ask you to send us your opinion about the new guidelines in solving the boundary problems. We must remember that the Commission on Stratigraphy expects us to make serious steps towards the definition of the chronostratigraphic units, especially of series and stages. A definition must be based on description and definition of the lower boundary of each unit and it must refer to a global Stratotype Section (Horizon and or Point), and global correlation by marker beds must have been achieved. For other important requirements see checklist (appendix 1 to Guidelines as published in Newsletter 14, see also enclosure 6). Furthermore, we must remember that the present subcommission has existed for eight years, which means in two periods of election. The second period will end with the Geological Congress in 1989, at which time a new chairman and a new secretary must be nominated according to the statutes par. 8.1. Results of these years' work must be presented for the commission before the Geological Congress in 1989. To carry through the work, preliminary results must be presented at the coming meeting in Lisbon this year, as we decided at the Erlangen Symposium.

The coordinators of the working groups are asked to fill in the questionary on stratotypes (next page) and to send a report to the chairman about the new research work carried out by their group according to the decisions from our Erlangen Symposium (time span 1984-1987). Furthermore, the coordinators are asked to prepare correlation charts and to present them for discussion at the Lisbon meeting. The correlation charts must be presented together with an evaluation of the basis for the correlation (see the papers by Mangold and Cariou from the Erlangen meeting).

Questionary

to all coordinators of Working Groups

Report: Stratotypes of all kinds or reference sections already proposed in the past for defining the stage concerned.Localities and references):.....
.....

Evaluation which of them could serve for selection as boundary stratotype in future following the new guide-lines. Locality.....
Please indicate with x if none of the old stratotypes or reference sections is useful for selection and give information by which reasons.....
.....

a) In this case do you see any chance in near future for selecting a new reference section (relation to name giving area is not necessary) providing accordance to the new Guidelines, especially what concerns completeness of section and global marker beds:
..... ☐ yes ☐ no

b) If you don't see this possibility please indicate which points of the check-list are not to be found at present.
.....
.....
.....
.....

Please sent back to chairman of the subcommission until end of May.

Meetings:

A Meeting of the Jurassic/Cretaceous Boundary Working Group will take place in the USSR (Caucasus) after the Lisbon Symposium, September 28th-October 5th, 1987. (Contact address: Dr. V.A. Zakharov, Novosibirsk 90).

The German Subcommission on Jurassic Stratigraphy will meet in Basel this year (May 27th-30th, 1987).

General:

We intend to announce in future all meetings concerning the Jurassic system. We ask all members to inform us in time. Also reports about the results of those meetings are very welcome.

The newsletter will be produced in future twice a year, one in April and one in November. Deadlines are, therefore, 1st of March and 1st of October.

A report on recent literature on the German Jurassic has been published in German language by Holder (Zentralblatt f. Geologie und Palaontologie, Teil 1, 1985, H. 11/12, p. 1710-1755, Stuttgart 1986.

Dr. Peter H. Roth (Dept. of Geology and Geophysics, University of Utah, Salt Lake City, Utah 84112-1183) has been proposed as a new member of the subcommission by Pessagno. Dr. Roth is a specialist of calcareous nannoplancton and he is going to work with Zakharov in USSR. He is willing to participate in active work at the definition of Jurassic boundary stratotypes. The members of the subcommission are asked to communicate their opinion to the secretary before the 1st of July.

Enclosures:

1. Announcement of death of the honorary member of the subcommission Prof. V.A. Vakhrameev, and of Prof. Dr. Birkelund, former chairman of the International Subcommission of Cretaceous Stratigraphy.

2. Report of the 2nd Colloque sur le Lias, Lyon 1986.

3. Report concerning the activity of the Bulgarian Jurassic Working Group (1981-1985).

4. News notes on Jurassic research in the United States (Part II). - Jurassic macroinvertebrate paleontology.

6. Brief check-list for criteria used in selection of a Global stratotype section and point (GSSP) under ICS guidelines.

Arnold Zeiss

Olaf Michelsen

Enclosure 1

It is my sad duty to annonce the sudden death of

Prof. Dr. Vsevolod A. VAKHRAMEEV

former head of the Laboratory of Palaeofloristics of the Geological Institute, Corresponding Member of the USSR Academy of Sciences.

He died on 14th November 1986, at the age of 74.

His fame in palaeobotany is outstanding, and his numerous works on Mesozoic plants and floras will remain a monument of his knowledge and activities during more than 50 years. He was a good friend for the staff of the Geological Institute and for many others all over the world. It is a tragic loss to all of us, but we are grateful that he has been with us for such a long time.

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S.V.Meyen
Head of the
Laboratory of
Palaeofloristics

Dr.V.A.Vakhrameev was one of our most active members and had a great interest to develop and promote the subcommissions activities. Thus he took part in many meetings and gave us many appreciated advices. His scientic work was concentrated on the fossil plants of the mesozoic age. In a book "Paläozoische und mesozoische Floren Eurasiens and die Phylogeographie dieser Zeit", 1978, he made available with cooperators his immense knowledge of the subject also for those not acquainted with russian language. The Subcommission regrets very much this loss of an active and very cooperative member as well as a very experienced scientist and kind and helpful collegue.

Enclosure 1a

INSTITUTE OF HISTORICAL GEOLOGY AND PALAEONTOLOGY
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Date: August 1986

Tove Birkelund
+24.6.1986

With the deepest regret I must inform you that Professor, Dr. Tove Birkelund passed away on June 24th after suffering several years from a fatal disease.

Throughout the last year it became apparent to all of us that the illness was incurable. However, Professor Birkelund carried on with her administrative duties and, most particularly, with her research to the very last day.

Through an incredible effort Professor Birkelund managed to dispose of practically all unfinished business. With her unfailing devotion to truth and duty Professor Birkelund made the last difficult phase easy to bear for us, her colleagues.

We have all lost a brilliant researcher, a faithful colleague, a good friend.

For the institute,
with kind regards

Valdemar Poulsen

Valdemar Poulsen
Professor, dr.phil.

Many members of our Subcommission knew Birkelund whose research work was also concerned with Jurassic problems, especially in the boreal realm of Europe and Greenland. She was also chairman of the International Subcommission on Cretaceous Stratigraphy until 1984. The highlight of this activity was the Symposium held at Copenhague in 1983, which led to the "Proposals for the Cretaceous Stage Boundaries" (see Bull.Geol.Soc.Denmark, vol.33). She was always interested in the affairs of our Subcommission, took place in the Erlangen Symposium, and created together with Prof. A.Zeiss the Jurassic/Cretaceous Boundary Working Group. We will keep her, who had to die much too early, in a good memory.

Report of the 2nd Colloque sur le Lias, Lyon 1986

Le 2ème colloque du Centre International d'Eudes du Lias (C.I.E.L.) s'est tenu au Laboratoire de Géologie de lUniversité catholique de Lyon du 27 au 30 Mai 1986. Il a réuni une cinquantaine de géologues spécialistes du Lias venant de 7 pays étrangers et des différentes régions de la France (liste des participants ci-joint à titre d'information)

Le colloque comprenait deux journées de session scientifiques et deux journées d'excursion sur le terrain en Ardèche.

La session fut ouverte par une conférence magistrale de H.Tintant sur " Les crises de l'Evolution?:innovation ou adaptation ?

Les 27 et 28 Mai, 14 communications ont été présentées sur le thème des rapports entre l'évolution ou la répartition des organismes fossiles (microfaunes, ammonites, lamellibranches, brachiopodes...) et les conditions de milieu qui ont présidé à leur existence et à leur fossilisation.

Voici les titres des communications:

D.Donovan :Evolution of the Arietitidae and their descendnts.

M.Corna : Les Ariétitidés sinémuriens du Jura méridional; essai de phylogénie.

D.Contini :Influence du milieu sur l'évolution de quelques lignées d'ammonites à la limite Lias-Dogger.

J.Gabilly : Taille des ammonites et environnement sédimentaire au Lias.

F.Cecca, S.Cresta, G.Pallini et M.Santantonio : Le Lotharingien-Carixien de Gorgo à Cerbara (M.Nerone,Apennin des Marches): un exemple de passage d'un milieu de plate-forme carbonatée à un milieu pélagique

F.Cecca, J.L.Dommergues, R.Mouterde et G.Pallini: ammonites mésogéennes du Lotharingien de Gorgo à Cerbara (M.Nerone, Apennin des Marches)

R.Cubaynes et Ch.Ruget : Influence de la bathymétrie sur les populations de Lenticulines du Quercy

J.P.Nicollin et Ch.Ruget : Assemblages de Foraminifères dans le Domérien de la carrière de Jean Delaincourt (Lorraine).

Y.Alméras et S.Elmi : Evolution et Paléo-environnement des brachiopodes du Lias ardéchois.

S.Elmi et Kh.Benshili : Les milieux et les faunes du Toarcien du secteur de Tizi Mehassa et de Dwira (Moyen Atlas marocain).

H.Bock. :Environnements sédimentaire et écologique dans le quart NE du Bassin de Paris au Trias terminal et au Lias inférieur.

H.Furrer : Influence de la tectonique liasique sur la distribution des faunes Exemple des Nappes austro-alpines en Suisse et en Italie.

A.Guiffray : sur un fichier systématique des bivalves du Lias.

R.Mouterde : quelques exemples d'évolution d'ammonites liasiques et de leur milieu

Une discussion générale sur l'évolution des ammonites et des autres organismes en fonction de leurs relations avec leur milieu a terminé la partie théorique du Colloque.

Après avis d'un comité de lecture, ces communications seront publiées dans les Cahiers scientifiques de l'Université Catholique de Lyon.

Deux jours d'excursion en Ardèche, sous la direction de S.Elmi, ont montré l'originalité du Lias de cette région située sur une bordure active du Massif Central. Notre attention s'est portée spécialement sur : les conditions locales du passage Trias-Lias (La Croix Blanche, St Julien du Serre) - les séries épaisses de l'Hettangien qui ont été proposées comme stratotype complémentaires (le Chou, le Bosc) - l'évolution de cette marge instable au cours du Lias avec l'opposition entre les faciès de bordures néritiques et les faciès de bassin en raison du jeu différentiel des axes résistants et des bassin subsidents.

Nous avons admiré des exemples typiques de tectonique synsédimentaire (La Chapelle sous Aubenas), de paléofailles et de paléoreliefs (La Clapouze) et l'arrivée massive de matériel détritique formant un véritable delta au sein des dépôts du Domérien supérieur de la Jaubernie.

Une trentaine de participants ont suivi cette excursion qui a été accueillie le Jeudi soir par la municipalité de Privas, très sensible à l'effort de notre collègue G.Naud pour mieux faire connaître la Géologie locale; un Musée sera prochainement ouvert dans cette ville.

R.Mouterde
Chr.Ruget

R E P O R T

concerning the activity of the Bulgarian Jurassic Working Group
(1981 - 85)

The Bulgarian Working Group on the stratigraphy and palaeontology of the Jurassic is represented by: D. Bakalova (calpionellids, algae), S. Černjavska (spores and pollen), L. Dodekova (dinocysts), I. Sapunov (ammonites), M. Stoyanova-Vergilova (belemnites), P. Tchoumatchenco (brachiopods and trace fossils), and E. Trifonova (foraminifere). In the working group took part also G. Čatalov (regional geology), whose activity was restricted to the area of Strandža (Southeastern Bulgaria).

1. Activites in the field of the regional stratigraphy

During the five years period (1981-85) the most of the members of the working group concentreted their effort in regional stratigraphic problems connected with the Jurassic System.

The new results suggest the idea of the existence of two basic stages in the development of this country during the Jurassic:

(1) trensgressive stage (Early-Middle Jurassic);

(2) stage of bathymetric differentiation in in the basin and activisation of the source land (end of the Late Callovian - Late Jurassic).

The marine transgression has been develloped gradually. It has been preceded by continental environments (with or without accumulation). Actually it is proved the presence of different in age Jurassic continental deposits (from Hettangian up to Bathonian).

In Bulgaria the Jurassic marine transgression has been realized in four episods during a remarkable interval from Hettangian up to the Late Callovian. Every episod consists of ingression in narrow

chanals, later followed by lateral transgression over broad territo ries:

(1) Hettangian-Early Pliensbachian ingression, followed by Early Pliensbachian-Late Callovian transgression (in Central Bulgaria and South-eastern Bulgaria);

(2) Sinemurian-Bajocian ingression, followed by Bathonian transgression (in North-eastern Bulgaria);

(3) Sinemurian-Bajocian ingression, followed by Bathonian transgression (in North-eastern Bulgaria);

(4) Pliensbachian-Aalenian ingression, followed by Bajocian transgression (in South-western Bulgaria);

(4) Aalenian-Bajocian ingression, followed by Bathonian-Callovian transgression (in North-western Bulgaria).

During the Late Jurassic the bathymetric differentation is re presented by positive blocks with platform carbonate sedimentation, which are divided by narrow zones with pelagic carbonate sedimentation. In the southern part of the Late Jurassic basin in Bulgaria have been deposited thick flysch sediments. In the central and western parts of the basin the flysch sedimentation has replaced the p lagic carbonate sedimentation during the Kimmeridgian. In the easte part of the basin the flisch sedimentation has began at the end of the late Callovian, when it has replaced the shallow wather terrigenous-carbonate sedimentation. In restricted localities the flysch sedimentation probably has begun directly above older rocks (mainly Triassic).

Some of the new stratigraphic and palaeogeographic results have been published, others are in press, or in preparation for printing.

Bibliographic data are given below:

Sapunov, I.G., Černjavska, S.P., Tchoumatchenco, P.V., Shopov, V.L

1983. Stratigraphy of the Lower Jurassic rocks in the regio of Kraište (South-western Bulgaria). - Geologica Balc., 13.4 3-29, pl. 1-3 (Russian with English and Russian summary).

Sapunov, I.G. 1983. Jurassic System. In "Geology and oil, and gas perspectives of the Moesian Platform in Central North Bulgaria" (A. Atanasov, P. Bokov ed.). Tehnika, Sofia; 18-28 (Bulgarian).

Dodekova, L.D., Sapunov, I.G., Tchoumatchenco, P.V. 1984, Stratigraphy of the Aalenian, Bajocian, and Bathonian rocks in part of South-western Bulgaria. - Geologica Balc., 14.2; 3-55 (Russian with English and Russian summaries).

Nikolova, L., Sapunov, I. 1985. Upper Jurassic-Lower Cretaceous dol mite formation in the eastern part of the Moesian Platform and ite place in the formal lithostratigraphic acheme.- Rev. Bulg. Geol. Soc., 46, 1; 78-83 (Bulgarian with English summary).

Sapunov, I.G., Tchoumatchenco, P.V. Dodekova, L.D., Bakalova, D.G. 1985. Stratigraphy of the Callovian and Upper Jurassic rocks in South-western Bulgaria. - Geologica Balc., 15.2; 3-61 (Russian with English and Russian summaries).

Čatalov, G.A. 1985. Stratigraphy of the Jurassic System in Strandža area, Bulgaria. - Geologica Balc., 15.4; 3-39 (Russian with English and Russian summaries).

Sapunov, I.G., Tchoumatchenco, P.V., Dodekova, L.D., Černjavska,S.I 1985. Contribution to the formal lithostratigraphic scheme related to the Middle Jurassic deposits from North-east Bulgaria.- Rev. Bulg. Geol. Soc., 46.2; 144-152 (Bulgarian with English summary).

Sapunov, I., Tchoumatchenco, P., Baburkov, I., Bakalova, D., Dodekova, L., Želeva, C., Nikolova, M., Cernjavska, S. 1986.

Černjavska, S. 1986. Lower and Middle Jurassic palinostratigraphy of Bulgaria. - Geologica Balc., 16 (English with Russian and English summaries) (in press).

2.2. Dinoflagellate cysts

Dodekova, L. 1983. Two new organic-walled microplancton genera from Northeast Bulgaria. - Palaeont., Stratigr. and Lithol., 18; 35-42, 2 pl. (English with Russian and English summaries).

2.3. Foraminifers

Trifonova, E. 1985. Foraminifers from the Aalenian, Bajocian and Bathonian in North-east Bulgaria.- Palaeont., Stratigr. and lithol., 21; 5-32, pl. 1-5 (Bulgarian with Russian and English summaries).

2.4. Calpionellids

Bakalova-Ivanova, D. 1986. Besonderheiten der Calpionella-Zone in Bulgarien.- Acta Geologica Hungarica (German) (in press).

2.5. Brachiopods

Tchoumatchenco, P.V. 1983. Druganirhynchia nevelinae gen. & sp. n. (Brachiopoda, Rhynchonellidae) and the repartition of the Aalenian rhynchonellids in South-western Bulgaria.-Geologica Balc., 13,6; 69-78, pl. 1 (English with Russian and English summaries).

Tchoumatchenco, P. 1984. Les zones de brachiopodes du Jurassique d' Algérie du Nord et leur corrélation avec les zones de brachiopodes en Bulgarie. Intern. Symp. Jur. Stratigr., Erlangen, Sept. 1-8, 1984 (O. Michelsen, A. Zeiss, ed.). - Symp. vol.3, Geol. Surv. Denmark, Copenhagen; 863-882 (French).

2.6.Belemnites

Stoyanova-Vergilova, M. 1982. On the palaeobiogeographical importance of the Early- and Middle Jurassic belemnites distributed in

Bulgaria. - Geologica Balc., 12, 4; 37-50 (English with Russian and English summaries).

2.7. Ichnofossils

Tchoumatchenco in Dodekova et al. (1984) (see above).

Tchoumatchenco in Sapunov, Tchoumatchenco, Dodekova, Bakalova (198
(see above).

I.G. Sapunov - member of the Int. Subcom. Jur. Stratigr.

I. G. Sapunov
(s i g n a t u r e)

Febr. 5, 1986
S o f i a

received in Erlangen, July, 31, 1986 (second sending, first not received)

NEW NOTES ON JURASSIC RESEARCH IN THE UNITED STATES: CONTRIBUTION TO NEWSLETTER, INTERNATIONAL SUBCOMMISSION ON JURASSIC STRATIGRAPHY.

PART I

MICROFOSSILS -INCLUDING PALYNOMORPHS.

From: Emile A. Pessagno, Jr., Program im Geosciences, University of Texas at Dallas.

RADIOLARIA.

1). Program in Geosciences, Univ. of Texas Dallas.

Patricia A. Whalen (1985) recently completed her Ph. D. Dissertation dealing with Lower Jurassic Radiolaria from the Hettangian to upper Sinemurian portion of the Kunga Formation, Queen Charlotte Islands, B. C., and from the upper Pliensbachian portion of the the San Hipólito Formation, Vizcaino Peninsula, Baja California Sur. Her studies were both taxonomic and biostratigraphic in nature. A total of 15 new genera and 81 new species were described by Whalen from the Kunga and San Hipólitc formations. She plans to publish the results of her research in Bulletins of American Paleontology, Paleontological Research Institution, Ithaca, New York. Dr. Whalen is also the co-author of 2 other reports (See Pessagno et al., in press b, c).

Kuei-Yu Yeh Cheng (1985) completed a largely taxonomic study of Lower Jurassic (upper Pliensbachian-Toarcian) Radiolaria from the Nicely, Hyde, and Snowshoe formations, Izee terrane (east-central Oregon). One new family, 2 new subfamilies, 14 new genera, and 78 new species were described in this dissertation. Dr. Yeh is also the co-author of 2 other reports (Pessagno et al., in press b, c).

Mr. Norman MacLeod nears completion of a comprehensive systematic, pylogenetic, and morphometric analysis of the Jurassic genus Perispyridium Dumitrica for his Ph. D. Dissertation. Using a variety of biometric techniques, he has established the presence of significant allometries among all Perispyridium species investigated and ranked gross skeletal dimensions in terms of relative size interdependency. Perispyridium morphologic diversity can be organized into three mutually exlusive groups of species which do not appear to reflect patterns of phylogenetic association. Finally, the Perispyridium skeletal Bauplan can be broken down into three correlated character complexes of which the gross dimensions of the peripheral shell exibit strong correlation with a general size factor and

dramatically reduced coefficients of variations. This seems to indicate that skeletal size in Perispyridium might have been influenced by natural selections to a much greater extent than other aspects of the overall morphology. Thirteen new species of Perispyridium have been described by MacLeod. MacLeod's sample base comes primarily from carefully measured sections of the Snowshoe Formation (Toarcian--upper Bathonian) near Izee (Izee terrane, east-central Oregon). These samples can be related to ammonite biostratigraphic data generated by R. W. Imlay (USGS) and P. L. Smith (Univ. British Columbia). MacLeod is also the co-author of two other reports (Pessagno et al., in press a, b).

Mr. Paul Heyroth is pursuing taxonomic and biostratigraphic studies (Masters Thesis) of the upper Bajocian portion of the Snowshoe Formation. Heyroth's samples were mostly collected from measured sections of the Snowshoe Formation in the vicinity of Seneca, Oregon (Izee terrane, east-central Ore.). In most cases, his radiolarian-bearing samples can be related to ammonite biostratigraphic data supplied by Imlay (1973).

Mr. Mitchel Alberts is studying (Masters Thesis) lower and upper Bajocian Radiolaria from the Snowshoe Formation in the northeast portion of the USGS Izee Quadrangle and in adjacent portions of the USGS Logdell Quadrangle. His samples can be related to ammonite biostratigraphic data from Imlay (1973) and Smith (1980 and unpublished; additional ammonites submitted to Dr. P. L. Smith, Univ. of British Columbia for identification).

Mr. Victor Davila nears completion of a Masters Thesis dealing both with Upper Jurassic (upper Tithonian) Radiolaria from the Eugenia Formation and Upper Cretaceous (Cenomanian) Radiolaria from the Asuncion Formation, Vizcaino Peninsula, Baja California Sur.

Mr. Christopher Garey is studying Upper Jurassic and Lower Cretaceous Radiolaria Gold Beach terrane (southwestern Oregon). In addition, he has studied Upper Jurassic Radiolaria (Kimmeridgian--Tithonian) from volcano-pelagic strata above the Coast Range ophiolite at Black Mountain (Sonoma County, California). Mr. Garey hpes to complete his thesis by Fall, 1986.

Mr. Qun Yang (People's Republic of China) is making a detailed taxonomic and biostratigraphic study of upper Tithonian Radiolaria from the Taman Formation (east-central Mexico) for his Ph. D. Dissertation. The Tethyan upper Tithonian radiolarian assemblage of the Taman Formation is extremely diversified. At least 150 species level taxa are present in the upper Tithonian assemblage. Moreover, about 90 percent of these taxa are new. The upper Tithonian (Zone

4) radiolarian assemblage of the Taman Formation (= Pimienta Formation pt. of Cantu Chapa, 1971; Imlay, 1980) differs from that occurring at DSDP sites in the North Atlantic by containing Parvicingula Pessagno (sensu Pessagno and Whalen, 1982) and from Boreal upper Tithonian strata in the California Coast Ranges by containing an abundant, diversified pantanelliid assemblage. Parvicingula is quite abundant in Boreal Jurassic strata, but is absent in lower latitude Tethyan strata. The Taman upper Tithonian assemblage is important because it contains many faunal elements that bridge the Tethyan and Boreal Realms (e.g., Vallupus hopsoni Pessagno and Blome, V. zeissi Pessagno and MacLeod, n. sp., Bivallupus longoriai Pessagno and MacLeod, n. sp., Hsuum mclaughlini Pessagno and Blome, Parvicingula colemani Pessagno and Blome, and Podocapsa amphitreptera Foreman). The Zone 4 radiolarian assemblage of the Taman Formation (sensu Pessagno et al., in press a) can be related to both upper Tithonian calpionellids identified by Dr. Jose F. Longoria (Univ. of Texas, Dallas) and to upper Tithonian ammonites identified by Dr. Arnold Zeiss (Univ. Erlangen--Nürenberg) and other competent specialists.

Dr. Emile A. Pessagno, Jr. is the senior author of 5 reports which should be published in late 1986 or early 1987 (Pessagno and Blome, in press; Pessagno et al., in press a, b, c, d).

The report by Pessagno and Blome (in press) deals with faunal and paleomagnetic evidence for the tectonic transport of geologic terranes in the Blue Mountains Province (eastern Oregon, eastern Washington, Western Idaho) from low to high paleolatitudes during the Jurassic. This report suggests that these geologic terranes represent components of a single major island arc system that was carried north by megashears and dismembered by accompanying transpression.

The report by Pessagno et al. (in press a) deals with radiolarian taxonomy, radiolarian biostratigraphy, and the chronostratigraphic, paleolatitudinal, and tectostratigraphic significance of the molluscan and radiolarian assemblage of the Taman Formation (east-central Mexico). The primary purpose of this report was to document the diversity of the rich pantanelliid assemblage occurring in the Upper Jurassic assemblage of the Taman Formation. One new subfamily, the Vallupinae Pessagno and MacLeod, n. subfam., which includes 3 new genera, and 8 new species is described. Ten new species are described from the Pantanelliinae Pessagno. In addition, 31 species-level morphotypes are figured. In western North America pantanelliids are rare and poorly diversified in low latitutude Boreal strata and are virtually absent in high latitude Boreal strata.

The report by Pessagno et al. (in press a) also reinforces the assignment of the base of Zone 4 (= base of Zone C_1, Baumgartner, 1984, 1986) to the upper Tithonian. In the type area of the Taman Formation at Taman (San Luis Potosi), the base of Zone 4 occurs about 6 m (20 f) below the contact between the lower, more massively-bedded member of the Taman Formation and the upper, thin-bedded member of the Taman Formation. Moreover, it corresponds closely to the first occurrence of Crassicollaria intermedia (Durand Delga) and upper Tithonian ammonites. In the upper, thin-bedded member (= Pimienta Formation, pt., of Cantu Chapa, 1971; Imlay, 1980), upper Tithonian ammonites are closely associated with or often occur in the same samples containing Zone 4, Subzone 4 beta Radiolaria. Ammonites recovered from upper Taman Subzone 4 beta strata include Hildoglochiceras sp. aff. H. tenuicostatulum and Salinites grossicostatum (Imlay) (Identifications by Dr. Arnold Zeiss, Univ. Erlangen--Nürenberg). A specimen of the former species was recovered 30 m above the contact between the lower and upper Taman. Specimens of S. grossicostatum occur at higher horizons. Data presented by Imlay (1939) and Cantu Chapa (1976) indicate that S. grossicostatum first appears above the last occurrence of Kossmatia Uhlig and last appears in strata that still contain Durangites Burckhardt. This suggests that at least the middle and upper parts of Subzone 4 beta are correlative with the lower part of Imlay's (1980) Substeuroceras--Proniceras assemblage.

Detailed measured sections of the Taman Formation are not presented in the Pessagno et al. (in press a) report. However, Dr. J. F. Longoria (Univ. of Texas, Dallas) and his students made measured sections of the Taman Formation in its type area using the tape and Brunton method and graphic projection. The position of most of our radiolarian-bearing samples was noted by Longoria in the process of measuring the type Taman. Other samples were collected from partial measured sections made by Pessagno and Yang or within the framework of stratigraphic/structural profiles made by Longoria.

The report by Pessagno et al. (in press b) presents a preliminary radiolarian zonation for the Jurassic of North America. It discusses the chronostratigraphic calibration of North American radiolarian biozones by co-occurring ammonites. Moreover, it deals with radical differences in chronostratigraphic calibration between Baumgartner (1984, 1986) and those of Pessagno et al. These differences in chronostratigraphic calibration cannot be attributed to differences in taxonomy. Baumgartner (1986) now assigns the base of his Zone C_1 (=base Zone 4, Subzone 4 beta) to the lower Kimmeridgian based on the alleged association of his C_1 radiolarian faunas with Ataxioceras Fontannes. Our North American ammonite and calpionellid-based chronostratigraphic data indicate that this biohorizon occurs at or at least

very close to the base of the upper Tithonian (See Pessagno et al., in press a, above). No Zone 4/C_1 Radiolaria occur within the lower Kimmeridgian s.g., upper Kimmeridgian s.g., or lower Tithonian strata of the Taman Formation in east-central Mexico (Ataxioceras, Idoceras, Glochiceras aff. fialar, etc. zones of Cantu Chapa, 1971). Furthermore, no Zone 4/C_1 radiolaria occur in volcano-pelagic strata above the Josephine ophiolite in the Klamath Mountains of California. Saleeby et al. (1982) obtained a concordant U/Pb date of 157 ±2 m.y. from zircon in plagiogranite within the Josephine ophiolite (See Geochronometry below).

Pessagno et al. (in press c) is largely a taxonomic study of dicyrtid and tricyrtid Nassellariina from Lower, Middle, and Upper Jurassic North American strata. Two new genera and 34 new species are described from the Farcidae, n. fam., the Hilarisiregidae Takemura and Nakaseko, and the Ultranaporidae Pessagno. Microfaunal and megafaunal evidence for the paleolatitudinal displacement of major North American geologic terranes is discussed.

Pessagno et al. (in press d) presents paleolatitudinal evidence for the rapid tectonic transport of the Coast Range ophiolite and overlying volcano-pelagic strata from low Tethyan paleolatitudes to higher Boreal paleolatitudes during the course of Middle Jurassic (late Callovian) to Late Jurassic (late Tithonian) times. In addition, this report focuses on U/Pb geochronometric data generated by Hopson et al. (1981), Saleeby et al. (1982), and Saleeby (1984) and its relation to both ammonite and radiolarian biostratigraphic data. (See Geochronometry, Saleeby below).

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2) U. S. Geological Survey.

In 1984, Dr. Charles D. Blome (Paleontology and Stratigraphy Branch, Denver Colorado) published a report dealing with Callovian Radiolaria from the Sheilikof Formation (Puale Bay area, southern Alaska) and the Lonesome Formation (Izee terrane, east-central Oregon). Radiolarian biostratigraphic data from both areas is well constrained by co-occurring ammonites. Dr. Blome is also involved with Pessagno in the analysis of Radiolaria from strata occurring above and within the Coast Range ophiolite (Calif. Coast Ranges) and the Josephine ophiolite (Klamath Mountains, Calif.). Other studies by Blome include analyses of Radiolaria from the Naknek Formtion (Alaska) and the Hawasina Complex of Oman.

In 1984, Ms. Benita Murchey (Paleontology and Stratigraphy Branch, Menlo Park Calif.) completed a study of Radiolaria occurring in cherts from the Franciscan Complex of Northern California (Marin Co.). Her studies clearly demonstrated that many of the red ribbon cherts are of Early and Middle Jurassic age and contain low latitude Tethyan assemblages.

FORAMINIFERA

Abundant benthonic foraminifera were recovered by Dr. Keith D. Berry (Chevron Oil, U. S. A., Concord, Calif.) in samples from the Upper Jurassic portion of the Eugenia Formation, Vizcaino Peninsula, Baja California Sur. Faunal lists from Berry were included in a Ph. D. Dissertation by Barnes (1982, Univ. Calif., Santa Barbara). In many cases, the foraminiferal faunas could be directly related to co-occurring Radiolaria and megafossils.

CALCAREOUS NANNOFOSSILS

In 1983, Dr. Peter H. Roth (Univ. of Utah, Salt Lake City) was the author of two reports (Roth, 1983; Roth et al., 1983) dealing with Jurassic and Lower Cretaceous calcareous nannofossils occurring at DSDP Site 534 (Western North Atlantic).

CALPIONELLIDS

Dr. Jose F. Longoria (Univ. of Texas, Dallas) is studying calpionellids and nannoconids from the Taman and Pimienta formations in east-central Mexico. Longoria's samples were collected from measured sections of upper Tithonian and Berriasian successions in the Sierra Madre Oriental in the states of San Luis Potosi, Hidalgo, Veracruz, and Puebla and from the Sierra Cruillas, Tamaulipas. Many of the successions sampled by Longoria also contain Radiolaria and ammonites.

DINOFLAGELLATES

Dr. William R. Evitt and some of his students at Stanford University (Stanford, Calif.) are studying dinoflagellates from the Naknek Formation of Alaska. The dinoflagellate biostratigraphy will be interfaced with Blome's (See above) radiolarian biostratigraphy.

In 1983, Dr. Daniel Habib (Queens College, City Univ. of New York) and Dr. Warren S. Drugg (Chevron Oil Field Research Co., La Habra, Calif.) published a report dealing with the Jurassic and Lower Cretaceous dinoflagellate stratigraphy at DSDP Site 534 (Blake-Bahama Basin).

TECTONOSTRATIGRAPHY

Dr. Jose F. Longoria (Univ. of Texas, Dallas) recently authored a very significant report dealing with major megashears and tectonic transpression in the Sierra Madre Oriental of northeastern Mexico (See Longoria, 1985). Longoria's investigations indicate that movement south of the northern megashear, the Texas lineament, is from southeast to northwest. Moreover, his studies demonstrate that movement south of the southern megashear, the Walper Lineament, is from northwest to southeast. Other investigations by Longoria (in progress) indicate the presence of additional megashears south of the Walper Lineament in southern Mexico. Longoria's studies impact on the interpretation of the tectonostratigraphy of Mexico and, indeed, all of western North America. Moreover, they offer a framework for interpretting biostratigraphic and paleolatitudinal data derived from both megafossils and microfossils. Many of the problems in correlation faced by biostratigraphers in Mexico are due to the structural juxtaposition of geologic terranes containing higher latitude faunas against terranes bearing lower latitude faunas or to the juxtaposition of terranes containing neritic assemblages against terranes containing bathyal or abyssal assemblages.

Reports dealing with Jurassic geologic terranes are too numerous to cite here. However, the reader is referred to a recent volume entitled: "Tectonostratigraphic terranes of the Circum-Pacific Region", Earth Sciences Series, no. 1, 581 p., Howell, D. G., ed., 1985 for additional information.

GEOCHRONOMETRY/GEOCHRONOLOGY

Some of the most significant geochronometric data pertaining the the development of a more accurate Jurassic geochronologic time scale was recently generated by Dr. Jason B. Saleeby (California Institute of Technology). Saleeby (1984) obtained a concordant U/Pb date of 157 ±1.5 m.y. from zircon in dacitic tuff breccia in the upper several hundred meters of the Rogue Formation (Rogue Valley subterrane, southwestern Oregon). The overlying strata of Galice Formation in the Rogue Valley subterrane contain Dichotomosphinctes Buckman and Buchia concentrica (Sowerby) (See Imlay, 1961, 1980). Because Buchia concentrica is often associated with Dichotomosphinctes and Amoeboceras, Pessagno et al. (in press c, d) suggest (1) that the lower part of the Galice is assignable to the middle part of the middle Oxfordian and (2) that the middle part of the middle Oxfordian is younger than 157 ±1.5 m.y.

Additional U/Pb geochronometric data were generated by Saleeby et al. (1982) in the Smith River subterrane (Western Klamath terrane), northwestern California. Here Saleeby et

al. (1982) obtained a concordant U/Pb date of 157 ±2 from zircon in plagiogranite within the Josephine ophiolite. Moreover, they obtained a concordant U/Pb date of 150 ±2 on zircon from a sill intruding the upper part of the overlying Galice Formation. Pessagno and Blome (in progress) have determined that Superzone 1 radiolarian faunas occur at 3.2 m (10.5 f) and 12.8 m (42 f) above the contact between the Josephine ophiolite and the overlying Galice Formation s.l. Zone 2 (Subzone 2 beta) faunas were recovered from the Galice s.l. succession from 17.5 m (58 f) to 61.2 m (201 f) above the contact with the JO at Harper (1983) Locality 1. Although additional studies of the radiolarian assemblage are needed, these data appear to indicate that the Superzone 1--Zone 2 boundary is younger than 157 ±2 m.y. and older than 150 ±2 m.y.

The Decade of North America 1983 Geologic Time Scale (Palmer, 1983; Kent and Gradstein, 1985) places the Oxfordian--Kimmeridgian boundary at 156 Ma. Following Westermann's (1984) estimates for the length of the middle and late Oxfordian, Pessagno et al. (in press d) suggest that the Oxfordian--Kimmeridgian boundary should be placed at 154 Ma.

Vast amounts of geochronometric data are being generated in western North America. Better shepherding of these data by both geochronometrists and stratigraphers is needed to compile a more accurate Jurassic time (geochronologic) scale.

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NEW NOTES ON JURASSIC RESEARCH IN THE UNITED STATES: CONTRIBUTION TO NEWSLETTER, INTERNATIONAL SUBCOMMISSION ON JURASSIC STRATIGRAPHY.

PART II

Jurassic Macroinvertebrate Paleontology in the United States - Present Status

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Introduction

Research on Jurassic macroinvertebrates in the United States within the last few years has centered on ammonites, although some coverage has been given to other groups in papers concerned with paleobiogeography and invertebrate depth zones. Research is concentrated in the western part of the country, where the Jurassic is widely exposed in the Western Cordillera and Western Interior regions. Discussion of recent research begins with 1980, since that year saw the publication of the most comprehensive synthesis for the Jurassic System in the United States that has been published to date. This work (Imlay 1980a) furnishes much information regarding depositional history of Jurassic rocks, extent of marine incursions and ammonite successions, and is a companion paper to that of Imlay & Detterman (1973) covering Alaska. The wealth of information and comprehensive bibliographies make these references a useful starting place for anyone familiarizing himself with the Jurassic System in this country.

Ammonite Systematics & Biochronology

Information on ammonoid successions for the whole of the Jurassic in the United States is given in Imlay (1980a, 1984b), while discussions regarding the Middle Jurassic and post-Lower Bajocian are provided in Westermann (1981) and Callomon (1984) respectively.

The Lower Jurassic is now receiving considerable attention. Imlay (1981a) described Early Jurassic ammonites from throughout Alaska. Guex

(1980, 1981, 1982) described new ammonites and furnished biostratigraphic data for the Hettangian Stage from the lower part of the Sunrise Formation in Nevada, while Taylor (1986) provided an informal zonation for the latest Hettangian-Early Sinemurian interval based on ammonites from the Sunrise Formation and the Graylock Formation, Oregon. Further reports (by P. Smith, D. Taylor, H. Tipper and J. Guex) describing ammonite faunas and developing a zonation for the Western Cordillera Early Jurassic are in preparation.

The faunal succession in Nevada spanning the Triassic-Jurassic boundary (Hallam 1981, Taylor et al. 1983) is noteworthy for its completeness as exemplified, for example, in Guex (1982) who documented the overlap in the stratigraphic ranges of Choristoceras and Psiloceras at the system boundary. This boundary is being investigated further by J. Guex & D. Taylor.

Middle Jurassic ammonite sequences in the United States were reviewed in Westermann (1981), while Hall & Westermann (1980) established a Lower Bajocian zonation for Western North America. At the same time Smith (1980) proposed an informal zonation for Bajocian ammonites from the Snowshoe Formation in the Izee area, Oregon. Taylor (in prep.) will refine the Late Aalenian-Early Bajocian zonation for the Western Cordillera, based primarily on data from the Snowshoe Formation. In this report, new zones will be established that will fill in gaps in the ammonite succession, as presently understood. Imlay's recent publications regarding Alaskan faunas from the Middle Jurassic include reports on ammonite systematics and stratigraphic range data for the Aalenian through Bathonian interval (Imlay 1980b, 1982a, 1984a). With regard to the Western Cordillera in the conterminous United States, Imlay (1981b) described Bathonian and Callovian ammonites from Oregon and Idaho. Further, Late Callovian ammonites from the Western Interior region are described in Imlay (1982b).

Papers providing descriptions of Late Jurassic ammonites include those of Imlay (1981c) for the Late Jurassic of Alaska and Imlay (1982b) for the Oxfordian of the Western Interior region.

Paleobiogeography

Ammonite paleobiogeography has been another area of interest in recent years (Callomon 1984; Imlay 1980a, 1984b; Smith 1983; Smith & Tipper, in press; Taylor et al. 1984; Westermann 1981, 1984). Taylor et al. (1984) and Smith & Tipper (in press), in particular, examined the faunal evidence bearing on the problem of interpreting the complex tectonic history of the Western Cordillera, now known to consist largely of a collage of tectonostratigraphic terranes, many of which are exotic (Coney et al. 1980). In Taylor et al. (1984), first a provincial framework for the Jurassic in Western North America was established (see also Westermann 1984) based on ammonoids [but including mention of Lower Jurassic bivalves Weyla and Lithiotis (=Plicatostylus, see Smith & Tipper, in press)] and then the faunal evidence bearing on displacement of several terranes was presented. Smith & Tipper (in press) examined the evidence for the Pliensbachian Stage in detail while Callomon (1984) also provided an important discussion regarding the Middle and Late Jurassic.

Macroinvertebrate Depth Zonation

Taylor (1982) proposed a depth zonation for the marine Jurassic in Western North America, based on macroinvertebrate faunas, notably from the Snowshoe Formation, Oregon. The depth zonation is further discussed with reference to the Sunrise Formation, Nevada (Taylor et al. 1983), while additional comments regarding the Western Interior region are provided in Taylor (1983).

Conclusions

The last few years have experienced a shift in research emphasis in paleobiogeography reflecting the needs of interpreting the Western Cordillera in the light of fact that it is composed of a collage of largely exotic terranes (most prior paleobiogeographic studies have assumed a comparatively stable configuration of the Western Cordillera during and since the Mesozoic). Another current endeavor is that of developing regional ammonite zonations for Western North America, based on biostratigraphic studies providing accurate range data. Current biochronologic and ammonite systematic studies are now concentrated on the Hettangian through Bajocian Stage interval and further documentation of the Triassic-Jurassic boundary in Nevada.

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Appendix I:

Brief CHECK-LIST for criteria used in selection of a GLOBAL STRATOTYPE SECTION AND POINT(GSSP) under ICS Guidelines.

1. Explicit motivation for the preference
2. Correlation on a global scale
3. Completeness of exposure
4. Adequate thickness of sediments
5. Abundance and diversity of well-preserved fossils
6. Favourable facies for widespread correlation
7. Freedom from structural complication and metamorphism
8. Amenability to magnetostratigraphy and geochronometry
9. Accessibility and conservation