

INQUA
INTERNATIONAL UNION
FOR
QUATERNARY RESEARCH

Union Internationale pour l'Etude du Quaternaire
Internationale Quaternärvereinigung
Union Internacional para el Estudio del Cuaternario



OFFICIAL COMPTE RENDU
OF THE XIV CONGRESS

Berlin, Germany
August 3–10, 1995

Prepared by Edward Derbyshire, Burkhard Frenzel and Margot Böse

OFFICIAL COMPTE RENDU
OF THE
XIV INQUA CONGRESS

HELD IN BERLIN, GERMANY, AUGUST 3–10, 1995

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1. THE WORK OF THE XIV INQUA CONGRESS, BERLIN, AUGUST 3-10, 1995

1. REPORT OF THE PRESIDENT AND SECRETARY-GENERAL OF THE ORGANIZING COMMITTEE ON

Burkhard Frenzel and Margot Böse

INTRODUCTION

During the XIII International INQUA Congress in Beijing, P.R.China, the General Assembly accepted the invitation by Burkhard Frenzel to hold its next international congress in Berlin, Germany, in 1995. He was subsequently elected President of the National Organizing Committee. Horst Hagedorn, Vice-President of INQUA, was elected Vice-President of the National Organizing Committee. As local organizer, Margot Böse became Secretary-General, supported by Dieter Jäkel as her deputy. Responsibility for the field excursions was delegated to Wolfgang Schirmer, and for the publications to Josef Klostermann. Control over financial transactions for the congress and over the travel grants was assigned to Dieter Anhuf, Peter Frankenberg and Joachim Marcinek.

The provisional scientific programme drafted by Burkhard Frenzel comprised:

- a) four topics of more general interest, and
- b) reports about the scientific results achieved by the INQUA Commissions, Subcommissions, Committees and Working Groups during the 1991-1995 intercongress period.

The four major topics were:

- 1) Modelling the future development of climate against the background of Quaternary palaeoclimatology: natural and man-made processes.
- 2) The North Polar Sea and the North Atlantic Ocean as driving forces of global oceanic circulation and of related climatic change.
- 3) Groundwater budgets, consumption, recharge, pollution and self-purification in Quaternary sediments of various climatic zones and in areas of various human impact.
- 4) Biostratigraphical and chronostratigraphical correlations of the Nordic and Southern schemes of Quaternary stratigraphy.

Although the XIV International INQUA Congress was held under the auspices of His Excellency the Bundespräsident, the organization of the congress proper and of the field excursions turned out to be extremely difficult. This unfortunate situation was largely due to financial constraints. They caused the Land Berlin, which was

responsible for funding the Berlin congress, to cancel its financial support. Furthermore, the preparatory work of the congress was financed - almost up to the very end of the congress - mainly by some university institutes and other institutions, and even by members of the Organizing Committee. The Deutsche Forschungsgemeinschaft (DFG) was the first - and for a long time the only - organization to give financial support. The German Federal Government, represented by the Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (BMBF), provided support for two of the main symposia: 'Tracing the future development of climate on the basis of palaeoclimatology' and 'The North Polar Sea and the North Atlantic Ocean as driving forces for the global oceanic circulation during various time windows of stable and transient climates'. Most of these funds were used for travel grants. A last-minute application to the Stiftung Deutsche Klassenlotterie Berlin for a limited deficit subsidizing according to the planning budget was successful in spring 1995. Additional financial sponsoring was received from Daimler Benz AG and Porsche AG. Further financial support for printing the abstract volume was given by the Alfred-Wegener-Stiftung und the Landesbank Berlin (LBB). Conference packs and stationery supplies were donated by Westermann Verlag Braunschweig and Herlitz AG Berlin, respectively. In addition, we wish to thank the following institutions for financially supporting the preparation of the field excursions: the Bundesanstalt für Rohstoffe und Geowissenschaften, Hannover, the Landesdenkmalämter of Brandenburg, Thüringen, Niedersachsen, Rheinland-Pfalz, Baden-Württemberg, and Bayern, the Römisch-Germanische Kommission, Mainz, the Geologische Landesämter of Mecklenburg-Vorpommern, Brandenburg, Sachsen, Sachsen-Anhalt, Thüringen, Schleswig-Holstein, Niedersachsen, Nordrhein-Westfalen, Rheinland-Pfalz, Baden-Württemberg and Bayern, and the Freistaat Sachsen.

Originally, it was planned to offer about 10 long field excursions through most of Europe in order to stimulate a multidisciplinary discussion of various aspects of Quaternary geology, geomorphology, palaeopedology, palaeoecology, prehistory, applied geology and engineering geology. However, the main emphasis was on Quaternary stratigraphy, since it was felt necessary to stimulate a comprehensive discussion of major correlation problems arising from the North European and the Alpine stratigraphic schemes presently used in various European countries. To achieve this goal, the countries involved had to cooperate intensively in preparing these 10 to 12-day

field excursions. Indeed, it must be gratefully acknowledged that, apart from some financial and organizational problems, this cooperation did work very well. The enthusiasm of numerous colleagues was so stimulating that altogether 23 field excursions were prepared.

In addition, several one-day local excursions were planned to enable participants of the XIV International INQUA Congress to study various aspects of Quaternary sciences as well as the cultural heritage in the eastern part of Germany, which is historically such an interesting region of Central Europe.

However, the financial constraints mentioned above also affected the organization of the field excursions. Several - though not all - of the university departments involved in planning these field trips did not have enough staff to carry out all the organization by themselves, and therefore an agency had to be brought in. This fact - together with the economic problems of some European countries, and also the opportunity of visiting hitherto politically inaccessible sites and regions of interest - caused an unexpected rise in the prices of field trips and the cost of living in Berlin.

The economic problems prevailing elsewhere caused a wealth of applications to be sent by numerous colleagues to the Organizing Committee and the INQUA Presidency asking for financial support. Many of these applications could be positively allotted: 125 of the participants obtained travel grants (for further details, see the Treasurers' Report below).

In the end, 1178 colleagues and some 100 unpaid student assistants were able to attend this congress, intensively contributing to the productive discussions during the congress proper and the field trips.

Originally it was planned, though not unanimously, to hold the congress in the International Congress Center, situated relatively near to the economic hub of the western part of Berlin. Later the Senate of Berlin unexpectedly needed this center for its own purposes. Hence, and due to the financial constraints, the Freie Universität was chosen. Its location is greener and more congenial than that of the International Congress Center, but the technical facilities are not as good. We are greatly indebted to the President of the Freie Universität for courteously hosting the XIV INQUA Congress.

SCIENTIFIC PROGRAMME

In spite of all the difficulties hampering the preparatory work as well as the congress proper, the scientific results of the congress were excellent. The following list groups the various symposia according to more general themes, taking the number of papers presented during the congress (1073) as indicating the 'degree of interest' triggered by the respective groups:

Palaeoclimatology	124 papers
Quaternary Stratigraphy	81 papers
Neotectonics	79 papers
Glaciology	72 papers
Palaeoecology	67 papers
Prehistory	59 papers
Palaeohydrology	54 papers
Glaciation History	47 papers
Quaternary Palaeontology	44 papers
Eustasy/Isostasy	43 papers
Past Global Change	42 papers
Palaeopedology	40 papers
CO ₂ -budgets	38 papers
Pleistocene-Holocene-transition	38 papers
Palaeomagnetism	34 papers
Palaeoceanography	33 papers
Loess, Loess-Stratigraphy	28 papers
Applied Quaternary Geology	27 papers
Palaeolimnology	23 papers
Vegetation History	22 papers
Permafrost	21 papers
Tephrochronology, Volcanism	18 papers
Geochemistry	11 papers
Geochronology	11 papers
IGCP 358	11 papers
Groundwater Problems	6 papers
Free contributions	93 papers

In contrast to the strong interest in palaeoclimatology (in a very broad sense), Quaternary stratigraphy, neotectonics, glaciology, palaeoecology and prehistory, for instance, the applied Quaternary sciences, including groundwater problems, were not as well represented as might have been expected from the general importance of these disciplines. Quaternary sciences are *per definitionem* intensively involved in all aspects of Global Change. Yet Global Change is not just a theoretical problem. Thus the varied aspects of applied Quaternary sciences - in a very broad sense - are of utmost importance for mankind, and will become even more crucial in the near future. It is felt that these sciences should be duly represented at the forthcoming INQUA Congress.

MEMBERSHIP

The number of registrants of the XIV INQUA Congress could be divided into four categories of membership:

A: Regular registrant	689
B: Accompanying person	60
C: Student registrant, scholar	236
D: Libraries, Institutions of all kinds	24

During the congress it became necessary to establish a further category of membership:

G: Guests	32
One-day-ticket holders	46
Others	91

Altogether 1178 participants from 56 countries and regions registered for the INQUA congress. In addition, some 100 students attended the congress and offered as a return service unpaid assistance for the duration of the congress.

In table 1. the participating countries and the number of participants are given.

Table 1: Comparison of the national representation during the last three INQUA congresses in Berlin (1995), Beijing (1991), and Ottawa (1987)

Participating country	Berlin 1995	Beijing 1991	Ottawa, 1987
Argentina	7	4	5
Armenia	1		
Australia	16	12	11
Austria	7	2	2
Bangladesh	1	1	
Belarus	2		
Belgium	23	15	5
Brazil	5	8	8
Bulgaria	2		
Canada	31	27	372* ¹
Chile	1	1	1
Czech Republic	7		
Denmark	8	4	4
Estonia	3		
Finland	21	8	15
France	48	42	43
Germany	397* ¹	30	29
Greece	6	1	1
Hong Kong	3	4	
Hungary	7	4	4
India	5	7	4
Ireland	7	1	4
Israel	9	17	11
Italy	44	26	20
Japan	49	68	26
Korea	1	26	1
Latvia	2		
Lithuania	7		
Mexico	1		1

Netherlands	38	15	20
New Zealand	5	3	14
Nigeria	1		1
Norway	10		13
Panama	1		
P.R. of China	47	409* ¹	21
Poland	24	6	10
Portugal	1	3	3
Republic of Georgia	4		
Russia	68	64	25
Serbia	1		
Slovakia	7		
South Africa	12	9	6
South Korea	3		1
Spain	11	7	14
Sri Lanka	1		
Sudan	1		
Sweden	23	8	19
Switzerland	26	11	9
Tadzhikistan	1		
Taiwan (ROC)	11	17	
Uganda	1		
United Kingdom	76	33	61
Ukraine	1		
USA	80	93	278
Venezuela	2	1	1
Yugoslavia	1	2	1
Participants in total	1178	1031	1075
Countries in total	56	44* ²	48* ³

*¹ country hosting congress.

*² additional countries presented at the Beijing Congress: Iran (7); Philippines (5); Czechoslovakia (4); Indonesia (3); Thailand (3); Vietnam (2); Algeria (1); French Guyana (1).

*³ additional countries presented at the Ottawa Congress: German Dem. Rep. (26); Thailand (2); Senegal (2); P.R.Congo (1), Guyana (1), Peru (1), Turkey (1), Iran (1), Philippines (1), Czechoslovakia (1), French Guyana (1).

2. REPORT OF THE CONGRESS TREASURERS

Dieter Anhuf & Joachim Marcinek

During the preparatory work in 1993 and 1994 the costs of the congress proper were estimated to be about DM 695,000. Not before the end of the congress, exact calculations could be made. The result was that the congress proper had yielded an income of DM 641,525 balanced by expenditures of the same amount. Yet it must be added that this sum does neither include the preparation of the pre- and postcongress field excursions and of the one-day field trips nor the organizational work done by the various German institutions involved in the aspects of the

organization of this congress. The travel costs for the preparation and organization of the congress amounted to some additional DM 24,500. The amount of money needed for the salaries of the scientific and technical staff involved in this preparatory work can be roughly estimated only and may have amounted to some DM 800,000.

The initial budget was based on an estimated income of DM 500,000 from registration fees and DM 195,000 promised by the Deutsche Forschungsgemeinschaft (DFG), the Land Baden-Württemberg and the Deutsche Klassenlotterie Berlin (DKLB).

The reason for the discrepancy between the initially

calculated income and the exact value is in some respect the fact that travel grants and fundings could be given to 125 colleagues from several countries. Yet we had to commit ourselves to the most important sponsors to charge only a reduced registration fee of DM 250 per funded colleague. Thus instead of the originally expected 900 participants paying the full rate (membership category A) only 634 actually did so. On the other hand the number of the colleagues with reduced fees grew from initially estimated 200 (membership categories B through D) to 651, including those 125 colleagues who received funds and travel grants. All audits, for example with the different sponsors, have been accepted.

LIST OF SPONSORS FOR THE CONGRESS PROPER:

DFG	DM 75,000
Alfred-Wegener-Stiftung	DM 10,000
Land Baden Württemberg	DM 10,000
Deutsche Klassenlotterie Berlin (DKLB)	DM 100,000
Mercedes Benz AG	DM 25,000
Porsche AG	DM 1000
Verband der Deutschen Automobilindustrie	DM 1000
BMW AG	DM 1500
Institut für Angewandte Gewässerökologie	DM 500
Professor Müller-Beck	DM 1200
International Union for Quaternary Research (INQUA)	DM 41,495

TRAVEL GRANTS

Donations to the Travel Grant Fund topped DM 150,000 thanks to the generosity of Asean Brown Boveri (ABB), Akademie der Wissenschaften und der Literatur, Mainz, Robert Bosch AG, Bundesministerium für Bildung, Wissenschaft, Forschung & Technologie (BMBF), Deutsche Forschungsgemeinschaft (DFG), Freie Universität Berlin (FUB), Humboldt Universität Berlin (HUB), INTAS, International Union for Quaternary Research (INQUA), Max-Planck-Gesellschaft (MPG), Alexander von Humboldt-Stiftung (AHS), Freistaat Sachsen, Umweltbundesamt (UBA), and Universität Mannheim. Out of the 1178 congress participants from 56 different countries and regions, 125 received travel grants, i.e. just over 10%. They came from 23 countries: Argentina, Armenia, Bangladesh, Belarus, Brazil, Bulgaria, P.R.China, Czech Republic, Estonia, Republic of Georgia, Hungary, India, Iran, Latvia, Lithuania, Mexico, Nigeria, Poland, Russia, Sri Lanka, Tadjhikistan, Ukraine, and Venezuela.

Together more than DM 150 000 were obtained for travel grants and fundings. Thus out of the total of 1178 participants (membership categories A through D), coming from 56 countries, 125 colleagues could be awarded travel grants and fundings enabling them to participate in the Berlin congress.

Finally should be mentioned that in times, in which public funds become smaller and smaller money was saved by choosing an adequate site where the congress was held: As already mentioned above, it was planned to hold the congress in the International Congress Center, Berlin. The costs for hiring the rooms and certain technical facilities there would have amounted to approximately DM 240,000. As the payment of such a sum was impossible for us, the Freie Universität Berlin was chosen. This was not only much cheaper, DM 10,000 for the time of the congress, but it also presented a much more informal and pleasant atmosphere, though the distance between the locality of the scientific presentations and the lodgings became longer. Yet, in view of the fact that the Land Berlin, which - due to common economic problems - refused the financial support for the congress, we had to accept this alternative. Following from all these unexpected problems the INQUA congress in Berlin could not yield any profit for the INQUA finances, but was financially balanced.

3. CONGRESS PROGRAMME

Burkhard Frenzel & Margot Böse

The motto of the congress was '*From the Past through the Present to the Future*'. The scientific programme of the XIV INQUA Congress included four main symposia and 61 additional symposia and workshops, dealing with palaeoclimatology, palaeoceanography, Quaternary stratigraphy, applied Quaternary geology, glaciotectonics and glacial sediments, glaciology, prehistory, Man as a geological factor, palaeobiology, Global Change - palaeoecology, loess and fossil soils, neotectonics, together with free contributions and poster sessions.

A total of 1160 abstracts was submitted to the Organizing Committee, of which 927 papers were scheduled in the oral sessions and 233 papers in the poster sessions. Some 800 papers (oral and poster) were in fact presented during the congress, but the Organizing Committee was dismayed by the discrepancy between the number of papers cited in the Programme and Abstract Volume and those actually presented during the congress.

Following from this, the coherence of the programme was weakened, and the work of the Programme Committee was made much more difficult by the large number of papers which were either withdrawn or for which the authors simply did not show up. Some authors were unable to attend for completely legitimate and often unfortunate personal reasons, but the majority of no-shows had no such reasons. Some prevented by travel or financial restrictions did inform us at the last minute, but many did not. We cannot estimate how many abstracts were submitted in cases where the author knew that she or he had no possibility of attending the congress.

We considered whether we should have checked the list of

registrants against the programme. But this would not have significantly helped to solve the problem of no-shows, because considerable numbers of papers were presented by others, without that the Programme Committee was informed.

At the meeting, we were forced to revise programmes on a daily basis by changing the master sheets that were used to print the Programme and Abstract Volume. This revised programme was posted prominently, but we felt that the percentage of missing papers was a serious detriment to some of the sessions.

The problem of large numbers of authors who submitted abstracts and then did not have the courtesy to inform the Organizing Committee that they would not be attending is one that the INQUA Council should address with National Committees before the next congress in South Africa.

SCHEDULED OUTLINE OF THE SCIENTIFIC PROGRAMME

Symposia - Oral sessions:

- 1) **Herterich, K., Frenzel, B., Berger, A.:** TRACING THE FUTURE DEVELOPMENT OF CLIMATE ON THE BASIS OF PALAEOCLIMATOLOGY. (GERMAN CLIMATE RESEARCH PROGRAM; INQUA PALAEOCLIMATE COMMISSION.)
- 2) **Sarnthein, M., Thiede, J., Crowley, E., Jansen, E., Labeyrie, L. & de Vernal, A.:** THE NORTH POLAR SEA AND THE NORTH ATLANTIC OCEAN AS DRIVING FORCES FOR THE GLOBAL OCEANIC CIRCULATION DURING VARIOUS TIME WINDOWS OF STABLE AND TRANSIENT CLIMATES. (GERMAN CLIMATE RESEARCH PROGRAM; INQUA PALAEOCLIMATE COMMISSION.)
- 2a) **Thiede, J.:** NORTHERN HEMISPHERE QUATERNARY CLIMATES: DATA AND MODELS.
- 2b) **Thiede, J.:** MARINE QUATERNARY IN THE NORTHERN AND SOUTHERN HEMISPHERE: CASE STUDIES.
- 3) **Gläßer, W.:** GROUNDWATER MOVEMENT, CONSUMPTION, RECHARGE, POLLUTION AND SELF-GENERATING CAPACITIES IN QUATERNARY SOFT ROCKS.
- 4) **Rose, J., Grube, E.F. & Eißmann, L.:** REGIONAL AND WORLDWIDE STRATIGRAPHIC CORRELATIONS. **Arkhipov, S.A. & Kumai, H.:** QUATERNARY STRATIGRAPHY OF ASIA AND THE ADJACENT PACIFIC AREA. (INQUA COMMISSION ON STRATIGRAPHY)
- 5) **Berger, A.L.:** MILANKOVITCH AND QUATERNARY CLIMATE HISTORY.
- 6) **Duplessy, J.C. & Berger, A.L.:** QUATERNARY CLIMATE HISTORY IN THE SOUTHERN HEMISPHERE? (INQUA PALAEOCLIMATE COMMISSION)
- 6a) **Partridge, T.C., Kershaw, A.P. & Iriondo, M.H.:** PALAEOCLIMATES OF THE SOUTHERN HEMISPHERE DURING THE LAST 200,000 YEARS: DATA, MODELS AND REGIONAL SYNTHESIS. (INQUA PALAEOCLIMATES OF THE SOUTHERN HEMISPHERE PROJECT; UNESCO-INTERNATIONAL UNION OF GEOLOGICAL SCIENCES: CLIMATES OF THE PAST.)
- 7) **Billard, A.:** CLIMATES OF THE MIDDLE PLEISTOCENE; LAND AND OCEAN RECORDS
- 8) **French, H.:** CENOZOIC GROUND ICE STRATIGRAPHY. (INTERNATIONAL PERMAFROST ASSOCIATION)
- 9) **Faure, H., Velichko, A.A. & Adams, J.M.:** TERRESTRIAL CARBON CYCLE CHANGES DURING THE PAST 150 KA. (INQUA CARBON PROJECT)
- 10) **Kröpelin, S., An Zhisheng, Derbyshire, E., & Rutter, N.:** PALAEO-MONSOON VARIATIONS AND GLOBAL CHANGE DURING THE LATE QUATERNARY. (INTERNATIONAL GEOSPHERE-BIOSPHERE PROGRAMME; PAST GLOBAL CHANGES; PALAEO-MONSOONS PROJECT)
- 12) **Machida, H. & Begét, J.:** THE IMPORTANCE OF TEPHROCHRONOLOGY FOR RECONSTRUCTING CLIMATE HISTORY AND ENVIRONMENTAL CHANGES IN THE QUATERNARY. (INQUA COMMISSION ON TEPHROCHRONOLOGY)
- 13) **Negendank, J.F.W., Merkt, J., Anderson, R.Y. & Kelts, K.:** PALAEO-LIMNOLOGY.
- 14) **Pachur H.-J. & Singhvi, A.:** ENVIRONMENTS IN THE AXIS OF THE OLD WORLD DESERT BELT (SAHARA-CENTRAL ASIA) DURING THE TERMINAL PLEISTOCENE AND THE EARLY HOLOCENE.

- 15) **Ringberg, B.:** VARVES, VARVE CHRONOLOGY, VARVE CLIMATOLOGY. (INQUA COMMISSION ON STRATIGRAPHY)
- 17) **Starkel, L.:** EPISODES OF HIGH VARIABILITY IN THE HYDROLOGICAL CYCLE OF THE PAST. (INQUA COMMISSION ON GLOBAL CONTINENTAL PALAEOHYDROLOGY)
- 19) **van Husen, D.:** GEOTECHNICAL ASPECTS IN QUATERNARY SOFT ROCKS.
- 20) **Lüttig, G.W.:** APPLIED QUATERNARY GEOLOGY. (INQUA COMMISSION ON APPLIED QUATERNARY RESEARCH)
- 21) **de Mulder, E.:** QUATERNARY GEOLOGY IN URBAN CENTERS.
- 22) **Starkel, L. & Annenkov, V.V.:** HYDROLOGY OF THE LAST MILLENNIUM. (INQUA COMMISSION ON GLOBAL CONTINENTAL PALAEOHYDROLOGY; IGU COMMISSION ON THE ENVIRONMENTAL CHANGES IN HISTORICAL TIMES)
- 23) **Boulton, G.S., Starkel, L. & de Mulder, E.:** SIMULATION OF THE PAST AND FUTURE HYDROLOGICAL EVOLUTION OF NW-EUROPE. (INQUA COMMISSION ON PALAEOCLIMATE; INQUA COMMISSION ON GLOBAL CONTINENTAL PALAEOHYDROLOGY; INQUA COMMISSION ON APPLIED QUATERNARY RESEARCH; INQUA COMMISSION ON GEOLOGICAL SCIENCES FOR ENVIRONMENTAL PLANNING)
- 24) **Cita, M.:** MARINE SECTIONS FROM SOUTHERN ITALY POTENTIALLY USABLE AS STANDARD REFERENCE FOR THE LOWER, MIDDLE AND UPPER PLEISTOCENE.
- 25) **Lindsay, E.H.:** CORRELATION OF EURASIAN LATE CENOZOIC MAMMAL CHRONOLOGY WITH THE MAGNETIC POLARITY TIME SCALE. (INQUA COMMISSION ON STRATIGRAPHY)
- 26) **Lundqvist, J.:** TERMINATION OF THE PLEISTOCENE. (IGCP 253)
- 27) **Partridge, T.C.:** THE PLEISTOCENE/PLEISTOCENE BOUNDARY. (INQUA COMMISSION ON STRATIGRAPHY)
- 28) **Richmond, G.:** MAJOR DIVISIONS OF THE QUATERNARY. (INQUA COMMISSION ON STRATIGRAPHY)
- 29) **Heller, F., Evans, M.E., Lovlie, R. & Thouveny, N.:** MAGNETISM OF QUATERNARY SEDIMENTS: ENVIRONMENTAL AND PALAEOENVIRONMENTAL APPLICATIONS.
- 31) **Aber, J.:** GLACIOTECTONICS. (INQUA COMMISSION ON PROPERTIES OF GLACIAL DEPOSITS)
- 32) **Lundqvist, J.:** GLACIGENEOUS SEDIMENTS. (INQUA COMMISSION ON PROPERTIES OF GLACIAL DEPOSITS)
- 33) **Piotrowski, J.A., Habbe, K.-A. & Ellwanger, D.:** DRUMLINS. (INQUA COMMISSION ON PROPERTIES OF GLACIAL DEPOSITS)
- 34) **Kuhle, M., Xu Daoming & Grosswald, M.G.:** QUATERNARY AND HOLOCENE GLACIATION IN ASIA AND ITS CLIMATIC IMPLICATION.
- 35) **Serebryanny, L.:** THE PROBLEM OF TIMING AND EXTENT OF PLEISTOCENE GLACIATIONS IN POLAR AND HIGH MOUNTAIN REGIONS OF THE NORTHERN HEMISPHERE.
- 36) **Li Jijun & Derbyshire, E.:** THE PROBLEM OF THE UPLIFT OF THE TIBETAN PLATEAU AND ITS BEARING ON ENVIRONMENTAL CHANGE.
- 37) **Gullentops, F. & Renault-Miskovsky, J.:** EUROPEAN PLEISTOCENE STAGES 4, 3 AND 2: MEN, THEIR CULTURE AND ECOLOGY. (INQUA COMMISSION FOR THE PALAEOECOLOGY OF EARLY MAN)
- 38) **Straus, L.G., Müller-Beck, H. & Eriksen, B.V.:** ARCHAEOLOGY OF THE PLEISTOCENE/HOLOCENE TRANSITION. (INQUA COMMISSION FOR THE PALAEOECOLOGY OF EARLY MAN)
- 39) **Amman, B.:** HUMAN IMPACT ON ECOSYSTEMS. (INQUA COMMISSION FOR THE STUDY OF THE HOLOCENE)

- 40) **Frenzel, B.:** EUROPEAN PALAEOCLIMATE AND MAN SINCE THE LAST GLACIATION. (EUROPEAN SCIENCE FOUNDATION: EUROPEAN PALAEOCLIMATE AND MAN SINCE THE LATE GLACIATION) AND QUATERNARY MAPS. SCIENTIFIC PROBLEMS. (INQUA COMMISSION ON THE PALAEOGEOGRAPHICAL ATLAS)
- 42) **Schulz, E., Roberts, N. & Pomel, S.:** THE HUMAN IMPACT: INDICATORS IN SEDIMENTS, SOILS AND VEGETATION AND THEIR HISTORY, MOST OF ALL IN THE MEDITERRANEAN REGION. (INQUA COMMISSION FOR THE STUDY OF THE HOLOCENE)
- 43) **Burga, C. & Hooghiemstra, P.:** THE BIOLOGICAL ROLE OF HIGH MOUNTAIN SYSTEMS DURING THE QUATERNARY.
- 43a) **Beug, H.J. & Urban, B.:** PALAEOBOTANICAL RESEARCH
- 44) **von Koenigswald, W.:** TAPHONOMY OF QUATERNARY VERTEBRATE ASSEMBLAGES; BIOCOENOSIS VERSUS THANATOCOENOSIS.
- 45) **MacDonald, G. & Velichko, A.:** CIRCUMPOLAR TREE LINE CHANGES.
- 46) **Rutter, N. & Mörner, N.-A.:** INQUA'S CONTRIBUTION TO PAGES (PAST GLOBAL CHANGES) OF THE IGBP: A STUDY OF GLOBAL CHANGE.
- 47) **Lowe, J.J.:** RAPID CLIMATIC CHANGES: MULTI-PROXY, HIGH-RESOLUTION STUDIES OF THE END OF THE LATE GLACIAL. (INQUA COMMISSION FOR THE STUDY OF THE HOLOCENE)
- 48) **Petit-Maire, N., Jelgersma, S. & Mörner, N.-A.:** QUATERNARY SEALEVEL CHANGES OF CONTINENTAL MARGINS. (INQUA COMMISSION ON QUATERNARY SHORELINES; UNESCO-INTERNATIONAL UNION OF GEOLOGICAL SCIENCES: CLIMATES OF THE PAST)
- 49) **Lowe, J.J.:** INTEGRATION OF TERRESTRIAL, OFFSHORE AND ICE CORE DATA FOR HIGH-RESOLUTION MODELLING OF THE NORTH ATLANTIC DURING THE LAST GLACIAL TO INTERGLACIAL TRANSITION. (IGCP 253 - TERMINATION OF THE PLEISTOCENE; IGBP-PAGES)
- 50) **Pécsi, M.:** PALAEOGEOGRAPHICAL ATLAS
- 53) **Suguio, K. & Turcq, B.:** AMAZONIA; PAST AND PRESENT.
- 54) **Billard, A., Kukla, G. & Shackleton, N.:** PLEISTOCENE LOESS AND PALAEOCLIMATE.
- 55) **Catt, J.A. & Bronger, A.:** RECONSTRUCTION AND CLIMATIC IMPLICATIONS OF QUATERNARY PALAEOSOLS AND PALAEOSOL SEQUENCES. (INQUA COMMISSION OF PALAEOPEDELOGY)
- 56) **Smalley, J.:** LÖSS IN EUROPA (IN MEMORY OF RUDOLPH GRAHMANN). (INQUA LOESS COMMISSION)
- 58) **Mörner, N.-A., Ollier, C. & Dramis, F.:** LARGE SCALE PATTERNS IN NEOTECTONICS. (INQUA NEOTECTONICS COMMISSION)
- 59) **Serva, L., Audemard, F.A. & Michetti, A.M.:** PALAEOSEISMICITY. (INQUA NEOTECTONICS COMMISSION)
- 60) **Streif, H.:** EUSTATIC AND ISOSTATIC DISPLACEMENTS OF SHORE LINES AND THEIR GEOLOGICAL/PALAEOECOLOGICAL CONSEQUENCES. (INQUA COMMISSION ON QUATERNARY SHORELINES)
- 61) **Schlüchter, C. & van Husen, D.:** IGCP 378
- 62) **Junge, F.W.:** GEOCHEMICAL RESEARCH
- 63) **Geyh, M.A. & Wagner, G.A.:** GEOCHRONOLOGICAL RESEARCH.
- 64) **Wefer, G., Sonntag, C. & Pons, A.:** PALAEOCLIMATOLOGICAL RESEARCH
- 65) **Reisch, L., Bosinsky, G. & Ranov, V.:** EARLY MAN
- 66) **Kahlke, R.D., Heinrich, W.-D., Rousseau, D.D.:** BIOSTRATIGRAPHY AND SYSTEMATICS
- 67) **Hagedorn, J., Nitz, B., Schlüchter, C., Kelletat, D. & Radtke, U.:** GEOMORPHOLOGICAL RESEARCH

- 67a) **Hagedorn, J. & Nitz, B.:** FLUVIAL GEOMORPHOLOGY.
 67b) **Kelletat, D. & Radtke, U.:** COASTAL GEOMORPHOLOGY
 67c) **Schlichter, C.:** GLACIAL GEOMORPHOLOGY

As already told before, many problems for the convenors and the Organizing Committee were caused by the relatively great number of no-shows of colleagues, who had already submitted their abstracts to the Organizing Committee. It would be fine for forthcoming INQUA congresses, if sometimes more discipline would be practised.

Symposia - Poster sessions:

About 233 papers were presented during the poster sessions.

BUSINESS MEETINGS

Meetings were held formally and informally by INQUA Committees, Commissions, Subcommissions and Working Groups and by other related international organizations such as International Permafrost Association (IPA), International Geosphere-Biosphere-Project (IGBP), International Geological Correlation Programme (IGCP 253 and IGCP 378), PAGES, Palaeomonsoons II. The meetings were held on a tight schedule and have proved to be highly constructive. New Commissions, Subcommissions, Working Groups and Inter-Congress Committees have emerged from such direct contacts.

4. PRE AND POST-CONGRESS FIELD EXCURSIONS

Wolfgang Schirmer

As it was already stated in the introduction of this report, the INQUA Organizing Committee agreed from the very beginning of their work that the congress field excursions should present the whole of Central Europe and adjacent areas. Finally 21 pre- and postcongress excursions embracing 18 European countries and, of course, presentations by representatives of these countries were planned. Taking into account the 45 local excursions planned in the Berlin area, 380 individual authors were involved in presenting the congress field excursions.

Central Europe exhibits one of the most detailed patchworks of natural and cultural landscapes in the world. One group of excursions, the Traverses, were to present this diversity in (Quaternary) geology, landscape and culture. Thus, they included different landscape units of Central Europe. The other group of excursions was to focus on special topics and therefore addressed more limited areas, such as the North Sea coast, the northern Central European lowland, or the Alps.

However, there was a considerable discrepancy between the

number of field excursions prepared for the congress and those that actually took place. The INQUA Organizing Committee suggested that some 800 participants would participate in these excursions; hence, 21 field excursions were considered appropriate. However, this calculation turned out to be wrong. One reason might have been that Europeans do not feel the need to participate in an expensive INQUA excursion within Europe, because it is much easier - and cheaper - to ask a friendly neighbour to act as a guide. Other reasons were the worldwide recession and the high price level of the western European industrial countries. In the end, only 128 people registered for the Central European excursions. Consequently, many Central European and Berlin excursions had to be cancelled.

PRE- AND POSTCONGRESS FIELD EXCURSIONS

Only 7 of the 21 planned pre- and postcongress field excursions took place. With the exception of the excursions A15 and A18 all excursions are published in the guide book. Excursion C21 was changed to B45. Below you will find the number of the participants of each excursion listed up in a table.

Excursion A1: West Scandinavian Traverse. -

Coordinator: M. Walther together with 15 additional contributors from Norway, Denmark, and Germany. (cancelled)

Excursion C2: Southwest Scandinavian Traverse. -

Coordinator: F. Grube together with 19 additional contributors from Germany, Denmark, and Sweden. (cancelled)

Excursion C3: Baltic Traverse. -

Coordinator: J. Ehlers together with 32 local guides from Germany, Poland, Lithuania, Latvia, Estonia, and Finland.

Excursion A4: Polish Traverse. -

Coordinator: S. Kozarski together with 27 additional contributors from Poland and Germany. (cancelled)

Excursion C5: Czech-Slovakian Traverse. -

Coordinator: K.-D. Jäger together with 12 additional contributors from Germany, Czech Republic, and Slovakia. (cancelled)

Excursion A6: Carpathian Traverse. -

Coordinator: A. Bronger together with 39 additional contributors from Hungary, Slovakia, Poland, and Germany. (cancelled)

Excursion A7: Eastern Alps Traverse. -

Coordinator: D. van Husen together with 9 additional contributors from Austria, Czech Republic, and Germany. (cancelled)

Excursion C8: Weser-Bodensee-Traverse. -

Coordinator: A. Semmel together with 11 local guides from Germany.

Excursion A9: Rhein Traverse. - Coordinator: W. Schirmer together with 16 local guides from Italy, Switzerland, Germany, and The Netherlands.

Excursion C10: Southwestern Traverse. - Coordinator: B. Frenzel together with 19 local guides from Germany and France.

Excursion A11: Central Upland Margin Traverse. - Coordinator: W. Boenigk together with 20 additional contributors from France, Belgium, The Netherlands, and Germany. (cancelled)

Excursion C12: Lowland Traverse. - Coordinator: K.-D. Meyer together with 16 local guides from Germany and The Netherlands.

Excursion C13: Alpine Traverse. - Coordinator: M. Maisch together with 16 additional contributors from Austria, Germany, and Switzerland. (cancelled)

Excursion C14: Alpine Foreland Traverse. - Cancelled by the coordinator. (cancelled)

Excursion A15: Donau Traverse. - Coordinator: H. Müller-Beck together with 9 additional contributors from Germany, Austria, and the Czech Republic. (cancelled)

Excursion A16: Mammal traverse. - Coordinator: W. v. Koenigswald together with 12 additional contributors from Germany. (cancelled)

Excursion C17: Northern and Alpine glaciation in Germany. - Coordinator: K. A. Habbe with 12 additional contributors from Germany. (cancelled)

Excursion A18: Quaternary volcanism. - Coordinator: van den Bogaard together with Schmincke.

Excursion C19: Palaeolithic sites in the Rheinland. - Coordinator: G. Bosinski together with 5 additional contributors from Germany. (cancelled)

Excursion A20: North Sea Coast. - Coordinator: H. Streif together with 14 additional contributors from France, Belgium, The Netherlands, and Germany. (cancelled)

Excursion C21: Northern glaciation in Brandenburg. - Coordinator: J. Marcinek together with 6 local guides from Germany.

ONE-DAY FIELD EXCURSIONS AROUND BERLIN

17 of the 44 planned one-day excursions actually took place on August 6, 1995. Below you will find a list of all one-day excursions planned, included those which had to be cancelled. The guide book comprises descriptions of all those excursions.

B1 Pre-Tertiary in the surroundings of Berlin. LEADERS: STACKEBRAND, BEER, GÖLLNITZ, WASTERNACK. (cancelled)

B2 Rüdersdorf - classical type locality for Muschelkalk (Middle Triassic) and glacial deformation. LEADERS: JUBITZ, STREICHAN.

B3 Older Pleistocene deposits and structures in the Weichselian glacial area east of Berlin. LEADER: HANNEMANN. (cancelled)

B4 Middle and Late Pleistocene and Holocene sequences in the open-cast pit of Schöningen/Niedersachsen. LEADERS: URBAN, THIEME, MANIA, VAN KOLFSCHOTEN.

B5 Travertine complex and fauna at Bilzingsleben. LEADER: MANIA

B6 Middle and Late Pleistocene of the Elbe-Mulde area. LEADERS: KNOTH, WANSA, WIMMER.

B7 Quaternary of the southern Leipzig basin - stratigraphy, archaeology and diapirism in the open-cast pits of Zwenkau and Profen. LEADERS: JUNGE, HOFFMANN, WEBER, RUDOLPH.

B8 Glaciotectionic structure of the Muskau fold arch. LEADER: KUPETZ. (cancelled)

B9 Open-cast pits of Jänschwalde and Oberspreewald. LEADERS: NOWEL ET AL., LAUBAG/SENFTEMBERG.

B10 Holstein Interglacial around Eisenhüttenstadt. LEADER: R. SCHULZ. (cancelled)

B11 Quaternary of Rüdersdorf and OTTO TORELL. LEADERS: HELLWIG, ZWIRNER. (cancelled)

B12 Eemian basin of Schönfeld. LEADERS: U. STRIEGLER, R. STRIEGLER.

B13 The classical investigation area of the northern German glaciation around Eberswalde-Chorin. LEADER: MARCINEK. (cancelled)

B14 Glacial and late glacial genesis of the landscape north of Berlin. LEADER: GÄRTNER.

B15 Weichselian glacial basins and periglacial valleys NE of Berlin. LEADER: NITZ. (cancelled)

B16 Ice-marginal deposits and dunes NE of

Berlin. LEADER: SCHLAAK. (cancelled)

B17 Origin and anthropogenic modification of the Oderbruch region. LEADER: BROSE.
(cancelled)

B18 Märkische Schweiz - Strausberg Lake District. LEADERS: MARCINEK, MIETZ & VIETINGHOFF. (cancelled)

B19 Glacigenic landscape south of Potsdam. LEADER: PAWLITZKY. (cancelled)

B20 Landscape development in the terminal area of the Brandenburg stage (Weichselian) south of Potsdam. LEADERS: BÖSE, BRANDE, MÜLLER, ROWINSKY.

B21 Glacigenic landscape of western Brandenburg. LEADER: WEISSE.

B22 Quaternary morphology of the Berlin landscape. LEADER: KALLENBACH.

B23 Eolian landforms in the central Baruth Urstromtal (ice-marginal valley). LEADER: DE BOER. (cancelled)

B24 Eolian landforms in the Berlin area. LEADER: JÄKEL.

B25 Landscape and soil development in north-eastern Brandenburg. LEADERS: SCHMIDT, HIEROLD, STROHBACH.

B26 Soils and landforms of the Barnim and adjacent areas. LEADER: BUSSEMER.

B27 Typical soils of Berlin. LEADERS: ALAILY, FACKLAM-MONIAK, HOFFMANN, RENGER, SCHLENTHER. (cancelled)

B28 Vegetation and soils of Berlin - changes during human settling activities. LEADER: SUKOPP.
(cancelled)

B29 Fen development north of Berlin. LEADER: TIMMERMANN.

B30 Berlin's lakes. LEADERS: PACHUR, WÜNNEMANN.

B31 Water supply for Berlin (Lakes Müggel and Tegel). LEADERS: EMSHOFF, MÜLLER, SOMMER-VON JARMERSTED, THIEBACH, WURL. (cancelled)

B32 Hydrography of the Teupitz-Köris Lake District. LEADERS: MARCINEK, MIETZ, VIETINGHOFF. (cancelled)

B33 Salified places of the Nuthe basin south of Berlin. LEADERS: KRAUSCH, SCHIRRMEISTER.
(cancelled)

B34 Geoecology in the Weichselian Moraine Area SW of Berlin. LEADER: BLUMENSTEIN. (cancelled)

B35 Sewage farming in the north-east of Berlin - ecological problems. LEADER: GINZEL. (cancelled)

B36 The Schorfheide-Chorin biosphere reserve. LEADER: WALTHER. (cancelled)

B37 Municipal waste disposal site and wastewater load in the Berlin area. LEADER: THOMÉ-KOZMINSKY. (cancelled)

B38 Natural potential and land use - a section across the eastern marginal areas of Berlin to the Oder Marsh. LEADER: ZAUMSEIL.

B39 Map set of nature resources of the glacial area of Chorin. LEADERS: KOPP, KONOPATZKY.
(cancelled)

B40 Glacial landscapes used as military training area - Döberitz near Berlin. LEADERS: BARSCH, GRUNEWALD. (cancelled)

B41 Landscape evolution of the Saale moraines in the Northern Fläming after military training use. LEADER: SCHRADER. (cancelled)

B42 Prehistoric survey of Berlin. LEADER: GOLDMANN.

B43 Morphology, foundation soil and historic-genetic building development in Berlin. LEADER: G. SCHULZ. (cancelled)

B44 GeoForschungsZentrum (GFZ, Georesearch Center) Telegrafenberg. LEADER: NEGENDANK. (cancelled)

Table 2: Number of participants of the pre- and postcongress excursions

Excursion	Number of participants	Excursion	Number of participants
C3	33	B2/B11	23
C8	22	B4	41
A9	15	B5	31
C10	15	B6	25
C12	19	B7	17
A18	12	B9	15
		B12	17
		B14	33
		B20	17
		B21	20
		B22	19
		B24	
		B25	14
		B26	11
		B29	10
		B30	31
		B38	8
		B42	29
		B45	12
Total	116	Total	375

PUBLICATIONS OF THE FIELD EXCURSIONS

The field excursions of the INQUA Congress in Berlin are published in:

Schirmer, W. (ed.) (1995): Quaternary field trips in Central Europe, vol. 1-4 and Addendum: 1543 p.; München (Pfeil).

The Central European pre- and postcongress excursions (A and C excursions) are included in vol. 1-2 and in the Addendum (in English), the Berlin excursions (B excursions) are collected in vol. 3 (English version) and vol. 4 (German version). Volumes 1-3 together with the Addendum are sold as package for DM 280. Volume 4 can be ordered separately for DM 50.

Please send orders to:
Verlag Dr. Friedrich Pfeil
P.O.Box 65 00 86
D-81214 München
Germany

Since the manuscripts were not received in time, the excursions A15, Donau Traverse, and A 18, Quaternary volcanism, are not included in this issue. Owing to this delay, the excursion A18 had been provided with an own guidebook:

Paul van den BOGAARD (1995): Quaternary volcanism. Field guide, excursion A18, July 29 to August 2. - 158 p.;

Kiel.

SOME DETAILS

Three of the leaders involved in the INQUA Berlin excursions died during or after preparation of the excursions. We shall honour the memory of:

Alexander Cepek, Berlin, † May 9, 1994. Obituary in Erd, K. (1994): Zum Gedenken an Alexander Georg Cepek 27.11.1929-9.5.1994. - Brandenburgische Geowissenschaftliche Beiträge, 1 (1): 127-128; Kleinmachnow; also Nowel, W. (1995): Zum Gedenken an Alexander Georg Cepek (27.11.1929-9.5.1994). - Natur und landschaft in der Niederlausitz, 16: 82-86; Cottbus.

Stefan Kozarski, Poznan, †January 19, 1996. Obituary in: Nowaczyk, B. (in press): Stefan Kozarski 4 August 1930-19 January 1996. - Polish Polar Research.

Lorenz Scheuenpflug, Neusäß/Bayern, †November 28, 1994. Obituary in: Schirmer, W. (1996): Lorenz Scheuenpflug - Forscher im zweiten Lebensanlauf. - Jahresbericht und Mitteilungen des oberrheinischen geologischen Vereins, N.F. 78: 31-40; Stuttgart.

The participant who spent the longest possible time (33 days) at the INQUA Berlin Congress was Roger Morrison, Boulder/Colorado. At the age of 81 he began the A9 excursion (Rhein Traverse) in Milano on July 21 and finished the C10 excursion (Southwestern Traverse) in Marseille on August 22, 1995.

Runner-up with only one day less was Sakae O'Hara, Chiba/Japan, likewise starting at Milano (Rhein Traverse) and finishing at Helsinki on August 21 with the C3 excursion (Baltic Traverse).

5. EXHIBITS AT THE CONGRESS

Burkhard Frenzel & Margot Böse

Key exhibits included:

- applied engineering problems of the central German industrial region, the industrial centre of the former GDR,
- problems and methods of the recovery of abandoned industrial land, disposal sites, mining dumps etc.,
- the treatment of contaminated soil and subsoil areas,
- the prehistory of the new German federal states,
- Quaternary maps and literature.

The Geological Services of the Federal Republic were represented by a map exhibition for the duration of the congress, compiled by the BGR and the geological offices of the Länder. The exhibition included the entire 1:2 500

000 International Quaternary Map. The sheets for Northern and Southern Germany of the 1:200 000 General Geological Map were shown, together with the 1:1 000 000 Geological and Soil Maps. The geological offices focused on different aspects, depending on the geological settings of their respective Länder. Both general and specialized maps of different scales were presented, including both old and new maps such as the 1:100 000 map of the area surrounding Berlin.

Exhibitors included the International Permafrost Association (IPA) and the National Committees of the individual countries.

6. PUBLICATIONS OF THE CONGRESS

The following publications were issued in connection with the Congress:

- Abstracts - INQUA XIV International Congress, Berlin, Germany
- Programme - INQUA XIV International Congress, Berlin, Germany
- Benda, L. (ed.)(1995): *Das Quartär Deutschlands*: 408 p.; Berlin-Stuttgart (Geb. Borntraeger)
- *GeoWissenschaften, XIV INQUA-Kongreß*, (ed.) Hagedorn, H., H. 8/9, August/September 1995, Berlin (Ernst & Sohn)
- List of participants - INQUA XIV International Congress, Berlin, Germany

- Schirmer, W. (ed.)(1995): *Quaternary field trips in Central Europe*, vol. 1-4 and Addendum: 1543 p.; München (Pfeil)

7. SOCIAL EVENTS

A number of social events were held during the XIV INQUA Congress. During the Opening Ceremony on August 3, Prof. Dr. Dr. h.c. Burkard Frenzel, President of the Organizing Committee of the XIV INQUA Congress, Prof. Dr. Klaus Dietz, First Vice-President of the Freie Universität Berlin, Staatssekretär Dr. Gebhard Ziller, Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie, Prof. Dr. Manfred Erhardt, Senator für Wissenschaft und Forschung, Berlin, Prof. Dr. Liu Tungsheng, President of the International Union for Quaternary Research (INQUA) and Prof. Dr. Dietrich Barsch, President of the International Geomorphological Association each delivered an address to the participants and expressed their good wishes for an interesting and successful congress. In the evening the Organizing Committee gave an icebreaker party at the Botanical Garden. On August 4, members of the INQUA Executive Committee and the International Council were invited to a buffet reception at the club-house of the Freie Universität Berlin. The most formal function was the INQUA Congress Dinner, held on August 9 during a riverboat cruise on the lakes of the River Havel.

2. PROCEEDINGS OF THE INTERNATIONAL COUNCIL MEETINGS

The International Council met in three sessions.

(Summary published in *Quaternary Perspectives*, Vol. 6, No. 2 (December, 1995))

FIRST SESSION: August 4, 1995, 09.15-13.00 hr.

In attendance: Sayago (Argentina), Colhoun (Australia), van Husen (Austria), Gullentops (Belgium), Occhiotti (Canada), Sun (China), Tyráček (Czech Republic), Aario (Finland), Rousseau (France), Klostermann (Germany), Pecsí (Hungary), Yaalon (Israel), Cita/Bartolini (Italy), Yonekura (Japan), Park (Republic of Korea), Jurgaitis (Lithuania), Koster (The Netherlands), Palmer (New Zealand), Mangerud (Norway), Starkel (Poland), Diniz (Portugal), Yanshin (Russian Federation), du Plessis (South Africa), Aguirre (Spain), Ringberg (Sweden), Schlüchter (Switzerland), Boulton (United Kingdom), Baker (United States of America).

Executives in attendance: Liu, Bowler, Derbyshire, Hagedorn, de Mulder, Porter, Rutter, Velichko.

1. Address of Welcome

The President extended a warm welcome to all delegates of the National Committees of INQUA, and introduced the members of the Executive Committee.

2. International Council Meetings

The Agenda was accepted without revision. The Minutes of the International Council (Beijing 1991) and the Minutes of the Executive Committee meetings (1991-1995) were accepted. The scheduling of the sessions was agreed and the order of the Agenda items modified.

3. Report by the President

See item 4 of this Compte Rendu.

CARRIED

4. Report by the Secretary

See item 5 of this Compte Rendu

CARRIED

5. INQUA Membership

The Treasurer summarised the current status of the Member Countries of INQUA, and noted that no new applications for Group membership had been received prior

to the Congress.

6. Report by the Treasurer

The Summary Report of the Treasurer presented at the Opening Session of the General Assembly was discussed and some additional matters of details requested. These were subsequently provided in an enlarged document (See item 6 of this Compte Rendu).

CARRIED

There was extended discussion about the number of National categories of INQUA membership, and a strong suggestion that this number might be reduced. It was formally requested that the new Executive Committee give this matter early consideration.

CARRIED

7. A mid- and long-term strategy for INQUA

It was proposed that this item be considered integrally with item 8.

CARRIED

8. The INQUA Commissions: review procedures and future strategy

The number, mode of operation, structure and longevity of INQUA's Commissions stimulated extended discussion. Several National Delegates sought clarification of the Executive Committee's document on the re-structuring of Commissions. (A formal document, being a preliminary version of "Guidelines for INQUA Commissions", was circulated to all Commissions in the summer of 1994, in accordance with a resolution at the XIII Congress in Beijing).

The Secretary presented a summary statement of the evaluation of Commissions undertaken by the Executive Committee. Further consideration was proposed at the second meeting.

CARRIED

It was proposed that opportunity be given for Commission officers to react to the "Guidelines" document by calling a special meeting between Commission officers and the Executive Committee on 7 August 1995, 12.45-1400 hr.

CARRIED

9. The Global Change Sub-Committee

Consideration of this item was deferred for consideration under "Commissions" at the second meeting.

10. INQUA Publications and Communications

Consideration of this item was deferred until the second meeting.

11. Revision of the Constitution

Amendments to the wording of several clauses of the INQUA Constitution were proposed by the Executive Committee on the instruction of the General Assembly at the XIII Congress in 1991.

Bye Law 8.3 (v). It was proposed that this be amended to read as follows (changed wording is underlined). "The duration of a Commission shall normally be limited to two intercongress periods. At least six months prior to its scheduled termination a Commission may submit to the Secretary of the Union a proposal justifying its continuation for up to two additional intercongress periods. Such continuation shall be approved by the International Council upon the recommendation of the Executive Committee. A Commission may be terminated by the General Assembly at any time either upon the request of the Commission, or upon a proposal by the International Council."

CARRIED

Statute VI. It was proposed to change the wording, with the aim of increasing the status of the title of Honorary Member of INQUA, as follows. "Prominent internationally known Quaternary scientists who have been active in INQUA may be elected by the General Assembly to be Honorary Member of the Union for life. Normally, candidates will be nominated by national delegates and their suitability evaluated by the Executive Committee for approval by the International Council prior to presentation to the General Assembly for election."

CARRIED

Appointment of the Auditing Committee

The following Congress members were appointed: Eronen (Finland), Fulton (Canada), Zarate (Argentina),

CARRIED

SECOND SESSION: August 7, 14.15-17.45hr.

In attendance: Sayago (Argentina), Colhoun (Australia), van Husen (Austria), Vermeersch (Belgium), Suguio (Brazil), Occhietti/de Vernal (Canada), Sun (China), Tyráček (Czech Republic), Aario (Finland), Rousseau (France), Klostermann (Germany), Pecci (Hungary), Yaalon (Israel), Cita/Bartolini (Italy), Yonekura (Japan), Park (Republic of Korea), Jurgaitis (Lithuania), Lozano-García (Mexico), Koster (The Netherlands), Palmer (New Zealand), Haldorsen (Norway), Starkel (Poland), Diniz

(Portugal), Yanshin (Russian Federation), du Plessis (South Africa), Aguirre/Zazo (Spain), Ringberg (Sweden), Schlüchter (Switzerland), Boulton (United Kingdom), Baker (United States of America).

Executives in attendance: Liu, Bowler, Derbyshire, Hagedorn, de Mulder, Porter, Rutter, Velichko.

6. Report by the Treasurer – continued

The Treasurer was commended. The goal set itself by the Executive Committee in Beijing to allocate 50% of funds to the work of Commissions and Committees had not quite been achieved, the percentage being closer to 45. Further efforts to meet this goal were commended. The low cost of administration achieved by the outgoing Executive Committee was noted with satisfaction.

The Executive Committee recommended that National subscriptions should be raised by 1.25% per year over the next four years (making a cumulative total over the inter-Congress period 1995-1999 of 5%), with the reservation that this increase will not apply to Category 6 in view of the substantial increase in the subscription applied to that category in 1991.

CARRIED

8. The INQUA Commissions: review procedures and future strategy - continued

The report setting out the results of the Executive Committee's financial and scientific auditing of the Commissions for the period 1991-1994 was commended. The following recommendations were formally proposed for recommendation to the General Assembly.

Commission on Stratigraphy. Continuation recommended. The Executive Committee be empowered to require this Commission to produce a research plan for the inter-Congress period 1995-1999.

Commission on Quaternary Glaciation. The new title was approved and continuation recommended, with a recommendation that the Commission's research programme should be re-examined and re-shaped.

Commission on Quaternary Shorelines. The Commission was commended and continuation recommended.

Commission on Loess. The level of activity and flexibility of approach was noted and continuation recommended.

Commission on Tephra Studies. This new name was approved. A high level of activity, and official recognition under the PAGES Programme, was also noted. Commission on Palaeopedology. The wide range of activities stemming from important links with other international bodies was noted, and continuation recommended.

Commission on Neotectonics. This Commission has a well-organised information network and is well suited

to expansion of a project-based approach. Continuation was recommended.

Commission on the Holocene. The quality of organisation and level of activity were commended. Continuation was recommended. Commission on Early Man. Discontinuance was recommended. However, the incoming Executive Committee was asked to seek new leadership of a revived Commission within 12 months. A new name was also proposed.

Commission on Palaeoclimate. Continuation was recommended, subject to submission of a strategy document in line with the newly agreed document "Guidelines for INQUA Commissions".

Commission on the Quaternary of South America. Termination was recommended, following the agreement of the Commission officers concerned, and an undertaking by Professor Martin Iriondo to cement links between South American regional research activities and PASH.

Commission on Applied Quaternary Research. Termination was recommended with the agreement of the Commission President, with recognition that the incoming Executive Committee would consider appropriate means of stimulating future research in this area.

Committee on Global Change. The Chairman of this Committee, Past-President N. Rutter, recommended that this Committee be terminated on completion of the task set it in Beijing.

Commission on Global Palaeohydrology. This Commission has good project-based potential. Continuation was recommended.

CARRIED

The following slightly revised draft of the document entitled "Guidelines for INQUA Commissions" was re-presented.

Objectives

1. Improve quality of INQUA research.
2. Loosen the system to permit more flexibility thereby enabling projects to respond more readily to strategic goals.
3. Heighten professional and public awareness of INQUA's contribution to science.
4. Ensure INQUA funds are best used to assist in production of high quality research results.

Methods

Restructuring of Commissions will reflect the following.

1. Demonstrate increased efficiency for targeting realistic research objectives. Commissions will prioritise research objectives consistent with evaluation of opportunities and scientific needs.
2. Demonstrate project orientation consistent with sound scientific principles achievable within limited time frames.

3. Rationalise/reduce overlap between existing and potential Commission activities by identifying common interests and increasing communication between related Commissions.

Processes

The following steps are suggested to improve INQUA's research performance.

1. Commissions will develop specific and, where appropriate, staged project orientation.
2. Proposed Commission projects will be reviewed and evaluated by the executive Committee.
3. Biannual reports, normally prepared by project leaders in consultation with Commission Presidents, will be forwarded through Commissions to the Executive Committee for evaluation.
4. While the function of Commission Presidents will remain to oversee and manage activities, specific projects within a Commission will maintain a degree of financial autonomy consistent with that Commission's established priorities.
5. Each Commission will liaise with the Executive Committee through one of the four Vice-Presidents of INQUA.
6. Commissions will terminate after two inter-Congress periods: they may be renewed subject to detailed evaluation.
7. Proposed new Commissions will initially have the status of a Committee or Working Group under the Executive Committee for one inter-Congress period. Then, subject to their success, they may be elevated to Commission status.

Commissions, with their specific project targets, will be asked to report by way of scientific symposia at the next Congress. In this way, Commissions (or Projects) should lead to publication of high quality research products.

Relationship between Commissions and Projects

Normally, Projects will provide the means whereby a Commission seeks to achieve its scientific objectives.

Projects will normally be carried out under the umbrella of a Commission

Some Projects that fall outside existing Commission terms of reference may be accorded Committee or Working group status under the Executive Committee.

CARRIED

10. INQUA Publications and Communications

A report on the INQUA house journal, *Quaternary International*, was presented by its Editor-in-Chief, Past President N. Rutter. An increased frequency from 4 to 6 volumes per year was noted, and the journal commended

for its theme emphasis. It was recorded that the Editor-in-Chief would step down before the next INQUA Congress.

The Secretary reported successful negotiations with Elsevier Science Publishers on a new format for INQUA's newsletter, *The Quaternary Perspective*, and also on discussions on the practicalities of launching it on the Internet in due course.

It was recommended that the outgoing INQUA Secretary continue as Editor of *The Quaternary Perspective*.

CARRIED

12. INQUA's External Relations.

The Secretary provided background information on relationships with IUGS and ICSU for the past inter-Congress period, and also set out the Executive Committee's case for INQUA's proposed full membership status within ICSU. The Executive Committee was asked to proceed to negotiate full ICSU membership status for INQUA.

CARRIED

Special Meeting between Commission Officers and Members of the Executive Committee

Vice-President Bowler presented an introductory statement covering the background to the new strategy for INQUA Commissions. There followed a lively and positive discussion, with calls for the Executive to attempt revitalisation of Commissions before dissolving them. There was also a clear message that the new strategy fits better on some Commissions than others, and that an extra clause might be added to the Guidelines emphasising liaison with non-INQUA bodies.

It was recommended that a meeting of this type be held during all future Congresses.

CARRIED

THIRD SESSION: August 9, 08.40-13.00 hr.

In attendance: Sayago (Argentina), Colhoun (Australia), van Husen (Austria), Vermeersch (Belgium), Suguio (Brazil), de Vernal (Canada), Sun (China), Ruzicka (Czech Republic), Aario (Finland), Rousseau (France), Klostermann (Germany), Pecsí (Hungary), Yaalon (Israel), Cita/Bartolini (Italy), Yonekura (Japan), Park (Republic of Korea), Jurgaitis (Lithuania), Lozano-García (Mexico), Koster (The Netherlands), Palmer (New Zealand), Haldorsen (Norway), Starkel (Poland), Diniz (Portugal), Yanshin (Russian Federation), du Plessis (South Africa), Aguirre/Zazo (Spain), Ringberg (Sweden), Schlüchter (Switzerland), Boulton (United Kingdom), Baker (United States of America).

Executives in attendance: Liu, Bowler, Derbyshire,

Hagedorn, de Mulder, Porter, Rutter, Velichko.

8. *The INQUA Commissions: review procedures and future strategy – continued*

It was proposed (Yaalon, Israel) that the incoming Executive Commission be charged with the setting up of a Standing Committee to consider the implications for Commissions of new and revised statutes.

CARRIED

It was formally recommended that Palaeoclimates of the Southern Hemisphere (PASH) continue its activities directly under the Executive Committee.

CARRIED

Committee on Palaeogeographic Atlases of the Quaternary. It was recommended that this Committee be continued, but with a sharper focus and closer collaboration with PASH. The Commission Officers were required to submit a strategy document in line with the "Guidelines on INQUA Commissions" for approval by the Executive Committee.

A case for a new Commission on Terrestrial Palaeocarbon was presented to the International Council by H. Faure (France). The establishment of this new Commission was recommended.

CARRIED

16. *The XV INQUA Congress*

The South African National Delegate presented a case for holding the XV INQUA Congress at the International Convention Centre in Durban, South Africa, 4-12 August 1999. The proposal, which has the written support of the Government of South Africa (Cabinet Memorandum No. 13 (1995), File Number 13/2/99G), was approved by acclamation.

17. *The XVI INQUA Congress*

Preliminary discussion elicited offers of two possible venues for the 2003 Congress: Switzerland and Scandinavia.

18. *Honorary Members*

The following new Honorary Members were proposed by the Council.

G.R. Coope (United Kingdom)
 F. Gullentops (Belgium)
 W. Hageman (The Netherlands)
 G.W. Lüttig (Germany)
 H. Maruszczak (Poland)
 F. Mitchell (Ireland)
 J.E. Mojski (Poland)
 N. Watanabe (Japan)

Yanshin (Russia)

CARRIED

19. Election of the Executive Committee: 1995-1999

The following members were elected to form the INQUA Executive Committee for the inter-Congress period 1995-1999.

President: S.C. Porter (U.S.A.)

Secretary: S. Haldorsen (Norway)

Treasurer: E.F.J. de Mulder (The Netherlands)

Vice Presidents:

M. Iriondo (Argentina)

Y. Ota (Japan)

T.C. Partridge (South Africa)

N.J. Shackleton (U.K.)

Past President:

Liu Tungsheng (China)

CARRIED

20. Other Business

(a) It was agreed that a proposal by Spain that an

adviser (non-voting) be allowed to assist each National Delegate at future meetings of the International Council would be passed on to the Executive Committee for consideration.

(b) The Delegate from Brazil recorded his country's gratitude for an anonymous cash gift that brought Brazil's INQUA subscription up to date and helped them to make a new start as full members.

(c) A vote of thanks to the outgoing Executive Committee for their four years of valuable work was approved by acclamation.

In his closing remarks, President Liu Tungsheng thanked the International Council for their hard work and valuable guidance over the past seven days.

Appendix: Report of the Auditing Committee

See item 6 of this Compte Rendu.

3. PROCEEDINGS OF THE GENERAL ASSEMBLY

OPENING CEREMONY: 3 August 1995 at 11.00 hr

The President of INQUA, Professor Liu Tungsheng, formally opened the first session of the General Assembly of the XIV Congress.

The Secretary-General of the Congress, Prof. Dr. Margot Böse, introduced the following Addresses of Welcome.

Professor Dr. Dr. h.c. Burkhard Frenzel, President of the Organising Committee of the XIV Congress;

Universitäts-Professor Dr. Klaus Dietz, First Vice-President of the Free University of Berlin;

Staatssekretär Dr. Gebhard Ziller, Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie;

Professor Dr. Manfred Erhardt, Senator für Wissenschaft und Forschung, Berlin;

Professor Liu Tungsheng, President of INQUA.

The President then delivered his address on “Loess and Global Change”.

Professor Dr. Dietrich Barsch, President of the International Association of Geomorphologists, on behalf of the International Scientific Associations.

President Liu presented his Report on the Inter-Congress Period 1991-1995.

See Item 4 of this Compte Rendu.

In his report, the President recorded, with deep regret, the death of fifteen members during the inter-Congress period. The General Assembly rose for one minute’s silence in honour of deceased Members and friends.

See Item 4 of this Compte Rendu.

Professor E. Derbyshire, Secretary of INQUA, presented his Report of Administration for the period 1991-1995.

See Item 5 of this Compte rendu.

The secretary reported that the following countries currently adhere to the Union:

Argentina, Austria, Australia, Belgium, Brazil, Canada, China, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, The Netherlands, New Zealand, Norway, Poland, Portugal, South Africa, South Korea, Spain, Sweden, Switzerland,

United Kingdom, United States of America, Russia.

Dr. E. F.J. de Mulder, Treasurer of INQUA, then presented the financial report for the period 1991-1995.

See Item 6 of this Compte Rendu.

Election of the Auditing Committee.

See Item 2 of this Compte Rendu.

Approved by the General Assembly.

OPENING ADDRESS BY THE PRESIDENT OF THE ORGANISING COMMITTEE, Professor Dr. Dr. h.c. Burkhard Frenzel: 10 August 1995 at 1430 hr.

The evolution of the main goals of Quaternary research since 1928: where do we come from, where should we go?

INQUA was founded in 1928, in a time of severe economic and political stress and on the eve of terrible political aberrations in various countries. This influenced the development of INQUA. Göttinger described these turbulent times in 1953, stressing the immense difficulties during the Dritte Reich, the Second World War and the ensuing years. It is not necessary to repeat this here. Rather the most important steps in the evolution of Quaternary sciences should be traced, not for describing the history of our sciences but to better focus on the most important tasks facing us.

To me it seems that the development of Quaternary sciences since the founding of INQUA can be divided into four major stages:

- 1) From 1928 to about 1950 or 1952: the phase of gathering a wealth of data in most fields of Quaternary sciences.
- 2) From 1950 or 1952 to approximately 1980: the time of process analyses in those fields of Quaternary sciences in which physical dating can be applied.
- 3) From 1980 to the beginning of the nineties: the phase of quantification and modeling.
- 4) From the beginning of the nineties: the time when processes and events of the past are taken paradigmatically as a basis for understanding and forecasting the future.

The first step, gathering a wealth of data, seems to have lasted longest.

At that time the framework of Quaternary sciences was thought to be well established; i.e. the stratigraphic division of the Quaternary into four glaciations in the Alps Mts. and into 3 major glaciations in the North European part of Northern Eurasia. Moreover, the division of the Holocene seemed to be clear thanks to the pioneering work of Blytt and Sernander, who showed that the vegetation history of Northern Europe occurred in well defined steps which were so similar to each other in different parts of Northern, Northwestern and Central Europe that it seemed to be proven that changes of climate had triggered these major steps. It was a fascinating time when in several other regions, at least of the Northern Hemisphere, comparable sequences of events were discovered in the Pleistocene as well as in the Holocene.

Having this well-established background in mind, it was interesting to confirm it by additional investigations in time and in space. The Quaternary record of North-Central Europe was extended into distant regions of the world since comparable sequences of events suggested the former worldwide existence of external forcing factors and thus the synchronicity of these events.

During this first period, Quaternary geology substantially consisted of Quaternary geomorphology, a situation that made it difficult for most hard-rock geologists to accept Quaternary geology as a geological science. On the other hand, Quaternary palaeontology and palaeobotany brought together a tremendous amount of most interesting data, even though these data were on the whole used for dating purposes only, and so providing a basis for endorsement of the already well-known division of the Quaternary. At that time prehistory seemed to be dependent on progress in other parts of Quaternary sciences. At any rate, it aimed at tracing the development of human handicraft-techniques, irrespective of the interrelations between human activities and environmental conditions.

Since the most important facts seemed to be clear, but since on the other hand the approach to dating was relatively unsophisticated, one could frankly speculate about causes for climatic change: In this respect it was a time in which hypotheses often got out of hand.

This situation only changed because of the discovery of the ^{14}C -dating method, soon followed by several other physical dating methods. Now it seemed that a reliable tool was ready at hand to date the duration of processes and important events. Since these techniques are physical in nature, they were often presented as being absolute also, and thus they were held to open up new dimensions. This is strange, because the advantage of using annually layered lake sediments for dating important episodes of the past had been well known for a long time. Nevertheless, the ^{14}C -dating method enabled dating processes to be undertaken in quite other biotopes than in certain types of lakes only. At first a wealth of past palaeoecological and palaeoclimatological episodes were dated. This made

possible the discovery that glaciations have occurred more frequently than had been supposed, some in only short phases of glacial conditions: in other words glacial periods are palaeoclimatologically inhomogeneous. This realisation rendered unreliable one of the hitherto fundamental tenets of Quaternary stratigraphy. Moreover it was found that similar phases in Holocene vegetation history had not necessarily occurred simultaneously all over the continent. Thus one had to conclude that the timing of the onset and duration of these phases was not governed by decisive exogenous forcing factors but evidently much more by internal biological processes. So it became imperative to look for reliable stratigraphic markers within different parts of the Quaternary record.

Although this new way of analyzing the past was prompted by the emergence of physical dating techniques, the process analysis approach to past environments was also applied to quite other realms of Quaternary science. Good examples for this are the classic investigations by Iversen and Andersen on the interrelations between interglacial soil development and vegetation history, or the study of the genesis of glacial and periglacial sediments. The same holds true for the extinction of Pleistocene animal species: at first it served as a stratigraphical marker only, but now the reasons for this phenomenon have become much more interesting. Another field of intensive research concerned the sediments of deep oceans. It seemed that they preserved the imprints of former processes and events much better than did those on the continents.

If we take both these phases together, it becomes evident that scientific knowledge does not increase constantly in time, but rather in stepwise fashion: initially, attempts are made by which to find new proof for well-established ideas. Diverging observations are suppressed or looked upon as the result of chance only. Suddenly the situation changes. New horizons are discovered. The mode of scientific thinking changes remarkably. Yet again the consequences are new levels of scientific knowledge that become corroborated and cemented just as the first case.

The third step in Quaternary research began about 1980. It lasted until about the beginning of the nineties of this century: if processes are to be well understood, the various parameters involved must be quantified accurately. Yet, if we are able to quantify them and if we hope to understand the governing processes, it should be possible to model situations and scenarios under given boundary conditions. This should help to criticize the data available and to check the reliability of the basic assumptions made. Indeed these most interesting and stimulating approaches were used, for instance in calculating the behaviour and consequences of growing and melting of inland-ice masses during the Pleistocene, in modeling important stages in climate history or in changes of the most important biomes. For all these calculations reliable data indicative of climatic forcing factors were needed. They were found, it seemed, by deep-

sea research since the oceans govern climate by their sea surface temperatures, their salinity, CO₂-contents, and past ocean currents: all these are archived in deep-sea sediments. So the study of deep-ocean sediments became decisive for important aspects of Quaternary sciences in total. The consequence was that major events on the continents were, and still are, correlated in a careless way with events documented by the records from the deep-sea floor. It was and is a time when counting of continental sediment sequences is done from top to bottom. Yet even now all that has been proven is that the Eemian proper is the equivalent of deep-sea stage 5e: all other correlations are more or less dependent upon association rather than proof within the context of such an approach. Thus the same broad outcome has occurred as that seen in phase one: science and faith seem to be very near to each other.

Modeling is an extremely difficult task. To handle the wealth of data and processes, it becomes important to simplify the basic assumptions. The need for this approach is readily justified. Yet it is dangerous to suppress the huge amount of data available for the sake of mere simplification. I believe that models of various types of processes should always be compared with and corrected by the incredible amount of palaeo-data available. Yet this is very often neglected. One consequence is that the wheel may be invented several times. Moreover it seems that these difficult approaches, paralleled by changing ideals of scientific life, sometimes cause a blockage against reading scientific papers written in foreign languages and a concentration on the most recent papers published in a lingua franca. Yet past generations contributed a great deal to our present-day knowledge and exact observations and descriptions recorded in the past can be (although they may not necessarily be) a firm base for our recent research.

The fourth step in Quaternary research began only a few years ago. This involves attempts to use past processes and events paradigmatically as a basis for understanding the future. It has long been known that the past abounded in drastic and rapid environmental changes. On the other hand, it is in general felt that we are at the onset of dramatic environmental changes caused by human activity. The past is used to understanding the future. This is quite valid, if we take into consideration the velocity and amplitude of palaeo- and modern ecological changes and the problem of dependence versus independence of ecological from climatic changes and the role of regulating factors within the most important types of ecosystems. At the same time, it frequently seems to be the case that only certain selected past processes or events are used for predicting the future, or that only relatively local past conditions are used as a basis for future global scenarios, or even that some episodes of the past are taken as homologues of the future. Very often the embarrassing interrelations of quite different processes are neglected. Also, the fact that identical external forcing factors can cause quite different regional consequences is not always

taken fully into account.

In view of the wealth of data available now, it seems that computers are the only solution to some of these problems. Yet the data fed into computers must first be critically analyzed on the basis of very broad knowledge.

From all this it follows that Quaternary research consists of palaeoecology in a very broad sense. It includes biotic and abiotic processes. On the other hand, Quaternary sciences inform us that the present ecological situation is one step only in a long sequence of events, leading from the distant past to the unknown future. Thus stationary analyses of present day conditions are of limited usefulness only: one has to understand the governing processes and their interrelations.

If we take this into account, it becomes apparent that Quaternary research is the converse of narrow specialisation. Of course, each science will have its own topics, but for embedding the results of our research into a more general picture it is vital that we consider the whole. Of course, such a sentiment is not new. Schelling (1808) stressed this 187 years ago. At the same time, it is regrettable that is so very often forgotten.

Process analyses in time and in space are most important in Quaternary research. This seems to be clear, yet we are very often far away from this goal. This situation is made even worse by the history of human impact on the environment in various regions of the globe, at various times and in view of changing climatological and global ecological conditions.

For the future the main goal seems to be to disentangle from each other natural and human processes of the past, so discriminating between their different influence upon the geological and ecological situation in time and in space. If we can succeed in such a task, this would have a great bearing upon political and economic decisions, and it might prevent us from staggering from one catastrophic assumption to the other. Yet in aiming at this goal we must remember to incorporate the economic and political sciences also. This does not imply that we have to say good bye to a great deal of past Quaternary research. On the contrary this is as indispensable as ever today. Yet the whole has always to be taken into consideration, including the human dimensions. This demands a broad knowledge of the international literature, a sophisticated appreciation of a variety of fields within Quaternary research, and a rejection of the famous phrase "publish or perish": rather, we should exhort our communities to "publish comprehensively or perish".

CLOSING CEREMONY: 10 August 1995, 1450 hr.

The second and final General Assembly considered a number of items arising from the deliberations of the

International Council.

The Report on the Commissions (see Item 2, Clause 8 of this Compte Rendu) was approved by acclamation.

The proposed revisions to the Constitution (see Item 2, Clause 11 of this Compte Rendu) were read out by Vice-President Porter and approved by acclamation.

INQUA publications (see Item 2, Clause 10 of this Compte Rendu) were reviewed by Past-President Rutter and the INQUA Secretary. The reports and recommendations were approved by acclamation.

The report of the Auditing Committee was presented by R. Fulton (Canada), and was approved by acclamation. (See Item 6 of this Compte rendu).

Budget proposals.

The Treasurer presented the anticipated outline budget for 1995-1999 (see Item 6 of this Compte Rendu). This was approved by acclamation.

The Annual Contribution to INQUA.

The Treasurer spoke to the proposal that the Annual Contribution payable by Member Countries be raised in the coming four-year period at a rate of 1.25% per annum, i.e. 5% for the inter-Congress period. This was approved by acclamation, with a recommendation that the Executive Committee should monitor its implementation.

The 1995-1999 Executive Committee.

The newly elected membership of the Executive Committee (see Item 2, Clause 19 of this Compte Rendu) was approved by acclamation.

Honorary Members

The list of new Honorary Members of INQUA (see Item 2, Clause 18 of this Compte Rendu) was approved by acclamation.

The XV INQUA Congress

T.C. Partridge (South Africa) formally presented the case, recommended by the International Council, for holding the XV Congress in Durban, South Africa, in August 1999. This recommendation was approved by acclamation.

On behalf of the organisers of the XXX International Geological Congress, to be held in August 1996, Congress Secretary-General Zhang extended to all members a warm welcome to Beijing, China.

Any other business. President-elect S.C. Porter announced the date and time of the first meeting of the newly elected Executive Committee.

In closing the XIV Congress, thanks were extended to the organising Committee for all their efforts, and to the retiring Executive Committee for all the work achieved in the inter-Congress period 1991-1995. President Liu Tungsheng thanked all who had contributed to the continuing success of INQUA and wished the new executive Committee every success during its term of office.

4. THE REPORT OF THE PRESIDENT TO THE INTERNATIONAL COUNCIL OF INQUA

It gives me great pleasure, as INQUA President, to report on the activities of the INQUA Executive Committee during the inter-Congress period 1991-1995. I should also like to take this opportunity to express some of my views on the future work and role of our Union and also on questions concerning international co-operation.

Quaternary palaeoenvironmental records contain information on the natural variability of the Earth's past environments and climates. These data provide a framework for understanding mechanisms of past climate change and for assessing the validity of global climate change predictions. With the increasing significance of global climatic change, Quaternary scientists from all over the world have concentrated their research on palaeoenvironmental records from Quaternary sediments. The members of the INQUA Executive Committee have spent much time attending conferences, symposia, workshops and planning meetings in order to increase the involvement of INQUA in important international projects and programmes. In so doing, we hope to bring INQUA to the forefront of global scientific research. During the past inter-Congress period, the INQUA Executive Committee has carefully reviewed the existing contacts between our Union and other scientific institutions. I should like to take a moment to comment upon the relationship between INQUA and other international programmes. In the 1991-1995 inter-Congress period, the INQUA Executive Committee and some of INQUA's Commissions collaborated closely with the International Geosphere Biosphere Programme (IGBP) and the International Geological Correlation Programme (IGCP). Our efforts have been fruitful. The North-South Pole-Equator-Pole Programme (PEP) and the International Continental Drilling Programme (ICDP) are good examples of this kind of collaboration. Thus, INQUA has demonstrated good levels of progress within the IGBP PAGES programme. Accordingly, we must constantly remind ourselves of INQUA's long-term commitment to global change research and the long-term problem of the human impact. In this way, INQUA will contribute to better understanding and management of the modern environment.

During the inter-Congress period 1991-1995, INQUA accepted Lithuania and the Czech Republic as new Group Members. We also welcome the interest and potential future involvement with INQUA of Moldova and Slovakia. Indeed, INQUA is actively involved in negotiations with a

number of countries with a view to their becoming full members in future years. In the ever-changing political world, INQUA continues to forge friendships and to cement collaborative links within the global scientific community.

Quaternary research during the last inter-Congress period gained prominence in the scientific world. The Royal Swedish Academy of Sciences awarded the prestigious Crafoord Prize for 1994 jointly to two Quaternary scientists, Professor N.J. Shackleton (United Kingdom) and Professor W. Dansgaard (Denmark). This is a proud moment for the INQUA family of nations, and I should like to take this opportunity, on behalf of our Union, to offer sincerest congratulations to Professor Shackleton and Professor Dansgaard. I am sure that all participants in this Congress will wish to be associated with this sentiment.

INQUA is an interdisciplinary Union engaged in the study of the youngest geological period. In our present state of knowledge, the Quaternary period is studied not only by traditional branches of geological and biological science, but also by new and rapidly developing disciplines such as the computer modelling and space sciences. It is clear that valuable scientific results may be expected from joint interdisciplinary efforts by scientists in many different fields and from many countries.

The four year period 1991-1995 has witnessed a number of achievements by your Executive Committee. These include:

- a shift from a deficit-driven budget to one showing a profit;
- a significant increase in the annual contribution of member countries;
- a financial profit from *Quaternary International*;
- an accumulation of reserves equal to one year's budget;
- rigorous scientific and financial auditing of Commissions;
- development of proposals for the streamlining of Commissions;
- admission of two new member countries (Lithuania and Mexico);
- improved communication through annual meetings of the Executive Committee and frequent meetings of the President, Secretary and Treasurer (the "Bureau");
- completion of the work of the Global Change Committee;
- a substantial contribution to the PAGES programme making INQUA the leading scientific body in IGBP;
- satisfying recognition by IGBP, ICSU and (finally) IGBP;
- and

writing and publication of INQUA's first brochure;

I should also like to take this opportunity to mention future work and the role of our Union, including the question of international co-operation.

1. INQUA should stress international co-operation, with ever more member countries being involved in the work of our Union. During the past inter-Congress period, the Executive Committee has made determined attempts to increase the number of member nations. However, there are many obstacles in the way of this process, especially in the case of developing countries. Because palaeoenvironmental records are capable of analysis at different temporal and spatial resolutions, the derived palaeoclimatic information can provide insight into the character, rate and spatial extent of climate change. However, no single palaeoclimatic proxy record (terrestrial, marine or ice core) can be regarded as representative of global palaeoclimate. Therefore, regional evidence has to be assembled and integrated in order to gain a global understanding of both the specific response of regional systems to climate change, and the climatic linkages between the different regions and systems. It is clear that more scientific effort is required to obtain the necessary regional evidence. Local scientists joining co-operative projects will help to stretch our limited resources. I hope that our INQUA membership will grow, especially through the involvement of developing countries, thereby increasing our scientific base and expanding our international expertise.

2. Although INQUA is still not a wealthy organisation, we have moved from debit into credit over the past four years. This was mainly a result of the higher level of subscriptions paid by member countries, but also a result of better "house-keeping" in line with the implementation of INQUA's new financial strategy. In addition, of course, our house journal (*Quaternary International*) has now become profitable.

3. The Executive Committee should continue to pay close attention to the work of our Commissions, sub-Commissions, and Working Groups because these are the core of INQUA's scientific endeavour and so are the agent to influence Quaternary research throughout the world and to foster international co-operation. At the Beijing Congress, the Executive Committee was charged with the

duty of reviewing Commissions in an attempt to ensure that INQUA's research programmes maintain their high quality. The Committee has devoted long hours to this formidable task. During this Congress we shall be suggesting guidelines designed to assist Commissions, now and in the future, to achieve these goals. I would urge the International Council and all Commission officers to assist me in this task. An associated process is that of renewal of Commission leadership. This is a most important process in the generation of new ideas and new solutions to significant scientific problems by way of Commission projects.

It is my sad duty to inform members of the death of several Honorary Members and distinguished Quaternary scientists including Professor Jean Dresch (France), Professor Cesare Emiliani (USA), Professor Jean-Charles Fontes (France), Professor Richard Goldthwait (USA), Professor André Guilcher (France), Professor Li Lianjie (China), Professor Gerardus C. Maarleveld (The Netherlands), Professor Joan Maria Montserrat Marti (Spain), Professor Georges Millot (France), Professor Jan de Ploey (Belgium), Professor Miguel Ramos (Portugal), Professor C. Bertrand Schultz (USA), Professor Ulrich Siegenthaler (Switzerland), Professor Wang Jingtai (China), and Professor Wang Nailiang (China). We gratefully acknowledge the contribution these and other departed colleagues have made to our science.

This has been an exciting four years for me personally. It has certainly been one full of challenges. Inevitably, there have been occasional worries, not least the news of reductions in the level of support for Quaternary research such as those recently announced by Germany and Sweden. INQUA scientists should use all the group powers they can muster to reverse such detrimental and short-sighted decisions

It is my pleasure, on stepping down as President of INQUA, to express to you all my best wishes for continued success in your work in Quaternary research and for the advance of this international Union.

Liu Tungsheng
President

5. REPORT ON INQUA ADMINISTRATION 1991-1995 BY THE SECRETARY

The International Union for Quaternary Research is administered by the Executive Committee on behalf of the International Council. The Executive Committee is required by the INQUA Constitution to meet at least once in each inter-Congress period which, in effect, means that the maximum time between meetings should not exceed two years. Quite early in the career of the present Executive, it was recognised that the weight of business would require meetings on an approximately annual basis, and that this would have financial implications. It was also agreed that the work of the Executive would be assisted if the President, Secretary and Treasurer (informally called 'The Bureau') could meet in between times, especially at particularly busy times, as pioneered during the 1987-1991 period. This arrangement has not only worked well, but has been accomplished at a moderate cost. This structure has been supported by even more frequent meetings between the Secretary and the Treasurer, frequently involving airport venues and at little or no cost to INQUA. There can be no doubt about the functional and financial advantages of INQUA having its Secretary and Treasurer from adjacent countries or, at least, having both on the same continent! Communication between members of the Executive has thus probably reached a new high level, and has been enhanced by the ready access provided by the dedicated fax in the Secretariat and, increasingly, by electronic mail contact.

The Secretariat was moved from Zurich to London on 3 September 1991. One year later, it was moved into dedicated two-room accommodation at no cost to INQUA. This has allowed the Secretary to operate without assistance but also without interruption. Many correspondents have expressed satisfaction with the average reply times. Costs to the INQUA Treasury of the Secretariat have been kept low: the calculated true costs over the four years were three times greater than the costs charged to the Treasury. The fact that these costs were met, for the most part, from the private resources of the Secretary serves to endorse the point made by my precursor in this post when he said, at the Beijing Congress, that the INQUA Secretaryship is a full-time job. Recognition of this fact should be formalised by INQUA with a decision to ensure adequate financial support so that this important job can be done as well as possible. Accordingly, may I suggest that the new Executive Committee undertake a review of the operations and attendant costs of the INQUA Secretariat.

The excellent level of communication with Executive Committee members enjoyed by the Secretary has not extended, it must be said, to many Commission officers,

and even fewer National Delegates have proved communicative. About half of INQUA's Commissions keep in good touch with the Executive through the Secretary: only about one quarter of National Delegates respond to requests for information within one calendar month. This is one important element serving to increase the workload of the Secretary, and there is no doubt that, as it costs INQUA time, so it also costs INQUA money. One simple solution to the problem of keeping the Executive informed of the changing composition of National INQUA Committees would be to require National Delegates to complete a pro-forma document at a fixed date each year, a course of action recommended by the Executive Committee.

Poor communication has wide implications, not least in the area of external relations in general, and as affecting INQUA's public image in particular. As an associate of both the International Union for Geological Sciences (IUGS) and the International Council of Scientific Unions (ICSU), INQUA is called upon quite frequently to provide documentation on its research activities and level of international involvement. Both IUGS and ICSU demand annual reports from INQUA, documents which greatly influence the view these important sister organisations take of our work and influence. Both of these reports have to be submitted in the autumn, at least four months *before* most Commission Presidents submit their annual reports to the INQUA Executive. It seems to me self-evident that INQUA would be wise to consider reorganising its affairs so that the "Commission year" runs from August to August, so ensuring that the annual reports of its Commissions reach the Executive in good time for fully-informed and up-to-date reports to go forward to IUGS and ICSU. There is no doubt that I, as Secretary, have had an "uphill battle" in persuading IUGS and ICSU, through the annual reports I have put together (often with a dearth of up-to-date information), that INQUA's research (as represented by the Commissions as the core of INQUA's activities) is topical, lively and valuable. I believe I can say that some progress has been made in that direction and I would particularly mention the positive response of ICSU to the Review Document provided by the INQUA Secretariat in 1994. Finally, it is important to recognise that INQUA is in a position to enhance its reputation by acting formally *within* IUGS through the nomination of INQUA scientists as officers in IUGS Commissions.

The need to stimulate a higher public profile for INQUA has been recognised for some time as shown by the repeatedly expressed intention to produce a brochure. This

has finally been achieved, and it is hoped that members, as well as Executive officers, will use this small document to spread the word about what INQUA is doing and why such activities are important. Only by using the brochure in an active and interactive way will this be achieved: regularly re-edited and re-issued versions should help to keep INQUA's external profile up to date. Never has the time been more ripe for advancing the cause of INQUA and Quaternary Science both in sister disciplines and in a wider range of countries of the world.

One of the disappointments of the period 1991-1995 has been the apparent decline in the number of member countries of INQUA. I deliberately say 'apparent' because the fall from 37 to 33 nations is largely a product of a more realistic policy by the Executive Committee which follows our Constitution's insistence that only those nations that pay the subscription are entitled to vote and to be regarded as members of INQUA. In fact, the 33 countries currently in good standing make up a larger 'core' than in 1991, and we particularly welcome back into the INQUA family Mexico and, in their new personalities, old friends the Czech Republic and Russia, and Lithuania which joins us for the first time. "New" nations Moldova, Slovenia, Estonia and Belorussia have written formal letters requesting membership but, alas, they are clearly unable to forward the necessary subscription. The Executive, especially the Treasurer and the Secretary, have worked very hard indeed to expand the international membership of INQUA. The way forward here may lie in suitably negotiated sponsorship, for the trouble appears to lie in the *formalities* of the subscription payment rather than the actual amount which, even in the case of developing countries, is trivial in some cases.

Another document that has a bearing on the question of how the outside world sees INQUA, is that of our newsletter, *The Quaternary Perspective*. I have no doubt that this is a useful medium, but one which could be made much more effective and penetrating by two actions: appointing a full-time Editor who does not also have to act as INQUA Secretary, and extending the newsletter into the electronic realm. I commend both actions to the membership, perhaps adding to the Editor's role a general responsibility for dissemination of information and publicity about INQUA.

The activities of INQUA's Commissions are described elsewhere in the documents provided by their Presidents in the form of inter-Congress Reports. It is evident that the level of activity is quite variable. For example, the Commission on Stratigraphy has had a more difficult than usual inter-Congress period by having to change its President in mid-term. Despite that disadvantage, there are signs that valuable work has been achieved. The level of activity and the quality of management of the Commission on Formation and Properties of Glacial Deposits have been formally commended by the Executive Committee. In

addition, the Commissions on Shorelines, Loess, Tephrochronology, Palaeopedology, Neotectonics, the Holocene, Palaeoclimatology, Global Palaeohydrology and the Committees on Global Change and Palaeogeographic Atlases have all been satisfactorily reviewed. Major inter-Congress conferences were organised by several Commissions including those in London, UK (four Commissions jointly), and Hamilton, New Zealand (three Commissions jointly). The Commission on Shorelines continues to sustain six active sub-Commissions. Also, formal association with the PAGES programme of IGBP has involved several INQUA Commissions. There is evidence that the publication rate of INQUA's Commissions has increased in the inter-Congress period, amongst which the "Atlas of Paleoclimates and Paleoenvironments of the Northern Hemisphere (Late Pleistocene-Holocene)" is an obvious highlight. It has given the Secretary great satisfaction to point out these, and other INQUA achievements, to both IUGS and ICSU.

So, let us turn for a few moments to the future. One major worry for the Executive Committee during the inter-Congress period has been the demonstrable fact that some countries base their evaluation of INQUA on the level of its association with ICSU. For example, India has stated that it cannot consider formally joining INQUA because INQUA is not a full member of ICSU. Using a similar argument, the Institut de France came very close (in January 1995) to drastically reducing the French subscription to INQUA. These two cases must be of real concern to all involved with INQUA, and I believe they should cause all of us to reconsider the advantages and disadvantages of a future move by INQUA to become a full member of ICSU.

One of the positive aspects of the past four years has been the sustained 'visibility' of INQUA scientists in the activities of the International Geological Correlation Programme (IGCP). Specifically, INQUA has had its Secretary represent it every one of the last four annual meetings of the Board of the IGCP. I believe that such a presence within the IGCP Board meetings should be sustained into the future in the form of an officer or, perhaps, a *co-opted* representative of INQUA. There is no doubt that the approach (including the funding strategy) of IGCP-UNESCO is changing in a direction which makes collaboration with bodies such as INQUA both more fruitful and, perhaps, more likely.

In conclusion, it is perhaps not too surprising that I have to admit to having found the INQUA Secretariat a somewhat frustrating exercise. To some extent, this is bound to be so, given the range of countries and the number of Commissions involved. It is hard to escape the view that reducing the number of INQUA Commissions would reshape and revitalise INQUA. However, we must be sure that we have the courage and commitment to proceed in this direction. Such evidence as we have, in the form of

only six substantive replies to the Executive Committee's challenging letter to all Commissions and Committees on "A new Strategy for INQUA Commissions" (sent out 5 August 1994), suggests that a majority of INQUA's Commissions are not prepared to face the possibility of any change. This may prove to be a lost opportunity. Certainly, it is a question which INQUA would do well to face squarely and as a matter of urgency in the one or two years ahead.

Equally, of course, I have found the INQUA Secretariat to be a challenge, and often a satisfying one. I am grateful for the support given to me by my fellow Executives, and for

the good counsel of our President. Last but not least I would record the deep pleasure and satisfaction I have gleaned from working for four years with the INQUA Treasurer, Eduardo de Mulder. Parting from that working relationship is my greatest regret but, happily, the friendship remains. In presenting my report, Mr. President, may I express the wish that the new Executive Committee will be successful in guiding INQUA to new levels of activity, size and achievement in the years to come.

Edward Derbyshire
Secretary

6. REPORT ON INQUA FINANCES BY THE TREASURER

In this report the development of income and expenditure, and the financial position of INQUA at the end of the period will be described (see Tables).

INCOME

As a result of the implementation of the modified annual dues to be paid by member countries to INQUA, income from member countries eventually increased substantially over this period. The increase in dues was twofold: a 13% increase to compensate inflation rates over the past 8 years; and the development of a new Category VI aimed to member countries belong to the so-called G7 group.

The results of this change were not noticed by the Treasurer before the fiscal year 1993. Modifications in membership dues to be digested by the national science councils cost time in general while these substantial changes have been the subject of many deliberations and negotiations by the Treasurer with the member countries. At the end of this term the situation has been stabilised.

One of the recommendations of the past Treasurer, Mr. Bob Hageman, was to invite organisations other than national committees to become paying members of INQUA. In the past inter-Congress period, however, it proved to be very difficult to identify such organisations, despite the many attempts taken to implement this recommendation. So far, only the Geological Survey of the Netherlands and the Quaternary Geology Education Institute, IFAQ, in Brussels have become Corporate Members.

Income from publications, more specifically the revenues from our Union journal 'Quaternary International', remained more or less constant over the first part of the past inter-Congress period, but substantially increased in 1994 due to the success of this journal based on excellent scientific contributions from the members of INQUA.

Income generated from INQUA's reserves has grown significantly in the last year of the period, mainly as a result of adding the 1993 surplus to the reserves.

Miscellaneous income was mainly generated by refunding taxes paid over the INQUA's bonds in Switzerland.

EXPENDITURE

A major part of INQUA's expenditure is traditionally devoted to the Commissions and Committees (excluding

the Executive Committee) where INQUA's scientific work is done. The following Commissions/Committees received financial support from INQUA in the inter-Congress period:

Stratigraphy (6,500 CHF), Glacial Deposits (12,000 CHF), Quaternary Shorelines (9,516 CHF), Loess (1 1,400 CHF), Tephrochronology (8,000 CHF), Paieopedology (6,700 CHF), Neotectonics (9,500 CHF), Hoiocene (13,500 CHF), Palaeociimate (1,750 CHF), South America (5,225 CHF), Applied Quaternary Research (2,500 CHF), Global Change (20,137 CHF), Palaeohydrology (10,041 CHF), Atlases (3,000 CHF), Quaternary Maps of Europe (3,000 CHF), Palaeogeographic Atlas (3,000 CHF), and Early Man (2,500 CHF). The latter three Commissions received this money in 1991 over the period preceding the inter-Congress period presently under discussion. Through these funds in total 132,132 CHF was thus invested in INQUA's research which money was used for communication, newsletters, organising scientific symposia and as seed money for initiating new projects.

In contrast to practise in previous inter-Congress periods, this Executive Committee considered it necessary to meet at least once a year. These meetings were needed to discuss the future organisation of the scientific structure and direction of INQUA's research. In addition, the Secretary and the Treasurer met several times, often at no cost to INQUA. As a consequence, travel costs have been stabilized and have been kept at an average level despite the higher frequency of meetings, when compared to earlier inter-Congress periods.

One of the results of the successful 'Financial Strategy' as developed at the beginning of this inter-Congress period was the reduction of costs related to the secretariat. Due to very effective use of communication and automation methods the Secretary-General managed to run INQUA extremely efficiently, making use of a special office at no cost to INQUA.

It is INQUA's policy to provide free copies of 'Quaternary International' to the national committees. The costs involved for this service have slightly increased in the last year of this period mainly due to the increased number of journal volumes produced.

Travel grants were provided to a selected number of young and bright Quaternary scientists to enable them to attend the INQUA Congress in Beijing in 1991.

Secretarial support for the President, up to a maximum amount of 1,500 CHF per year, was agreed upon by the Executive Committee

Miscellaneous items of expenditure included the annual contribution to ICSU (500 US\$ per year), the taxes to be paid over the interest on the bonds in the Swiss Bank, bank costs and meeting costs. These miscellaneous costs have been kept at a constant and rather low level.

BALANCE

The first year of the inter-Congress period showed a deficit of 13,017 CHF. This was mainly due to the extra costs involved with the Beijing Congress and to the fact that both the Financial Strategy and the benefits of the higher dues could not yet be implemented. This picture changed in 1992, showing a modest surplus of 2,010 CHF and more dramatically in 1993 with a surplus of 41,153 CHF. In addition, INQUA had a surplus in 1994 (11,194 CHF) which was added to INQUA's reserves. For the fiscal year 1995 (see 'Budget 1995' below) neither deficit nor surplus

is anticipated. The Treasurer considers this positive because more than 37,000 CHF has been provided to support the attendance of a large group of Quaternary scientists at the Berlin Congress in 1995. At 29 July 1995 (just before the Berlin Congress) INQUA possessed the sum of 110,488.72 CHF (see 'Statement of INQUA finances on 29 July 1995' below).

CONCLUSION

The period considered here was characterised by a considerable growth of income in conjunction with a decrease in expenditure, causing a shift from a deficit-driven organisation to a financially-sound organisation with the equivalent of one year's budget in the bank at the end of the period. The INQUA Treasurer anticipates consolidation of INQUA's finances leading to a 60% higher contribution to support scientific work done through commissions, committees, working groups and projects.

Eduardo F.J. de Mulder
Treasurer

INQUA inter-Congress period 1991-1994: Summary financial statement

Income	1991	1992	1993	1994	total
member countries	77,825	44,242	109,428	66,768	298,263
corporate members	0	9,320	8,755	6,275	24,350
publications	143	404	417	4,399	5,343
interest	2,354	1,362	1,543	4,077	9,336
miscellaneous	847	528	661	3	2,039
total	81,169	55,856	120,804	81,522	339,351
surplus		2,010	41,153	11,194	54,357
Expenditure	1991	1992	1993	1994	total
commissions	33,242	16,833	49,123	32,934	132,132
travel executives	33,473	22,240	21,143	20,305	97,161
administration	8,644	7,691	1,084	6,507	23,926
publications	4,418	4,855	4,726	5,483	19,482
travel grants	13,404	0	0	0	13,404
support president	0	0	1,500	3,000	4,500
miscellaneous*	1,005	2,227	2,075	2,099	7,406
total	94,186	53,846	79,651	70,328	298,011
deficit	13,017				13,017

* 'miscellaneous' comprises annual contribution to ICSU, taxes, bank costs and meeting costs.

All amounts are in Swiss Francs; 1 CHF = 1,30 Dfl; however major fluctuations in exchange rate may occur.

All amounts are in full, no decimals.

Income from publications in 1995: 7,700 CHF

INQUA FINANCIAL STATEMENT FOR 1991

INCOME	AMOUNT IN CHF
Member countries	77,825
Bank interest	2,354.24
Publications	143.25
Refund withholding tax	847.40
Total	81,169.89

EXPENDITURE

Commissions and Committees	33,241.60
Travel executives	33,473.34
Administration and secretariat in Zurich	8,644.20
Publications	4,418.32
Withholding tax	820.35
Travel grants	13,404
Miscellaneous	184.63
Total	94,186.44

1991 deficit: **13,017.55** CHF

INQUA FINANCIAL STATEMENT 1992

(per 31-12-1992)

INCOME	AMOUNT IN CHF
Member countries	44,242
Supporting/Corporate members	9,320
Bank interest	1,362
Membership dues <u>Quaternary International</u>	404
Miscellaneous	528
Total	55,856

EXPENDITURE

Commissions and Committees	16,833*
Travel executives	22,240
Administration and secretariat	7,691**
Publications	4,855
Bank costs	135
Contribution to ICSU	709
Miscellaneous	1,383 ***
Total	53,846

1992 surplus: **2,010** CHF

* including 1,187.77 reserved for 1993;

** including 1,541.50 reserved for 1993;

*** including purchase of fax machine, software

INQUA FINANCIAL STATEMENT 1993
(per 31-12-1993)

INCOME 1993	AMOUNT IN Dfl
Member countries '92,'93	143,351.58
Supporting/Corporate members	11,469.25
Bank interest	2,020.89
Publications	547.38
Miscellaneous	866.36
Total	158,255.46

EXPENDITURE	
Commissions and Committees	63,859.81
Travel executives	271697.53
Administration and secretariat	1,421.85
Secretarial Support President	1,965.--
Publications	6,190.94
Bank costs	286.05
Miscellaneous	3,349.97
Total	104,771.15

1993 Credit Balance : 53,484.31 Dfl

INQUA FINANCIAL STATEMENT 1994

INCOME	AMOUNT IN Dfl
Member countries '92,'93,'94	86,681.91
Supporting/Corporate members	8,157.39
Bank interest	5,299.69
Publications	5,718.34
Miscellaneous	4.10
Total	105.861,43

EXPENDITURE	
Commissions and Committees	42,814.64
Travel executives	26,396.71
Administration and secretariat	8,459.85
Secretarial Support President	3,900.--*
Publications	7,127.30
Bank costs	811.24
Miscellaneous	1,917.07**
Total	91,111.54

1994 Credit Balance: 14,749.89 Dfl

1 Sfr = 1.30 Dfl

(* period 1992-1993 and 1993-1994;** including 949.or tax and 315.27 meeting costs)

BUDGET 1995

5 July 1995

EXPECTED INCOME 1995	AMOUNT IN CHF
Member countries	103,037
over 1992: 625*	
over 1993: 1,250*	
over 1994: 12,125*	
over 1995: 89,037**	
Supporting/Corporate members (RGD only)	7,800
Bank interest	5,200
Income from publications and membership Quaternary International	7,733
Miscellaneous	300
Total expected income over 1995	124,070
 EXPENDITURE over 1995	
Commissions and Committees	36,985
Travel executives	28,000
Administration and secretariat	8,000
Secretarial Support President	1,500
Publications	6,500
Bank costs	600
Contribution to ICSU 1994 & 1995	1,200
Contributions to Congress	35,770
Miscellaneous	2,500
Total expenditure	124,070

* minus non-paying countries;

** minus non-paying countries; received up to 05-07-95: 27.612 CHF; expected over 1995 (minus non-paying countries) 51.425: total 89.037 CHF

STATE OF INQUA FINANCES AS ON 29 JULY 1995

ABN	Dfl	Dfl 1241247.19		
ABN	CHF		CHF 3,960.70	
ABN	US\$			US\$ 2,592.77
SKA	CHF		CHF 2,080.45	
ABN	exc	Dfl 67,515.86		
SKA	Bonds		CHF 40 000.--	
TOTAL:		Dfl 79,763.05; CHF 46,041.15; US\$ 2,592.77		
		(=CHF 61,356.19; CHF 46,041.15; CHF 3,091.38)		

Total financial reserves of INQUA on 29-07-95: **110,488.72 CHF**

1CHF = 1,30 Dfl

1 US\$ = 1, 55 Dfl

SUMMARY FINANCIAL STATEMENT: INQUA INTER-CONGRESS PERIOD 1995-1998

Income	1995	1996	1997	1998	Total
member countries	103,037	90,000	93,000	93,000	379,037
corporate members	7,800	6,000	3,000	3,000	19,800
publications	7,733	8,000	9,000	10,000	34,733
interest	5,200	5,200	5,500	5,500	21,400
miscellaneous	300	500	500	500	1,800
Total	124,070	109,700	111,000	112,000	456,770
surplus	0	11,200	12,500	13,500	37,200
Expenditure	1995	1996	1997	1998	total
commissions	36,985	60,000	60,000	60,000	216,985
travel executives	28,000	22,000	22,000	22,000	94,000
administration	8,000	6,000	6,000	6,000	24,000
publications	6,500	6,500	6,500	6,500	26,000
travel grants	35,770	0	0	0	35,770
support president	1,500	0	0	0	1,500
miscellaneous	4,300	4,000	4,000	4,000	16,300
Total	124,070	98,500	98,500	98,500	419,570
deficit	0	0	0	0	0

Berlin, 2 August 1995

REPORT OF THE AUDITING COMMITTEE

The auditing committee, consisting of M. Eronen (Finland), M. Zarate (Argentina) and R. Fulton (Canada), met on August 5, 1995 in Berlin and reviewed the records and documents pertaining to the INQUA budget 1991 through 1994.

The committee found the books and records to be in good order and to have been kept in a complete and honest manner following practices that made them relatively easy to understand. We commend the Treasurer for having had a professional accountant prepare annual audit reports on the books. This made the work of the committee much easier and is a practice we would highly recommend to be carried on in the future.

The last audit committee reported that three recommendations made by a previous audit committee had not been carried out. We are pleased to report that the earlier recommendations concerning budgeting on an annual basis and initiating use of a computer system have been carried out. The third recommendation, that the auditing committee review the books at two year intervals, has not been carried out. This measure might have been desirable when a new Treasurer was working his way into the job but would serve little purpose after the Treasurer's methods and records had been scrutinized by one audit committee.

At present INQUA holds funds in three currencies. This made it a little difficult to accurately follow all transactions but the Treasurer converted totals to a single currency so that it was possible to easily obtain an overview of the financial status of the organization. As long as the organization is handling funds in this way, we would recommend that the Treasurer look into ways to obtain maximum value from holding three currencies. It has been brought to our attention that on occasion as much as one-fifth of Commissions' grants have been used to convert INQUA funds into local currency. This is non-productive

use of scarce resources and we would ask if the Treasurer could attempt to provide committees and commissions with the currency they could most economically convert for local use.

One goal that INQUA set for itself was to allot 50 % of its annual income to scientific purposes (i.e. running commissions and committees). Over the four years covered by this report they fell 5 % short of this target. It is recommend that every attempt should be made to reach this objective.

An automatic response to save money is to suggest that administrative costs be cut. At present, however, costs assigned to administration is very low. This is because host organizations of Executive members cover many items of expenditure that might well be passed on to INQUA. This support is very much appreciated and we would hope that it will continue in the future. One place where INQUA might look for savings that could supplement scientific expenditure is executive travel. During the past four years 32 % of INQUA funds were used for this purpose.

In conclusion we commend the Treasurer for a job well done and for implementing recommendations made by previous audit committees. We recommend that he attempt to use the three currency accounts held by INQUA in creative ways to obtain maximum value for our money. We also recommend that every attempt be made to increase expenditure on scientific programs to 50 % of income and that expenditure on executive travel be the first place he looks to obtain the extra resources.

Matti Eronen (Finland)
Robert F. Fulton (Canada)
Marcelo Zarate (Argentina)

7. REPORT BY THE COMMISSIONS AND INTER-CONGRESS COMMITTEES 1991-1995

The following reports are those received before commencement of the XIV Congress in Berlin on 3 August 1995.

Edward Derbyshire
Secretary.

1. COMMISSION ON STRATIGRAPHY

1. Commission Objective. To define the boundaries of the lower, middle and upper subseries of the Pleistocene Series.

2. This inter-Congress period was a difficult one for the Commission on Stratigraphy in that it had to face the resignation, with effect from the end of September 1993, of its President. Although Dr.G.M. Richmond (USA) took over promptly from Professor D.Q. Bowen (UK) early in October 1993, the change was inevitably disruptive to some extent and there is no doubt that the work of the Commission was affected for several months as a result. This report reflects, to some degree, this unexpected situation and what follows is an abbreviated account of steps taken to readjust to the new situation and to set on course again the work of the Commission.

In the first 12 months of the period, Commission membership was revived from only 5 to 17 (under the Constitution of both I.C.S. and INQUA). The period May 1994 to February 1995 was one of intense work by the President with officers of I.C.S. who were concerned to press for a halt in the studies of Vice-President Partridge's INQUA Working group on the Plio-Pleistocene boundary. Working Group evidence, including both pollen and vertebrates suggesting that the boundary should be moved down towards the Gauss-Matuyama transition, clearly conflicts with the commitment of the I.C.S. Neogene Subcommittee to the existing GSSP at Vrica. As Chairman of the I.C.S. Pleistocene Subcommittee, I cannot countenance interference with the work of Partridge's Working Group. Differences between the Constitutions of INQUA and I.C.S. show that it cannot be an I.C.S. Working group, although the Chairman of I.C.S. regards it as an informal group and so retains an element of control. Although the I.C.S. Subcommittee on the Neogene has equal status with the INQUA Commission on Stratigraphy in respect to defining the Plio-Pleistocene boundary, defining subdivisions of the Pleistocene is the responsibility of the INQUA Stratigraphic Commission (I.C.S Subcommittee on the Quaternary) alone.

3. Meetings and Symposia. The world-wide distribution of Commission membership has effectively prevented meetings or symposia of the Commission as a whole. However, meetings of individual groups such as the group studying the lower-middle Pleistocene in Japan, and of the Subcommittee on European Quaternary Stratigraphy have been very productive.

Some idea of the level of activity since the changeover of the Presidency may be seen from the following outline of the activity of Subcommittees and Working Groups in 1994.

4. Recent publications. Paper on stratigraphic section of lower -middle Pleistocene boundary, Matuyama-Brunhes reversal, and dated tephra in Wanganui basin, New Zealand. Preparation of papers by Japan on potential lower-middle Pleistocene boundary in the Boso Peninsulas, Japan; and on problems with the Plio-Pleistocene boundary in Czechoslovakia, in the Mediterranean area, and in east Africa.

5. Proposed Future Work. Team preparations for definition of boundaries of lower, middle and upper Pleistocene at the INQUA Congress in Berlin in August 1995.

With respect to Subcommittees and Working Groups, these teams should relate their work to that of the parent Commission. What they will do in the next inter-Congress period in co-operation with the parent Commission's plans. More joint planning is essential.

G.M. RICHMOND
President

Activities of sub-Commissions and Working groups

SC on European Stratigraphy (C.Turner): In October 1994 the Symposium "Cold Warta Stage- lithology, paleogeography, stratigraphy" took place in Lodz (Poland). At this meeting the following general topics were the subject of fruitful discussions:

1. Warta sequences in their type region, their lower and upper boundaries.
2. Lithological recognition of Warta tills. Are the so-called Warta tills of Germany, Poland, Lithuania and Belarus equivalents ?
3. How secure is the proposed Odra/Warta interstadial ?

The proceedings will be published in "Acta Geographica Lodziensia".

The next SEQS meeting will be held in June 1996, at Tegelen, The Netherlands. The meeting will focus on the changes in climate and environment during the Early Pleistocene.

SC on Major Subdivisions of the Pleistocene : In charge are two groups. One is the New Zealand Group headed by B.Pillans. They are studying possible Middle-Lower Pleistocene boundary stratotype sections in the Wanganui Basin. Investigations are carried out through marine stratigraphy, paleontology, magnetic stratigraphy and fission track ages. The other group is represented by Japanese scientists headed by H.Kumai. They are working on the same problems on Boso Peninsula. Studies are carried out by stratigraphers, paleontologists, magnetostratigraphers, litho-stratigraphers, and tephrostratigraphers.

WG on Plio-Pleistocene Boundary (T.C.Partridge): Attention was given to the identification of potentially GSSP's in marine sequences which might prove suitable for the definition of a revised Plio-Pleistocene boundary at ~ 2.6 myr. Sections in southern Calabria and Sicily were visited in the company of Dr.J.-P.Suc (University of Montpellier, France).

SC on Quaternary Stratigraphy of Asia and Pacific Area (S.A.Arkipov): During 1994 the SC held a meeting in Moscow in June, focusing on stratigraphy and paleogeography, genesis and lithology of Quaternary deposits, Quaternary tectonics, and archeology. Considerable progress is reported on studies of Quaternary stratigraphy of N. Asia and the Pacific Region.

The international meeting on "Wind blown sediments in the Quaternary record", held in London in January, engaged the specialists on loess stratigraphy and paleoenvironment of Asia.

2. COMMISSION ON FORMATION AND PROPERTIES OF GLACIAL DEPOSITS

1. Commission Objectives

During the period between 1973 and 1977 the Commission on Formation and Properties of Glacial Deposits concentrated its efforts on a good understanding of the processes behind the studied deposits and the classification of these deposits. A good deal of criticism was raised against this way of working. This criticism is rather unjustified, however, if we bear in mind that the main outcome was not the classification systems themselves but the knowledge we achieved about the numerous processes that are active in the glacial environment. The classifications were of minor importance, but to be able to

establish anything of that kind we needed a very good basic knowledge about the processes and their effects.

Our efforts provided an excellent basis for the work that has been performed after the reestablishment of the Commission at the XII INQUA Congress in Ottawa, Canada, 1987. During the two inter-congress periods since then the efforts have to a great extent been focused on the understanding of different environments from the point of view of glacial processes. Work Groups have been set up, aiming to a study of these aspects in the subglacial environment, in alpine environment, and on the continental shelves. A special case of the first aspect are glaciotectionic features, to which the work of one group has been devoted. A wider aspect, the mapping of glacial deposits, has been studied by a separate group, aiming at some general guidelines and recommendations for such mapping.

A new Working Group has recently been established for the study of possibly glacial deposits in Monsoon Asia, the Tibetan Plateau in particular. The reason is partly a problem studied by the IGCP project 253 "Termination of the Pleistocene". The issue of possible former ice sheets over the Plateau is essential for our full understanding of the global weather systems ruling the onset of glaciations, and impossible to attack without good knowledge of the true nature of widespread sediments there.

Due to the various reasons the activity has been rather different within the different groups. Several meetings have been organized, partly as Work Group meetings and partly as All-Commission meetings. Also joint meetings with other organizations have been held, for instance, with IGCP 253 "Termination of the Pleistocene".

In general, the main outcome of our work is a better understanding of the processes active in different glacial environments and their sensitivity to, for instance, human influence. Another very important outcome is the improvement of scientific contacts between different countries. Since we are dealing with glacial deposits and processes it is natural that the main contacts have been between countries of the northern higher latitudes, that is, in general the industrialized world. Also in this respect, however, the support of former socialist countries has implied an important step forward.

2. Commission Activities 1991-1995

Working Groups

1. Glacial Tectonics

This working group has been very active. It has been involved in two of the meetings (see point 3). Several attempts have been made to secure funding for the European Glacitectionic Mapping Project from UK and European institutions. Compilation of data continues, with

good data secured for parts of Poland, Germany and Latvia. However, the overall structure of the database is not yet prepared. The work group has not yet finished the planned Atlas of Glacial Tectonic Landforms. The results of the work group activity are presented in three books (Aber 1993, Sauchyn 1993, Warren & Croot 1994, see point 4).

2. Montane Glacial Deposits

Very little activity has been reported for this inter-congress period. The Working Group President reports that it has been difficult to initiate any correspondence and to get any ideas from the Work Group members. Result from an earlier meeting is presented in Quaternary International 18 (see point 4).

3. Subglacial Processes and Deposits

There has been a close co-operation between this Working Group and the Drumlin Symposia. One meeting has been organized. This group will also be involved in the planned drumlin meeting in Berlin in 1995. The activities of work group focus on the observation of modern subglacial and ice-marginal glacial and the interpretation of subglacial processes which took place during the Pleistocene. The aim of the group since the last INQUA meeting has been to visit field sites, discuss subglacial processes, and then relate those discussions and observations to those made in our own field areas. We have begun to incorporate an understanding of glaciology in interpretations of subglacial processes. The results of the work are presented in *Sedimentary Geology* v. 91 (see point 4).

4. Marine Glacigenic Processes and Products

The Working Group president has been active within the field of the work group. However, very little information has been brought back to the Commission leaders. It is, therefore difficult to report what has really been done on the behalf of the INQUA-Commission and what has been the activity among the work group members.

5. Glacial Mapping

The main project of this group has been to compile data from different parts of the world and to work out a handbook for mapping Quaternary geology of glaciated regions. This involves a great work and is still not fulfilled. It is the goal to finish it during the next inter-congress period. The work group has been one of the organizers of two of the meetings (see point 3). The results from the work are presented in a Balkema book (Warren & Croot, see point 4).

6. Glacial Environments in Monsoon Asia

The work group has organized one international meeting (see point 3) and some more informal field excursions. The work group has been very active in spite of a small

financial support. We regard it as very important that problems about Quaternary glaciations in China are studied in this group where it is an important international support. Several international field groups have had important discussions at key sites in China. There is a clear connection to the work group on montane glaciations.

Regional Groups associated with the Commission

Two regional groups have been active in the Commission. These have their own meetings, where all kinds of glacial processes and landforms close to the margins of the Scandinavian ice sheet are discussed. We regard these groups as important for the understanding and discussion of ice sheet environments.

Glacigenic deposits in Southwest Part of Scandinavian Ice Sheet

Leader: Grube, Friedrich, Geologisch Paläontologisches Institut der Universität Hamburg - Geomatikum - Bundesstrasse 55, 2000 Hamburg 13, Germany

Southeastern Scandinavian Ice Sheet - Lithology and Stratigraphy of Glacial Deposits

Leader: Gaigalas, Algirdas, Department of Geology and Mineralogy, Ciurlionio 21/27, 231009 Vilnius, Lithuania

NEW WORKING GROUP PROVISIONALLY ACCEPTED IN 1994

Geospatial Analysis of Glaciated Environments (GAGE)

GAGE was proposed as a new work group at this Commission's annual business meeting in Iceland, August, 1994. James S. Aber agreed to serve as president, and Ole Humlum is the secretary. The work will focus on investigations of modern and ancient glaciated environments utilizing techniques of geographic information systems (GIS). The central goals of GAGE are assembly of regional and continental GIS databases for display, analysis, and interpretation of glaciated terrain, as well as for modeling of glacier dynamics and processes. Achieving these goals depends on many new technical tools, for example: high-powered computers, satellite imagery, global positioning system, acoustic and radar mapping, and space-shuttle photography. Integration and analysis of various kinds of data also require development of new concepts for geospatial analysis in glaciated environments.

3. Meetings and Symposia 1991-1995

Ireland May 20-28, 1991: Organizer: Work Group on Glacial Tectonics and Work Group on Mapping Glacial Deposits.

Poland-Germany 1992: Organizer: Peribaltic group in cooperation with the regional group Southeastern Scandinavian ice sheet.

Northern Ireland and Ireland July 3-10, 1992: Drumlin symposium. Organizer: the Forth drumlin symposium and the Work Group on subglacial processes and products.

Saskatchewan, Canada, May 9-15, 1993: Field Conference and Workshop. Organizer: Work Group on Glacial Tectonics and Work Group on Mapping Glacial Deposits.

Amsterdam, The Netherlands, September 18-24, 1993: Technical workshop on till micromorphology. Organizers: John Menzies and Jaap van der Meer

Minsk, Russia, November 11-12, 1993: Post-sedimentary transformation of glacial deposits. Organizer: Prof. A. Matveyev on the behalf of the Commission.

London, England, January 5-8, 1994: Loess in the Quaternary record. Organizers: INQUA/QRA. Secretary: Edward Derbyshire, Secretary INQUA. This meeting was organized as a general INQUA meeting and was addressed to the Commissions working actively with problems related to loess, including our Commission.

Patagonia, Tierra del Fuego, Argentina 15-25, 1994: Field Meeting on Glacigenic Deposits and the Termination of the Pleistocene. Organizers: INQUA Commission 2, IGCP 253 and SUDAMQUA.

Lanzhou, China, July 19-30 1994: International symposium and field workshop on glacial deposits and environments in Monsoon Asia. Organizers: Work Group on glacial deposits and environments in Monsoon Asia and Quaternary Glacier and Environment Research Center, Lanzhou, China in cooperation with IGCP 253.

Iceland, August 20-23 1994: Field Conference and Work Shop, Myrdalsjökull.

Organizers: Hreggvidur Norddahl, in cooperation with the Work Group on Glacial Tectonics.

Ireland, May 1995: Symposium and Field Excursion. Organizers: Work Group on Glacial Mapping.

4. Recent Publications:

Aber, J.S. (ed.) 1993: Glaciotectonics and Mapping Glacial Deposits. *Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, Volume 1*. Balkema, Rotterdam. 310 pp.

Sauchyn, D.J. (ed.) 1993: Quaternary and Late Tertiary Landscapes of Saskatchewan and Adjacent Areas. *Proceedings of the INQUA Commission on Formation and Properties of Glacial Deposits, Volume 2*. Balkema,

Rotterdam. 114 pp.

Husen, D.van & Schliichter, Chr. (eds.) 1993: Glacial Processes: Stratigraphic, sedimentologic and proxy Records. *Quatern. Intern.* 18, 101 pp.

Warren, W. & Croot, D. (eds.) 1994: *Formation and Deformation of Glacial Deposits*. Balkema, Rotterdam. 223 pp.

5. Proposed Future Work

There is a consensus of opinion that the Commission should continue its work. Important work is in progress, and proposals for new activities have been put forward. The planned new work group GAGE (see point 2) is of considerable interest, as shown by their aims as presented here. The details will be formulated when the organization has been firmly established under the leadership of a new President.

Working Group 1, Glacial Tectonics, must continue its work. The data-bases and maps of glacitectonic features in Europe and North America are being completed, work that cannot be finished within the present inter-congress period. It is also our intention to extend this work to comprise the entire glaciated world.

Working Group 2, Montane Glaciations will be cancelled. Most of the themes of interest for this former group is taken care of in the group Glacial Environments in Monsoon Asia.

Working Group 3, Subglacial Processes and Deposits, should continue along the same lines as now. The recently started cooperation with the informal Drumlin Symposia has been very fruitful, and the possibilities for continued cooperation are good. A study of large scale glacial erosion, proposed for a new Working Group, will be included with this group. A palaeoglaciological focus is suggested for this Working Group for the next inter-congress period.

Working Group 4, Marine Glacigenic Processes and Products, has not been very active in 1991-1993. At present we recommend that it be cancelled. However, in 1994 this work has focused on "Seismic Facies Analysis of Marine Glacigenic Sequences", which seems to be quite promising. Closer cooperation between the Working Group and the Executive Committee is essential, and we need more exact plans for the specific Working Group activity before continuation can be recommended.

Working Group 5, Glacial Environments in Monsoon Asia, has been established recently. Due to topographical and logistical problems in the area under considerations the

work cannot progress rapidly. Good results require more time than one inter-congress period. The aims of the work are extremely important, among others for our understanding of the global climate system. Within IGCP 253, terminated by the end of 1994, the problem of possible former ice sheets in Siberia and the Tibetan Plateau has been identified as a key issue that must be further studied. Its solution requires identification of possible glacial deposits, a work that is naturally performed in this Commission. The extent of glaciation is also closely dependent on the uplift of the Plateau, a process with world-wide climatic implications. Advanced plans for international scientific exchange in the form of workshops and expeditions are being worked out. Collaboration between China and, e.g., Japan and India is planned.

The cancelled Working Group will be replaced by two new ones:

GAGE will deal with "Geospatial Analysis of Glaciated Environments." Its work will focus on investigations of ancient glaciated environments utilizing techniques of geographical information systems (GIS). The main goal is assembly of regional and continental GIS data-bases for display, analysis and interpretation of glaciated terrain, as well as modelling of glacier dynamics and processes.

Another group will probably be established, following a proposal put forward some years ago. Its topic will be "Sedimentology of glaciogenic deposits".

For practical reasons we have established Regional Groups within the existing organization. One candidate for activity of this kind is the Peribaltic Group, hitherto working for the now-closed IGCP 253. Its new leader, Prof. Leszek Marks, Warszawa, Poland, has declared that the group wants to work within our Commission. This might well replace the existing group for the Southwest Parts of the Scandinavian Ice Sheet.

For reasons mentioned below, the existing Regional Group for the "Southeastern Scandinavian Ice Sheet - Lithology and Stratigraphy of Glacial Deposits" should continue its work along the lines defined by the Work Groups.

A special aspect of our work makes continued activity highly justified. Several joint east-west projects and other links are established. In order to promote such work and to support our colleagues in former socialist countries, and to some extent also in countries in the Third World, we must encourage this cooperation. The Commission could aid collaboration in several ways. We could actively recruit new members from those countries. We could establish an on-line bulletin board via the internet. We could extend the European conferences in those countries. We could pursue national and international funding to support scientific exchange with them.

In conclusion, and taking into account the points raised above, we formally apply to INQUA for continuation of this Commission, the name of which we propose to change to "Commission on Glaciers and Glaciated Terrains".

S. HALDORSEN
Secretary
J. LUNDQVIST
President

COMMISSION ON QUATERNARY SHORELINES

1. Goals for the inter-Congress period

Five main priorities were identified:

- (a) Sea-level changes and shoreline response during the last 2,000 years.
- (b) Evaluation of last interglacial shorelines including the flora and fauna.
- (c) The position of the shoreline during the last glacial maximum.
- (d) Mapping of coastal lowlands to provide information for coastal zone management.
- (e) To investigate the processes, mechanisms and impacts of periods of rapid sea-level changes.

2. Activities 1991-1995

Of the six Subcommissions, only four (Indian Ocean, Mediterranean and Black Seas, Northwestern Europe and West Pacific) have been active. The two Subcommissions - Africa and Americas were inactive because of a variety of problems including the secondment of the President of the Africa Subcommission to an appointment out of Africa and the resignation of the President of the Americas Subcommission after some difficulty in forming a committee.

The Commission has continued to enjoy working closely with IGCP project no. 274 'Coastal Evolution in the Quaternary' and its successor project no. 367 'Quaternary Shoreline Dynamics: Coastal Response to Rapid and Extreme Events'. Links have also been set up with the IGBP core projects LOICZ and PAGES (both streams I and 11), and UNESCO-IUGS programmes Earth Processes in Global Change on Climates of the Past (CLIP) and IGCP project no. 296 'Quaternary in the Asia-Pacific Region'.

A project on the mapping of coastal lowlands was carried out with the FAO in Rome. The maps are currently in press.

Dairy of events -

September 1991: members of the Northwestern Europe Subcommission contributed papers to the European Coastal Zone Association for Science and Technology Meeting held

in Aveiro.

August 1992: members of the West Pacific Subcommission contributed papers to the Second Asian Marine Geology Conference held in Tokyo.

August 1992: members contributed papers to the Twenty-ninth International Geological Congress held in Kyoto. A business meeting of the Commission was also held.

September 1992: a field meeting of the Northwestern Europe Subcommission was held in northern Norway.

September 1992: members of the Northwestern Europe and Mediterranean and Black Seas Subcommissions contributed papers to the Eurocoast 1992 Symposium held in Kiel.

December 1992: members contributed papers to the IGCP project no. 274 meeting in Wellington. A business meeting of the West Pacific Subcommission was also held.

March 1993: members of the Northwestern Europe Subcommission contributed papers to the Baltic Sea Symposium held in Stockholm.

April 1993: members of the Mediterranean and Black Seas and Northwestern Europe Subcommissions contributed numerous papers to Section E4 'Sea-level changes and their impacts on European coastlines' of the European Union of Geosciences meeting in Strasbourg.

April 1993: members contributed papers to the Workshop on Sea-level Changes and their Consequences for Hydrology and Water Management held in Noordwijkerhout.

June 1993: members contributed papers to the International Symposium on Dynamics of Fluvial-coastal System and Environmental Changes in San Benedetto del Tronto, Italy.

September 1993: the Northwestern Europe Subcommission field meeting was held in Belgium and the Netherlands as a joint function with IGCP project no. 274.

October 1993: members of the Mediterranean and Black Seas Subcommission contributed papers to the Third Iberian Quaternary meeting held in Portugal.

October 1993: members of the West Pacific Subcommission contributed papers to the IGCP project no. 296 final meeting in Khon Kaen.

November 1993: members of the Mediterranean and Black Seas Subcommission contributed papers to the Med Coast 1993 meeting held in Ankara.

November 1993: members of the West Pacific Subcommission presented papers at the International Symposium on Environmental Change in the Pacific Area held in Tokyo.

December 1993: members of the Northwestern Europe Subcommission contributed papers to the European Science Foundation Workshop on Holocene Sea-level Changes held in Rennes.

April 1994: members of the Mediterranean and Black Seas Subcommission contributed papers to the Field Symposium on Field Methods and Models to Quantify Rapid Coastal Changes held in Crete.

April 1994: the President of the Commission was invited by the Intergovernmental Oceanographic Commission to

contribute a paper at the First International Symposium on Gulf of Guinea held in Lagos.

May 1994: the Northwestern Europe Subcommission field meeting was held in Portugal.

July 1994: members of the Mediterranean and Black Seas Subcommission contributed papers to the International Symposium on the Quaternary of Gibraltar held in Gibraltar.

August 1994: a meeting was held between the Secretary and Vice-president in the UK followed by a meeting between the Vice-president and the President in the Netherlands.

August 1994: members of the Northwestern Europe Subcommission contributed papers to the NORDQUA 1994 Meeting held in southern Iceland.

August 1994: members contributed papers to the CLIP Workshop held in Bali followed by a fieldtrip to Lombok and Sumba.

September 1994: members of the Northwestern Europe and Mediterranean and Black Seas Subcommissions contributed papers to the Second International Symposium on Eurocoast held in Lisbon.

September 1994: members contributed papers to the IGCP project no. 367 Symposium and Field Meeting held in Scotland.

November 1994: members from several Subcommissions contributed papers to the European Science Foundation meeting on 'Continental shelf evidence of sealevels over the last 20 ka'. A Northwestern Europe Subcommission business meeting was also held.

November 1994: members of the Mediterranean and Black Seas Subcommission contributed papers to the First Symposium on the Atlantic Iberian Margin held in Cadiz.

November 1994: members of the West Pacific Subcommission in Japan presented papers at the Symposium on Coastal Evolution held in Japan.

January 1995: the President, Vice-president and Secretary of the Commission and the Vice-president of the West Pacific Commission attended the 4th International Conference on the Evolution of the East Asian Environment held in Hong Kong to present papers. A business meeting of the Commission was also held.

April 1995: several members including the President attended the Second LOICZ Open Science Meeting held in Manila.

June 1995: members will contribute papers to the International Association of Geomorphologists Southeast Asian Conference to be held in Singapore. A West Pacific Subcommission business meeting is also planned.

3. Berlin Congress

A special symposium entitled 'Sea-level changes at continental margins' is planned together with at least one business meeting.

4. Newsletters

Indian Ocean Subcommission February 1992, 4p.

Mediterranean and Black Seas Subcommission

No. 14, 134p.

No. 15, 117p.

No. 16, 115p.

No. 17, in preparation.

Northwestern Europe Subcommission

April 1993, 46p.

February 1994, 64p.

1995 issue, in preparation.

West Pacific Subcommission

April 1993, 28p.

1995 issue, in preparation.

5. Selected scientific contributions

Baeteman, C. & De Gans, W. (1993). Excursion Guide: Fieldmeeting 1993 Quaternary Shorelines in Belgium and the Netherlands. Northwestern Europe Subcommission, INQUA, 185p.

Finkl, Jr. C.W. ed. (in press). Special volume in honour of Rhodes Fairbridge. Journal of Coastal Research.

Jeftic, L. et al. (1992). Climatic Change and the Mediterranean. Edward Arnold.

Jelgersma, S., Van der Zijp, M. & Brinkman, R. (1993). Sealevel rise and the coastal lowlands in the developing world. Journal of Coastal Research Vol. 9/4, 958-972.

Nicholls, R.J. & Leatherman, S.P. (1995). Potential Impacts of Accelerated Sea-level Rise on Developing Countries. Journal of Coastal Research Special Issue No. 14, 323p.

Ota, Y. ed. (1994). Study on Coral Reef Terraces of the Huon Peninsula, Papua New Guinea. Monbusho International Research Program, 135p.

Ota, Y., Koike, K., Omura, A. & Miyauchi, T. compiled (1992). Last Interglacial Shoreline Map of Japan. Scale 1:2,000,000.

Ota, Y., Nelson, A.R. & Berryman, K.R. eds. (1992). Special issue on Impacts of Tectonics on Quaternary Coastal Evolution. Quaternary International Vol. 15/16.

Tooley, M.J. & Jelgersma, S. (1992). The Impacts of Sea-level Rise on European Coastal Lowlands. Blackwell Publishers, 267p.

Warrick, R.A. et al. (1993). Climate and Sea Level Change. Cambridge University Press, 424p.

Wingfield, R.T.R., Scourse, J.D. & Devoy, R.J.N. eds. (in preparation). Continental Shelf Evidence of Sealevels Over the Last 20 ka. Geological Society Special Publication.

Yim, W.W.-S. ed. (1992). Proceedings Workshop on the Logging and Interpretation of Transported Soils in Offshore Boreholes. Geological Society of Hong Kong

and the University of Hong Kong, 78p.

W.W.-S. YIM

Secretary

LOESS COMMISSION

1. In many ways the 1991-1995 inter-Congress Period has been a very successful one for the Loess Commission (LC). The Commission has participated in a range of activities, and publication has continued at quite a high level. It is observable that loess, in a general sense, is becoming more popular, and that overall levels of investigation and publication are rising. The Commission has changed enormously since it was established by Julius Fink in the 1960s as a small, cosy project to investigate loess stratigraphy in East/Central Europe. It is now a world-wide, very loosely defined contact group which exists mostly as a communication system. The central aim to investigate and study loess now covers so many aspects of activity that perhaps it needs to be made more precise.

'Co-operation' was encouraged at the 1991 INQUA and the Commission has initiated and developed a whole range of co-operative activities. The link with IGCP-349 (the desert margins project) has proved particularly fruitful and should continue into the next inter-Congress period. The Commission will participate in the IGCP-349 meeting in Cardiff in September 1995. If links with other bodies are to be developed and extended this may affect the nature of the Loess Commission itself. Tentative approaches have been made to the ISSMFE (Soil Mechanics), IESS (Soil Science), IAG (Geomorphology), IAEG (Engineering Geology), GSG/IUGS (Sedimentary Geology), and questions about co-operative activity have been raised in 'Loess Letter'.

One failure of the Loess Commission has been its inability to generate a range of independent action. The regional and topical working groups have not functioned well: possibly each group lacks the critical mass which generates activity. In the future the Commission needs to identify more precisely an area of potential development, and promote those which can be realistically supported. It would be ideal if the Commission could provide support for every loess scheme in the world. It might be possible to post 'Loess Letter' to every committed loess worker, but what else can be done? Regional meetings would promote loess activity but that needs an enthusiastic organiser in place. The recent Commission meetings in South America and New Zealand have worked well as regional meetings. Perhaps a region or two could be identified at the major INQUA meetings and targeted meetings organised.

2. Meetings

1993. The engineering properties of arid soils. A meeting organised by Technical Committee 3 of the ISSMFE to discuss practical problems of arid soils. The Loess Commission members participated mostly in the Soil Classification section and supplied a number of chapters for the final volume, which was augmented by two special issues of 'Loess Letter' (Nos.29 and 31).

1993. The Third International Geomorphological Congress (IAG). This was held in Hamilton, Ontario, Canada, and provided the major Loess Commission discussion meeting for North America for the 91-95 period. A Loess Commission session was incorporated into the conference and allowed discussion of probable futures. It was at this meeting that the idea of concentrating on loess material studies was developed. If an IAG Working Group on 'Landform Materials' is formed, the Commission should participate fully.

1994. The INQUA/QRA Aeolian Sediments meeting. The meeting title was 'Windblown sediments in the Quaternary Record'. The meeting report was published in Quaternary Newsletter No. 72 and the conference abstracts in QN73. This was perhaps the major stratigraphic meeting of the 91-95 period. The major papers are now in press in 'Quaternary Proceedings' and 'Quaternary Science Reviews'.

1994. The joint 'Tephrochronology-Palaeopedology-Loess Commission meeting in New Zealand' was a co-operative meeting, organised by David Lowe of Waikato University. This was the major co-operative meeting for 91-95, and the NZ regional meeting for the Loess Commission. It was not too well attended by Northern Hemisphere members, but very successful nevertheless, and a good model for future joint meetings.

The IGCP-349/Loess Commission joint meeting in China. Another logical joint meeting, this time with a relevant IGCP project. IGCP 349 organisers are Drs Derbyshire, An and Singhvi. The Loess Commission connection will continue. This was the Loess Commission's regional China meeting for 91-95.

1994. The NATO Advanced Study Workshop on Collapsing Soils. An ambitious attempt to define the research frontier, and to bring together workers on loess, and on the post-glacial high-sensitivity clay soils (the 'quickclays'). A useful exchange of views, leading to a substantial book (published 1995).

1995. "Yet another windy day". A small, local meeting held at Sheffield University, U.K., but a possible model for regional loess meetings. The 1996 "Windy Day" meeting is to be held at Nene College, Northampton, U.K.

3. Publications

A major aim of the Loess Commission is to encourage publication, so as to spread the word on loess investigations. What sort of publications should the Commission promote? Without publications of some sort there can be no communication, and hence no Commission.

'Loess Letter' is the Commission's informal newsletter, and its main publication. The special issues for Berlin '95 were 33 and 34. At a rate of two issues per year this represents 17 years of continuous publication. It is believed that 'Loess Letter' is widely appreciated but we receive little feedback. The aim is to supply key libraries and institutions (hoping to catch the eye of browsers, and also to provide reference collections), to supply interested investigators, and to have something to circulate at conferences. When the 'LL' experiment was initiated by Jim Bowler and Ian Smalley in Auckland in 1978 it was (optimistically) intended that 50 issues should be produced, making a 25 year programme. At no.34, this interim report is possible. We propose to go on publishing LL and will concentrate on theme issues (like 31 on collapsing soils and 34 on fragipans) and also on production associated with conferences and meetings. No.35 will probably be on collapsing soils again (to celebrate the NATO book) and 36 is targeted at arid zones and associated loess. The major linked conferences will be the main INQUA Congress and the International Geomorphological Congresses.

Bibliographies are important. The Commission promotes the preparation and publication of reviews and bibliographies: these are essential if progress is to be made in loess investigation (and we need more!). The '70 Books on Loess' list was published by the East Asian Tertiary Quaternary Newsletter. This list is still available as LL Supplement 20. The famous Stuntz & Free 1911 Bibliography has been republished (80 years on).

'Quaternary International'. The Loess Commission has supported QI, and several loess issues have appeared. QI number 24 was a special issue on geotechnical topics, and QI number 17 dealt largely with loess in South America. In fact, QI 17 represents a step forward for the Loess Commission: the loess in South America was identified at the Beijing INQUA as an 'area' of interest, and QI 17 is a useful contribution to this topic. See LL33 for QI summaries, and see 'Loess and the Argentine Pampa' ed.E.Derbyshire (Occasional Paper, Geography Department, University of Leicester, No.23) for more abstracts and diagrams.

Books. The Loess Commission contributed to several books in the 91-95 period. We mention 'Engineering Characteristics of Arid Soils' (eds. P.G. Fookes & R. Parry) and 'Genesis and Properties of Collapsing Soils' (eds. E.Derbyshire et al.) They illustrate a growing interest in the engineering properties of loess soils.

Maps. There has not much activity on the map front. The LL Map on loess distribution in Europe (Grahmann's map) is being recirculated for Symposium 56 at the Berlin INQUA. A map of loess distribution in Slovakia has had limited distribution.

Electronic publishing . We are exploring the possibilities of electronic publishing. 'Loess on the Internet' is an attractive proposition, as is a complete loess bibliography on CD-ROM. It is expected that Loess Commission members will participate in GGG (the new electronic journal 'Glacial Geology & Geomorphology', to be published by John Wiley: details from the Loess Commission Secretary).

4. Futures

It is apparent that interest in loess is growing. How will the Loess Commission reflect and influence that growth? It could widen its activities or it could focus them down on to a few specialised projects. The future will depend on the level of interest of those scholars who want to be involved in Commission activities. The 'realistic' view is that few people will actually take on the organising and publishing tasks required, and this suggests a narrowing of the range of interests, to reflect the activities of a few motivated individuals. The 'broad sweep' approach suffers because there are not sufficient people placed in regional centres or discipline groups to generate interest.

Vice-President Jim Bowler's Pacific Working Group functioned well because it was well targeted, had simple, straightforward aims (3 field trips) and a limited time scale. Three reports were published, each an excellent volume, and there was general satisfaction. This might be the model for future Commission activity, but it will require the involvement of some dedicated initiators and organisers. A research project could be focussed on the Chinese loess, but if stratigraphy is the main thrust of the investigation it might better be associated with the Stratigraphy Commission rather than the Loess Commission. Working with the Stratigraphy Commission might enhance the Commission's work in such cognate areas.

In order to be more effective, the Loess commission needs more active participants: a representative in North America; one in Soil Mechanics; one in China; and one in Geoinorphology. Discipline-based and regionally-based representatives are required, and more co-operation is essential.

I.J. SMALLEY
Secretary

THE COMMISSION ON TEPHROCHRONOLOGY

This commission was reconstituted as a formal commission of INQUA at the Beijing INQUA Congress in 1991. For the 1991-1995 inter-Congress period the President is Hiroshi Machida (Japan) and the Secretary is David Low (New Zealand). There are 14 Formal Members and around 120 Corresponding Members.

Commission objectives:

Our aims are to promote research, international co-operation, and the exchange of information on Quaternary tephrochronology and tephrostratigraphy.

Activities during the current inter-Congress period:

1) Activity reports of four working groups

"Application of Tephra to Land and Sea (ATLAS)"

This group aims to promote cooperation, interdisciplinary studies, and exchange of information on correlation of marine and continental Late Neogene sequences using tephra layers. Andrei Sarna-Wojcicki, chair of this group, reports that he arranged cooperative studies in China, Mongolia, and in Lake Baikal and Kamchatka. The long-term goals of these studies are to establish chronostratigraphic ties between the land-based sections in Asia and the deep-ocean record in the western Pacific and the Indian Oceans to compare the marine and terrestrial palaeoclimatic records. He and colleagues in USGS and several universities are also working on improving the Neogene chronostratigraphy in the western United States and the adjacent eastern Pacific borderland, particularly as it applies to studies of palaeoclimate.

"Catalogue of Widespread Tephra Layers in the World (CATALOG)"

This group aims to compile a catalogue of widespread Quaternary tephra layers over the world. Such a catalogue will include data on marker-tephra layers such as source vent, type of explosive volcanism, age, distribution, petrographic nature of constituent material, and hence should be useful in the world-wide and regional correlation of Quaternary sequences. Notes on the rationale are given in COT Newsletter No.2. Hiroshi Machida, chair of this group, and colleagues are working on collecting information on the most widespread tephtras of more than 10 km³ in volume, and compiling into a database. Part of the results will be presented at the Berlin INQUA Congress.

"Dating Methods for Tephtras (DATES)"

Robert Waiter, chair of this working group, and colleagues made a short report that there are many exciting developments in the tephrochronometry. Part of the results

was presented in the Yellowstone proceedings in *Quaternary International* and at the New Zealand Inter-INQUA (Hamilton) meeting in February 1994. Applications of single crystal geochronological techniques in particular are planned as a part of Excursion A 19 (Quaternary Volcanism) prior to Berlin INQUA Congress, 1995.

"Climatic Impacts of Tephra Eruptions (CITE)"

Jim Begét, chair of this group, and his colleagues are working on high latitude northern hemispheric volcanism in Alaska, Kamchatka, Iceland and Japan. Eruptions at these volcanoes are likely to be strongly represented in the Greenland Ice Cores because of the efficient transport of aerosols and fine-grained ash by the atmospheric circum-polar vortex. CITE is also a central part of a proposal to involve COT with the PAGES project of IGBP, as summarized below.

2) COT involvement in PAGES/IGBP

Nat Rutter, chairman of INQUA Global Change Committee, recommended that COT carry out the PAGES/IGBP project on Explosive Volcanism because it could be one of the forcing factors in climatic change. It is clear that COT could make an important contribution to this project. Consequently, Hiroshi Machida submitted proposals for funding from the PAGES steering committee to support for the scientific meetings, and compilation and publication of current world-wide data on the recent explosive volcanism. It is suggested that the COT officers and working group conveners act as coordinators to organize the meetings and work as editors for the publications. The first meeting was held in December 1993 in Tokyo as described below.

Meetings and symposia held or sponsored by the Commission during the current inter-Congress period

1) Field Workshop at Mount Tateyama, Central Japan, Sept.8-10 1992 (Toyama, Japan). This workshop followed the 29th International Geological Congress and was organized by Hiroshi Machida, Koji Okumura and Shoji Fujii and partly supported by Toyama Prefecture Government.

This workshop focused on the application of tephrochronology to the Late Pleistocene glaciations and associated problems around the northern Japanese Alps. Many distal and proximal tephras were demonstrated to be of the first importance for stratigraphical correlations and dating of various formations including fluvial, glaciofluvial, lacustrine and glacial deposits. Late Quaternary movements of active faults were dated by the presence of tephra layers in the displaced terrains. A total of 27 members attended the workshop from South America,

Europe, China and Japan.

2) PAGES-COT meeting "Climatic impacts of Explosive Volcanism", 1- 4 December, 1993 (Tokyo, Japan).

This international meeting was supported by the IGBP-PAGES project and INQUA-COT in part, and convened by Hiroshi Machida and Jim Begét at Meiji University.

A total of 30 invited participants attended this meeting. Papers focusing on the central topic were given by ice-core scientists, dendroclimatologists, climatic modellers, tephrochronologists, 'proxy' climatologists, and volcanologists. The link between rather large eruptions and climate was well established. The best records for the high resolution required for this project are to be found in the ice core and tree ring records. After the presentation of papers, the meeting broke into four working groups to discuss and document future directions of research. A report of the working groups is currently in the press with PAGES. The meeting was completed by a two-day excursion to Asama and Haruna volcanoes to have a look at deposits from recent eruptions and associated hazards and archaeological sites.

3) International Inter-INQUA Field Conference and Workshop on "Tephrochronology Loess, and Paleopedology", 7-12 February, 1994 (Hamilton, New Zealand).

This international conference was organized under the auspices of INQUA and involved Commissions 4 (Loess), 5 (Tephrochronology), and 6 (Paleopedology). It was supported in part by the Royal Society of New Zealand and the University of Waikato, and convened by David Lowe at the University of Waikato.

A total of 62 registrants attended the conference, 35 from countries other than New Zealand and 27 from New Zealand. The aim of the organizing committee was to devise a meeting suitable both for specialist and integrated studies, and for the meeting to run with only a single session at any one time so that all registrants could participate in every session. A total of 47 papers was given in 13 sessions. The majority of papers fell into one of the three fields, but many covered at least two of the disciplines, some all three. Many delegates commented that they had appreciated being exposed to other fields and that the integrated nature of the meeting was a great success.

Two special symposia were held: the "New Zealand Society of Soil Science Symposium on Paleopedology in New Zealand", and the "C.G.Vucetich Symposium on Tephrostratigraphy and Tephrochronology in New Zealand."

About 26 conference delegates attended a 1.5 hr business

meeting to discuss past and future activities of COT.

As field studies formed an integral component of the conference, all registrants participated in two days of Intra-Conference Tours (one to the Raglan-Mt Karioi region, the other to the Rotorua region), and 35 took part in the 5 day Post Conference Tour through the North Island from Hamilton to Wellington. Guides for both Intra- and Post-Conference tours were compiled into one A-4 size volume.

Recent publications, including newsletters

- 1) The proceedings of the Yellowstone Meeting were published as Volume 10 of *Quaternary International* in 1992.
- 2) Three Commission Newsletters, Nos. 1, 2 & 3 were published in 1991, 1992 and 1994. No.4 may be published before the forthcoming INQUA Congress.
- 3) The proceedings of the Hamilton Meeting are currently being reviewed and edited for publication in *Quaternary International* in a volume entitled "Tephra, Loess, and Paleosols - An Integration." It is expected that about 30 papers will be published around mid 1995.

Proposed future work

- 1) A COT symposium, convened by H. Machida and J. Begét, is planned at the INQUA Congress in Berlin in August 1995: "The importance of tephrochronology for reconstructing climatic history and environmental changes in the Quaternary".
- 2) A pre-INQUA congress excursion A19 (Quaternary Volcanism), convened by H.-U. Schmincke, is the principal field trip recommended by COT.
- 3) Publication of proceedings of the above meetings and annual newsletters.

H. MACHIDA
President

PALEOPEDOLOGY COMMISSION

Introduction

The Paleopedology Commission was formed in 1965 at the Paris Congress. In 1968 it was affiliated to the Soil Genesis, Classification and Cartography Commission of the International Society of Soil Science, of which it remains a Working Group, and in 1990 it was affiliated to the Stratigraphy Subcommittee of the International Union of Geological Sciences. These additional links reflect the increasingly multidisciplinary activity of the Commission's work in relation to the genesis and Quaternary history of non-buried soils and the recognition and interpretation of

pre-Quaternary paleosols.

The Commission now has over 300 corresponding members. Some attend our meetings at ISSS Congresses or IGCs rather than the INQUA Congress, but our activities are still principally concerned with the paleoclimatic and stratigraphic interpretation of buried Quaternary soils.

Inter-Congress Meetings

Four Business Meetings have been held since the 1991 Congress:

- August 1992, Kyoto, Japan, at 29th International Geological Congress. Attended by 10 Commission Members and 18 others.
- August 1993, Champaign, Illinois, at Commission's Inter-Congress Symposium. Attended by 60 Commission Members.
- February 1994, Hamilton, New Zealand, at joint Paleopedology, Loess and Tephrochronology Commissions Inter-Congress Meeting. Attended by 11 Commission Members and 4 others.
- July 1994, Acapulco, Mexico, at XV World Soils Congress. Attended by 10 Commission Members.

At the 29th International Geological Congress, President J.A. Catt contributed a paper 'Evidence from paleosols for global climatic change during the last interglacial/glacial cycle' to Symposium C11 on 'The Activities of INQUA in Global Change'. Other papers on paleosols were given by commission members in symposia on 'Chemical Evolution of the Atmosphere, Oceans and Sedimentary Rocks', 'Interactions of Climatic, Glacial and Sea-Level Changes during the Last Climatic Cycle' and 'World Deserts in the Quaternary'.

The Inter-Congress Symposium at Champaign, Illinois, August 8-12, 1993 was organised by L.R. Follmer (Secretary of Commission) and D.L. Johnson (University of Illinois). It was attended by 60 Commission Members representing 12 countries, and considered fundamental problems of investigating and interpreting paleosols. The 40 papers read described buried soils of various Quaternary and pre-Quaternary periods, the effects of diagenesis after burial, distinguishing grades of soil development, the steady state concept in pedogenesis, laterite formation, magnetic properties of paleosols in loess, recognition of soil sediments, etc. On August 11 the participants divided into working groups to consider classification of paleosols, effects of diagenesis, definition of paleopedological terms, analytical methods in paleopedology, dating of paleosols, field description, stratigraphy and horizon nomenclature. Proceedings of the symposium are currently being edited for a volume of *Quaternary International*, which will also include reports of the Working Groups. The symposium was followed by a 7-day excursion in western Illinois, Missouri, Kansas and Nebraska to see Quaternary,

Cretaceous and Carboniferous paleosols, and a guidebook for this was published by the University of Illinois. The symposium was supported financially by a grant of \$2000 from the Soil Science Society of America.

A symposium on 'Windblown Sediments in the Quaternary Record' organised jointly by the INQUA Loess Commission and the UK Quaternary Research Association, was held at Royal Holloway, Egham, UK in January 1994. President J.A. Catt and other members of the Paleopedology Commission contributed papers, some of which were published in *Quaternary Proceedings* No. 4.

The 3-commission Inter-Congress meeting held at the University of Waikato, Hamilton, New Zealand in February 1994 was organised by Dr D.J. Lowe and attended by 67 participants from 13 countries. President J.A. Catt and other commission members contributed papers on paleosols, which will be published with other papers read at the meeting in a volume of *Quaternary International*.

At the XV World Soils Congress in Acapulco, July 1994, Commission members contributed 9 oral papers and 16 poster papers in a variety of the 45 symposia. These will be published in various soils journals. At the very long meeting of ISSS Council, spread over five days and lasting about 16 hours in total, J.A. Catt submitted a proposal that the Paleopedology Working Group should be upgraded to a Subcommission of ISSS. Although this was strongly supported and recommended for approval by the ISSS officers, the full council (including representatives from all countries present) voted against it by a narrow majority. However, the council also received a report from a Standing Committee on Statutes and Structures recommending radical changes to the ISSS Commission structure: this means that the position of all ISSS Commissions, Subcommissions and Working Groups (including Paleopedology) will be reviewed up to the next ISSS Congress at Montpellier in 1998.

Publications

Since the 1991 Congress, three volumes of *Paleopedology Newsletter* (Nos 8-10, totalling 100 pp.) have been distributed to corresponding members. The cost of the Newsletter is now partly covered by voluntary subscriptions from recipients, which have so far amounted to 40% of the postage charges.

Other publications planned or already in press are listed above, under the appropriate meetings.

Plans for 1995-99

After the Berlin Congress, at which the Commission will sponsor a symposium on 'Reconstruction and Climatic Implications of Quaternary Paleosols and Paleosol

Sequences', the Commission plans to hold an Inter-Congress meeting in Morocco, probably in spring, 1997.

The 30th IGC (Beijing, August 1996) has nine symposia for which papers on paleopedology could be offered, and the XVI World Congress of Soil Science (Montpellier, August 1998) will include a symposium on 'The importance of soil genesis for erosion-and other aero-environmental problems' organised by the Paleopedology Working Group.

J.A. CATT
President

COMMISSION ON NEOTECTONICS

1991

Neotectonics is a fast-growing discipline. Our goal is contributing to the course of events by sponsoring both live and, via the Bulletin, indirect contacts between our members and beyond. Since meetings are highly demanding in terms of money and time, we rely on the Bulletin as the backbone of the Commission. The editorial staff is, of course, largely up to the task. A lot has to be done, instead, on the side of contributors: all scientists involved in Neotectonics should realize that this magazine is their spokesman. A "Letters to the Editor" column could be added next year to host comments, ideas and criticism from the readers, that would improve both the magazine message and the Commission activity. As to the latter, we shall give now a look to the achievements of the last year, beginning with the XIII INQUA Congress, starting-line of the present intercongress period.

The two business meetings held at the XIII INQUA Congress in Beijing were reported in Bulletin. no. 14. Besides electing a new Board, the list of the Working Groups has been updated. In order to stimulate the activity of Working Groups, a Coordinator has been appointed for each of them. An important task for the Coordinators (even more, vital for the Commission) should that of preparing an Annual Report on the activity carried out within each theme, to be published in the Bulletin (which already bears the headings).

As to the INQUA Congress as a whole, it must be said that our Chinese colleagues were well up to the painstaking task of organizing both the Congress (featuring a peak activity of 12 contemporaneous sessions) and the field trips, covering the four corners of that huge Country. At least seven of them were of high neotectonic interest. (Brief reports from the NC members who participated would be most welcome on the Bulletin).

Andrei Nikonov, of Moscow, is presently collecting the manuscripts of the twelve papers presented at the Symposium V4 "Seismotectonics and paleoseismicity",

to be published on a special issue of *Quaternary International*.

MESETA PROJECT

After a prolonged effort, mainly backed by Cari Zazo, Madrid, the MEDITERRANEAN SEISMOTECTONIC Assessment Project proposal was submitted to the Commission of the European Communities, last January. Scientists from Spain, France, Sweden, Greece and Italy laid down an integrated and detailed research program that, if financed, will be the first broad-scope research project issued from our W.G.s I (Formalization of neotectonic maps) and IX (Multinational groups working on neotectonics).

SCIENTIFIC EVENTS CO-SPONSORED BY THE COMMISSION

A two-day meeting on Neotectonics organized by the Italian Quaternary Association (AIQUA) took place on 2 and 3 March in Rome: "La neotettonica in Italia a dieci anni dalla fine del Progetto Finalizzato Geodinamica". Although of obviously national scope, many contributions were of such high scientific interest, and deserved a much wider audience. For instance the knowledge of the kinematic relations between the Tyrrhenian Basin on the one side and of the Southern Apenninic Arc on the other has progressed greatly in the last few years (thus making the Neotectonic Map of Italy rather obsolete especially as far as horizontal mobility is concerned!). This area really became a focal point within the neotectonic domain. The Proceedings of this Meeting, although written in Italian, will feature extended abstracts and captions in English in order to reach appropriate readers outside Italy.

The "Former ENSO Phenomena in Western South America: Records of El Niño Events" Symposium took place in Lima, Peru, 4 - 7 March. N.-A. Mörner attended this meeting and reports it in Bull. no. 15.

1992

The main event of the year was the London Conference "Neotectonics: recent advances" held in June. Echoes from this meeting may be found in the Bulletin and within this report. Throughout the year, however, the media tirelessly forwarded information and ideas along the world-wide net set-up by researchers involved in neotectonics. An account of this activity can be found in the Bulletin of the Commission.

N.-A. Mörner represented the Commission at the International Geological Congress held in Kyoto, Japan. He set-up a display of the Commission's activities in the main Exhibition Hall.

Beside the events hitherto mentioned, a number of contacts (by fax, mail and seldom personal) were held as a relevant part of the Commission activity.

1993

This was a year of intense activity in neotectonics. It began with the EUG VII Biennial Meeting held in Strasbourg from April 4 to 8. As usual with wide ranging-scope conferences, rather than a forum of scientific debate the Meeting appeared to many observers to be, once more, an opportunity to talk science, although at a very expensive rate!. Two-thousand abstracts were spread into the over one-hundred symposia. "Our" Symposium, "Geomorphology and neotectonics in "stable" Europe: implications for energy resources and the environment" hosted 16 communications covering themes as far apart as fluvial geomorphology and crustal instability, passive margins and Holocene deformations in the Alps (as part of the "stable" Europe !), remote sensing applied to hydrogeology and fault scarp height-angle, just to mention a few.

Shortly after Strasbourg came the Northern Apennines Field trip. Thanks to the generous support given by Vittoria Zichella, Massimo Coli, Maurizio Magi, Mauro Coltorti and many other colleagues from the universities of Camerino and from C.N.R. in Rome, this was a successful meeting. We learned a great deal from our hosts.

At the end of this trip, a meeting of the Commission took place in Rome, attended by 16 people. Minutes of the meeting may be found in Bulletin no. 16.

There was further activity at the Ivth International Conference on Geomorphology in Hamilton, Ontario, Canada, 23 - 28 August. The Conference was preceded by field trips. Among these was "Mojave Desert to Death Valley", a field excursion of outstanding neotectonic interest.

A Conference on the Intermountain Basins, co-sponsored by our Commission, took place in Rome, 13 - 15 September. The 36 oral papers and 10 poster presentations were all in Italian. The Conference was followed by a field trip which merged with our own (see report by N.-A. Mörner in Bulletin no. 16).

On October 1 the MAGNEC (Multi-Agency Group for Neotectonics in Eastern Canada) Fall Meeting took place in Ottawa. MAGNEC Meeting Minutes are part of the MAGNEC 1987-1992 Report, which contains an updated overview on the neotectonics and seismotectonics of Northern America (obtainable from Ashley Reproductions, telephone +1-613-235-2115).

The Conference "Neotectonics of Poland: methods, dating, regional examples" was organized in Krakow by the Commission Secretary, Witold Zuchiewicz, 25 - 26 October. The next day, the participants, including scientists from Austria and Ukraine, went on an excursion to the Dunajec River Valley.

The Field Symposium on "Field Methods and Models to Quantify Rapid Coastal Changes", co-sponsored by IGU and the Neotectonics Commission, was held in Crete. The organization by Dieter Kelletat, pleasantly backed by Miss Koppenhagen and Miss Radmacher, was superb. After a full day spent to attend a high-quality paper session, we had the opportunity to become acquainted - in a fascinating natural as well as cultural environment - with the diachronous interfingering of erosive, sedimentary (including bioconstructional) and anthropic events, with sea level acting as the appropriate datum. The Symposium was attended by several members of the Commission. It was an encouragement to feed new ideas on research methods and targets into our Task Group III, Sea Level and Coastal Stability: an informal meeting of this Group was held. Undoubtedly such well-defined narrow-scoped meetings deserve a much higher cultural fallout than the broader ones, such as the EUG. The eighty pages hard-back, error free, exhaustive field-guide stands now on our bookshelves as both the best souvenir from the Symposium and a valuable reference book.

The world-wide decline in research funding was probably the main reason for the lower than expected attendance at the Neotectonic Transect which was being organized by our Secretary, Witold Zuchiewicz, and which therefore had to be cancelled. In the coming September, it was due to cross the Lublin Upland, the Sandomierz Basin and the Carpathians.

1994

As a pre-Congress year, this was mainly a time for preparation. In January the updated Commission memberlist (105 entries) was ready for publication (see Bulletin no. 17, pp.81-87). A full programme of activities was scheduled for the XIV Congress in Berlin.

Reports from the Working Groups

Task Group "Paleoseismicity: methods, criteria and dating"

Coordinator Andrei Nikonov

This Group mainly deals with the techniques of identification of past earthquakes and earthquake-generating features. It was decided to focus the WG activity on methods and criteria for identifying traces of past, strong earthquakes and dating them.

Close collaboration exists with Task Group II-3 "Paleoseismicity in Late Holocene" of the ILP (chairman Dr. R. Yeats). Publication of the V-4 Symposium (Beijing, 1991) Proceedings was one of the special tasks of the W.G. during this intercongress period.

Implementation of these demanding tasks was hampered by the extremely unfavourable situation for scientific research in Russia. The lack of financial support from INQUA has also to be mentioned. Despite this, the

following achievements should be noted. 1) The volume of the V-4 Symposium Proceedings has been completed as a Special Issue of "Quaternary International", due to be printed at the end of 1994. It contains ten original papers on active tectonics, seismotectonics and palaeoseismicity as well as a foreword by the convenors: scientists will be able to get acquainted with these topics just in time for Berlin 1995. 2) The first All-Russian Conference on Quaternary geology was held in June 1994 in Moscow. The Conference program included a special Session on "Seismotectonics and paleoseismicity" which was organized and convened by A.A. Nikonov, V.G. Trifonov and V. I. Makarov. Some 60 papers have been presented at the session and most of them have been discussed thoroughly. Abstracts of the papers were published as a special volume (in Russian). Selected papers will be also published. This session gave a real impulse to Russian research on seismotectonics. Two relevant contributions may be mentioned: the regional catalogue and map of seismodeformations for the Caucasus (A. Nikonov and colleagues) and the world catalogue of seismotectonic ruptures along with magnitudes of causative earthquakes (A.L. Strom).

3) A. Nikonov prepared and distributed among the members of the W.G. two papers respectively entitled: "On terminology and classification of seismogenic disturbances: state-of-the-art and some suggestions" and "Active faults: problems of identification and classification". The former will be presented to the Symposium on paleoseismology which is to be held at the next INQUA Congress in Berlin. The latter was published in 1994 in the "Active faults" magazine printed in China. They both appear to be basic documents for the discussion of the WG's tasks and for working out mutually agreed-upon concepts, classifications and standard terminologies. 4) A Russian bibliography on paleoseismology with over 150 entries was compiled by A. Nikonov and A.P. Sergeev. It is finalized to a better acquaintance, by foreign specialists, of Russian data bases and ideas in a field that is still poorly known in the West.

Because of the financial restraints, several members of the W.G. were not able to contact each other personally. It was especially regrettable that the W.G. Coordinator could not take part in either the London Conference on Neotectonics (1992) or the Apennine Field Trip (1993). Fortunately, he was able to attend the Symposium on Paleoseismology, Rome, 1992, the Symposium on mountain regions of Europe, Lvov, Ukraine, 1994 and the Workshop on paleoseismology, California, 1994. Exchange of papers, ideas and suggestions took place during each of these events and the way was laid for the next Symposium on paleoseismology to be held in Berlin.

Educational Group "Isostatic Processes"

Coordinator E.N. Bylinski

Due to the very unfavourable situation in Russia

throughout the period 1991-95, it was impossible to organize a meeting of the Group. Despite this, the three members were very active.

Prof. D.R. Grant published an interesting article on the neotectonics of northern Cape Breton Island, Nova Scotia, where he states that some neotectonic events may be caused by glacio-isostasy (see Bull. INQUA Neot. Comm., no. 16, 1993).

Prof. N.-A. Mörner critically reviewed the book on "Glacial isostasy, sea level and Mantle rheology" edited by R. Sabadini, K. Lambeck and E. Boschi (Bull. INQUA Neotectonic Commission, no. 15, 1992). According to E.N. Bylinski, the main deficiencies of this volume are: 1) the lack of papers by field geologists on observational data in the section "Post glacial rebound" containing 7 contributions by modellers, and 2) some unrealistic data on global sea-level rise. The same points were raised, among others, by N.-A. Mörner in his review.

In another paper (Bull. INQUA Neotectonic Commission, no. 16, 1993) Mörner suggests that some deformation structures recorded in formerly glaciated areas result from "methane dehydration tectonics" and not from seismic related tectonics. The cause of it may be the decrease of hydrostatic pressure during rapid glacio-isostatic uplift and sudden degassing of methane hydrate, previously accumulated underneath ice sheets.

A very intriguing paper was published by Mörner on Tectonophysics, vol. 188 (3/4): "Intense earthquakes and seismotectonics as a function of glacial isostasy".

A synthesis of Bylinski's Ph.D. thesis will be published in the next issue of the Neotectonics Commission Bulletin under the title "Glacio-isostatic influence on Earth relief and structure development in the Pleistocene". Three major types of glacio-isostatic influence on the relief are discussed: 1) global and regional residual deformations, 2) compensational lithosphere movements and 3) swell-like lithospheric uplifts (forebulges) round the periphery of former ice sheets.

Task Group "Sea Level and Coastal Stability"
Coordinator P.A. Pirazzoli

Abbreviated Report by L. Carobene. P.A. Pirazzoli and N. Yonekura

This Task Group is concerned with both sea-level changes (regional and global) and vertical movements affecting coastal areas. At recent intercongress meetings of the Commission (London, 1992; Crete, 1994) it has been observed that the former title of this TG ("Sea level and coastal stability") is inappropriate, since no vertically-stable coastal site exists which could be used as a datum for comparisons (Pirazzoli, 1993). This is due to the well-known fact that sea-level variations correspond to a complex of local, regional and global processes that interact at various temporal, areal and vertical scales. The processes involved include large scale geotectonic effects,

which prevail over the long term (several Ma), climatic and isostatic effects, controlling the medium term (1-100 ka), whereas over the short term (1-100 yr) a loud background noise (due to meteorological, hydrological, geodynamic, neo-and volcano-tectonic and anthropic factors) usually prevents accurate estimates.

Since the last INQUA Congress in Beijing, members of this TG have had opportunities to investigate relative sea-level changes in several areas. These include:

The Island of Sumba (Indonesia), the Eastern Mediterranean, Italian peninsula the coastal sectors fringing the Apennine, the east coast of Taiwan, the Mariana Islands, the Ryukyu arc, Japan, the Huon Peninsula, Papua New Guinea, and near Ushuaia, Tierra del Fuego, Argentina.

C. BARTOLINI
President

HOLOCENE COMMISSION

Structure

The commission contains both regional sub-Commissions and working Groups, as well as the following Regional Subcommissions:

Africa
Eurosiberia
Mediterranean
Australia, New Zealand
- Far East
- South America
- North America and Greenland

In addition, there are three Working Groups:

Data handling methods
Man at the forest limit
- Fine resolution and laminated sediments

Activities 1991 - 1995

The Commission used two means of communication: newsletters and symposia.

Newsletters

The newsletter of the main Commission did not appear for some time. There were two reasons for this: first, the regular appearance of *Quaternary Perspectives* and, second, editor John Bintliff had a major research project to accomplish within a very limited time. Nevertheless, a newsletter (no. 4) was sent out in December 1994.

The new team leading the Mediterranean Subcommission,

Erhard Schulz and Neil Roberts, continued to produce very useful circulars. These consistently presented both news and up-dated bibliographical items. It is important that these efforts be continued, and that scientists of all nationalities from around the Mediterranean Sea are included.

An excellent newsletter is produced by Louis Maher for the Working Group on Data Handling Methods. This is always up to date with statistical and computer methods and it is used by a broad spectrum of scientists, some of whom heard about INQUA for the first time through this newsletter.

For the Eurosiberian Subcommittee, Professor Wolfgang Schirmer launched a circular letter informing members of activities such as excursions.

Symposia

The main theme at the Inter-INQUA Congress in Canberra (April 1993) was 'Quaternary Record, Human Impacts and Global Change in the Australian Region, with the following three sub-themes as reported by John Dodson:

1. Marine and Terrestrial records: do they agree? (*Quaternary Science Reviews* 13(3))
2. Environments of Human Settlement
3. Climatic Processes and Landscape Response

A great deal of Holocene material was presented and discussed, including ENSO, sea level, human impact on Pacific Islands, and global comparisons in the region. There is a good possibility that the proposed PEP II (Pole-Equator-Pole) transect from Antarctica, Australia, the Oceanic Continent (Indonesia, New Guinea et al.) and eastern Asia will eventuate.

Towards the end of the last Inter-Congress, the Working Group on Laminated Sediments held a workshop at Lammi in Finland. This was organized by Matti Saarnisto and Jaakko Putkonen. During this inter-Congress period, a meeting of this Working Group in Canberra was organized together with the Mediterranean Subcommittee and the Palaeolimnology Conference (see *Journal of Paleolimnology* 11 (3), edited by A.F. Lotter and M. Sturm)

For the Working Group on Man at the Forest Limit, Dr. Sheila Hicks and Dr. Dagfinn Moe organized, together with Professor Elissaveta Bozilova, an international symposium with lectures and excursions in Borovetz, Bulgaria, in July 1993, on the theme: History of Mountain flora and vegetation. In September 1994, Professor Guy Jalut offered an excursion through the French Pyrenees on the same subject.

The Eurosiberian Subcommittee organized a symposium on the subject 'Glacier and debris flow activity in alpine regions', August 28 - September 10,

1994 (main organizer: Professor W Schirmer).

The Mediterranean Subcommittee (Drs. E. Schuiz and N. Roberts) organized the following four workshops and conferences on quantification of human impact in semiarid and arid regions held in:

- Würzburg, Germany in December 1993, on Fire and Vegetation;
- Chott Mariem/Sousse, Tunisia, March 23-27, 1994, on The Northern Margin of the Sahara and the consequences of economical and ecological changes in these environments;
- Quinta da Figueirinha Silves, Portugal, May 23-29, 1994 on the Indicators of Human Impact on Vegetation and Soil;
- Zarzis, Tunisia, October 23-30, 1994 on *Laminated Sediments and their Indicator Value for Environmental Changes*.

In addition, this subcommittee cooperates with PEP III (coordinated by Françoise Gasse)

B. AMMANN
Secretary

COMMISSION ON THE PALAEOECOLOGY OF EARLY MAN

The policy decision taken at the XIII Congress in Berlin, that no activity was planned for the Commission as a whole, was followed during this inter-Congress period. At the same time, it was agreed that Working Groups would be free to continue, and that they would be reviewed at the XIV Congress in 1995, after which a decision on their continuation either within the existing Commission or under a newly-formed Commission would be taken.

The Working Group on 'Archaeology of the Pleistocene/Holocene Transition' has been very active under the Presidency of Professor L.G. Straus and Secretary Dr.B.V. Eriksen. (see below).

There has also been some activity within the Working Group on 'European Pleistocene stages 4, 3 and 2: Men, their culture and ecology' under the Presidency of Professor F. Gullentops and Secretary Dr.J.Renault-Miskovsky.

Both of these Working Groups were authorised to continue at the INQUA Congress in Beijing

There has also been new activity in a group not yet officially accepted as new Sub-Commission (on 'The Geology of the Palaeolithic' led by Professor

S.A.Laukhin with Dr.C.S.Gamble as Secretary). (see below).

H. MÜLLER-BECK
President

WORKING GROUP ON THE ARCHAEOLOGY OF THE PLEISTOCENE-HOLOCENE TRANSITION

This Working Group was formed by Professor H. Müller-Beck, President of the Commission for the Paleoecology of Early Man, shortly after the INQUA Congress in Beijing 1991. Professor L.G. Straus, University of New Mexico, was appointed chairman and Dr. B.V. Eriksen, University of Aarhus, was appointed secretary.

Straus and Eriksen form the executive board of the Working Group. The steering committee also includes Professor O. Bar-Yosef, Harvard University, Dr. L.A. Borrero, Universidad de Buenos Aires, Professor G.W. Frison, University of Wyoming, Professor T. Akazawa, Tokyo University Museum, Professor J. Parkington, University of Cape Town, Dr. P. Dolukhanov, University of Newcastle upon Tyne, Dr. J. Erlandson, University of Oregon, and Professor D. Yeaner, University of Alaska.

The steering committee first met at the 58th annual meeting of the Society for American Archaeology in St. Louis, April 1993. The steering committee unanimously decided that work should focus on the period of approximately 13,000 - 8,000 BP (Bölling through Boreal in Northern Europe). Focus should be on regions with good chronological and palaeo-environmental data, rich archaeological records and subsistence information. There was also general regarding the goals of the working group as outlined by Straus in the Dinant statement (See Appendix A).

The steering committee also decided to propose a day-long symposium to be held at the 1994 SAA meeting in Anaheim. The symposium should consist of two consecutive sessions to be held morning and afternoon of the same day. The following subdivision met with approval:

- 1) Europe, Western Asia and Africa - organized by Straus and Eriksen.
- 2) Eastern Asia and the Americas - organized by Erlandson, Frison and Yesner.

Participants in both sessions were invited to address the state of our knowledge of human responses to the environmental fluctuations of the period between 13,000 - 8,000 BP in regions of the world with particularly rich records. Papers should thus serve to define topics and areas in which further specific research is most needed, thereby setting a stage for more detailed presentations and discussions in Berlin. The aim was to avoid unnecessary detail (such as typological discussions) and concentrate on broad patterns, taking a comparative inter-regional

approach where relevant, to highlight and point to possible reasons for the diversity of human reactions to specific environmental/ resource changes, with the focus being on subsistence strategies in the broad sense,

The sessions were held at 59th Annual Meeting of the Society for American Archaeology, Friday, April 22, 1994 in Anaheim, California. Both sessions were well attended and with a few exceptions all participants were able to present the papers themselves. The Anaheim proceedings are currently being published with Plenum Press. The volumes are co-edited by Straus, Eriksen, Erlandson and Yesner. The publication will hopefully be available by fall 1995, i.e. at or shortly after the Berlin Congress.

A two-day-long symposium on the 'Archaeology of the Pleistocene-Holocene Transition' is scheduled for the Berlin Congress. The aim of the Anaheim symposia and the first publication was to review, summarize and synthesize our present knowledge of human responses to specific environmental changes throughout the late Pleistocene - early Holocene in different regions of the world. Contributors to the Berlin meeting have been asked to focus on the humans in their environments, i.e., scientific and archaeological facts' and more immediate interpretations with respect to subsistence economy and settlement patterns. Presentations should be illustrated by many absolute dates, detailed maps and exhaustive references in order to facilitate the eventual compilation of an atlas-like publication.

Up to now the activities of the Working Group have concentrated on the organization of the Anaheim and Berlin symposia and the publication of the Anaheim proceedings. The database project mentioned in the Dinant statement has been postponed for the time being due to lack of financial support.

The agenda of the meeting in Berlin should stress a serious re-evaluation of the goals and prospects of the working group on the "Archaeology of the Pleistocene-Holocene transition". During the past three years funding has indeed turned out to be a major problem. This problem must be solved if the working group is to continue its work successfully on a global scale.

B.V. ERIKSEN

Appendix A: PROPOSED WORK OF THE INQUA WORKING GROUP ON "THE ARCHAEOLOGY OF THE PLEISTOCENE-HOLOCENE TRANSITION"

During their existence as a family, the hominids have adapted to some 20-25 transitions between full glacial and interglacial conditions. Only once, though, in the period between 13,000 and 18,000 BP, were there anatomically

modern humans living - often in relatively high population densities as sophisticated hunterfisher-gatherers - in most regions of the world (including the Americas) at the time of such an environmental change. And only after the last glacial-interglacial transition did humans in most regions of the world adopt food production as their principal means of subsistence. Thus, an understanding of the nature of the changes in the physical environment and in the resource bases across the Pleistocene-Holocene boundary is critical to the comprehension of the differing regional processes of human adaptations that, seen in retrospect, led either to the so-called Neolithic and Urban Revolutions or to the development of systems of late Quaternary hunting and gathering that survived into the ethnographic present. Given the diverse regional changes in climate, land forms, vegetation and fauna, there arose a wide variety of specific regional adaptive responses, reflected in technologies, settlement patterns, subsistence practices, social organizations and ideologies. Underlying this diversity of specific environmental and adaptive changes was the fundamental fact of a global change in conditions that was relatively rapid and extreme. The Pleistocene-Holocene transition must be studied both as an event in the geological time-scale of the Quaternary and as a complex ensemble of regional *processes* of environmental and human adaptive change. The time limits for this transition are defined as 13,000-8,000 BP: from the beginning of Bölling until the beginning of Atlantic, as defined in Northwest Europe.

The success of CLIMAP in detailing the global variety of environmental conditions during the Last Glacial Maximum (20,000-16,000 BP) has been matched by a fruitful first discussion of world-wide human responses to the Upper Pleniglacial based on a growing, albeit still spotty, archaeological record for the middle Upper Palaeolithic/ mid-Later Stone Age (Soffer & Gamble 1991; Gamble and Soffer 1991). The idea to approach a specific, fairly restricted time-slice by means of the compilation and interpretation of a corpus of relevant environmental and cultural data has proven to be a productive one. Because of its relatively recent age, the Pleistocene-Holocene transition is already quite well studied, and a great Plumber and variety of both palaeoenvironmental and archaeological data have been gathered, albeit unequally across the globe. Baseline information on the climatic changes of this transition has recently been synthesized by COMAP, making it timely to proceed with compilation and analysis of archaeological data on the Pleistocene-Holocene transition at a world-wide scale. In fact, this task has already begun under the direction of L.G. STRAUS resulting in the first publication, *The End of the Paleolithic in the Old World* (British Archaeological Reports, 1986), with articles on this transition in Europe, Southwest Asia, North and South Africa.

The proposed working group will be formed of a core group (a steering committee consisting of the Chairman, Secretary and 4-5 members chosen for their active research in and

broad knowledge of the archaeology of the transition in various continents) and a larger group of some 30 members, all specialists in terminal Pleistocene/ initial Holocene prehistory (Epipalaeolithic/ Mesolithic, Later Stone Age, Palaeoindian/ Archaic, etc.) and/ or Palaeoenvironments. In addition, the working group will gather specific information from a wide network of correspondents. The steering committee will communicate by RITNET, FAX, mail and telephone as needed, and it is envisaged that it will meet once a year, either in Europe or in the USA. Its first task will be to define the specific goals and methods of the working group and to prepare a preliminary meeting, possibly in the context of the Annual Meeting of the Society for American Archaeology or the Paleoanthropology Society, in either Spring 1993 or 1994. The full group will also meet at the Quadrennial Congress of INQUA in Berlin in 1995. Specific data will be collected among the members and correspondents concerning radiometric chronology, palaeoenvironments and resources, technologies, site numbers and locations, etc.

The fundamental data to be compiled and questions to be asked and at least partially answered by the Working Group are the following (subject to modification and amplification by the steering committee):

1. What were the detailed changes in the 'shape' of the world available for human occupation and exploitation across the environmental fluctuations of the Pleistocene-Holocene transition (e.g., extent of glaciers, location of coastlines and estuaries, extent and character of forests, deserts, grasslands, tundras, etc.)?
2. What was the timing and nature of the environmental changes between 13,000-8,000 BP insofar as they affected resource composition, diversity, distribution, structure and density? Resources include foods (animal and vegetal, terrestrial and aquatic) and manufacturing raw materials (lithic and other minerals, vegetal and other organics).
3. What was the timing and nature of specific human reactions to these changes in environments and resources? Among the areas to be explored in systematic, standardized fashion will be population distribution, density, mobility and disposition (e.g., group size, aggregation/ dispersal, seasonality of movements/ sedentism), changes in technologies, subsistence strategies and tactics, social organization, ideology and artistic activity, etc.
4. How did the adaptive changes across the transition differ (or resemble one another) among natural subcontinental regions? Were the changes abrupt or gradual, punctuated or continuous? When did the most significant adaptive shifts occur in each region: at 13,000-12,000 BP, at 11,000-10,000 BP, at 9,000-8,000 BP? What were the apparent rates of change and why were they fast in some regions and slow (or practically nil) in others? This

should include evaluation of different possible explanations for the specific changes observed in each subcontinental region, including the relative importance of "environmental", demographic and other 'causes'.

Proposed results of the Working Group, besides symposia and meetings, will include the development and distribution of the databases on human settlement, site locations and contents, radiometric chronology, palaeoenvironmental and resource information, etc., in the forms of diskette, date lists with evaluations, and a commented atlas of information amenable to cartographic treatment (e.g., geographical distribution of human settlements at various scales through time by 'slices' of ca. 250-500 years). In addition, one or more interpretive volumes will be published, in which regional specialists will address specific, standardized questions regarding the nature of the record, the timing, character and possible explanations of the observed changes.

The working group will begin its investigations by comparing the records of some of the world's best-studied regions insofar as the adaptive changes of the Pleistocene-Holocene transition are concerned (e.g., west Europe, Southwest Asia, Japan, North and South Africa, Northeast America, American High Plains and Southwest, Andean South America).

Initial expenses of the Working Group will include a half-time salary for the Secretary (Dr. Eriksen), travel costs for steering group members, telephone, xerox, FAX and computer costs for the Chairman and Secretary. Later there will be expenses to assist members for participation in the Berlin Congress and to produce the computer data bases (GIS, etc.) and the proposed publications, possibly under the auspices of the Institut für Urgeschichte of the Universität Tübingen, the Department of Anthropology of the University of New Mexico, and the Institute of Prehistoric Archaeology of the University of Aarhus.

L. G. STRAUS

PROPOSED SUB-COMMISSION ON THE GEOLOGY OF THE PALAEOOLITHIC

At present, this group's President is S. A. Laukhin (Russia), and the Secretary is C. Gamble (U.K.). The Sub-Commission includes two Working -Groups.

1. The European Pleistocene Stages 4,3,2.
This group will deliver its first results during the XIV Congress in Berlin.

The Geology of the Asian Palaeolithic
It has been proposed that this group be accorded sub-Commission status.

S. A. LAUKHIN
President

PALAEOCLIMATE COMMISSION

During this inter-Congress period, the Palaeoclimate Commission has continued to promote palaeoclimate research and to participate in the international effort to attain a better understanding of the response of the climate system to both natural and man-made forcings. This role is mainly underwritten by the members of the Palaeoclimate Commission who are members of other international bodies involved in climate research and who are involved in organising workshops and symposia on specific topics.

1. Links with other international commissions

There are quite a large number of commissions now dealing with climate and climate change. It is encouraging to see that, more and more, palaeoclimatologists are invited to participate in international efforts to improve our understanding of the behaviour of the climate system.

Some Palaeoclimate Commission members are members of the PAGES (Past Global Changes Programme) Core Project of the International Geosphere-Biosphere Programme. They are playing a very active role in organising and participating in the programmes on Pole-Equator-Pole transects across the continents, on ice coring and on international marine global change studies.

Some members are directly involved in the World Climate Research Programme and, in particular, in CLIVAR (Climate Variability Programme) and in its European component, Euro-Clivar.

Links exist with the Intergovernmental Panel on Climate Change, the United Nations Environment Programme, the Organisation de Cooperation et Développement Economiques, and with the International Union of Geodesy and Geophysics.

It is important to note that there will be a chapter on past climate change in the second assessment of IPCC (1995-96), and the President of Palaeoclimate Commission was also the President of the International Climate Commission of IUGG until 1993. The Commission President is also a member of the Evaluation Committee of the International Geosphere-Biosphere Programme and, within this framework, Chairman of the PAGES Evaluation Team.

2. Organisation and sponsoring of workshop-symposia

2.1 *Former ENSO Phenomena in Western South America.* Records of El Niño events, Lima, 10-13 July 1991.

Chairman: J. Macharé

2.2. *International Conference on Desert Landscapes*, Perth, 7-10 October 1991.

Chairman: J. Firman

IGCP Project 252 - Arid zone landforms of Western Australia, 11-19 October 1991.

Convenor: N. Petit-Maire

2.3. *Past and Future Evolution of Deserts*. International Symposium held in Ahmedabad, India, 11-19 February 1992.

Chairman: AK Singhvi

2.4. *IUGS-UNESCO Cooperative Programme "Earth Processes in Global Change"*. Pilot Project. Climates of the Past (CLIP).

Coordinator: N. Petit-Maire

Geological records of climate change over the last 350 ka - the continental margins of the tropical and sub tropical oceans, Durban, 4-9 January 1993.

Field Trip Natal and Zululand, 10-15 January 1993

CLIP Barbados, 24-30 November 1993

3. Preparation for the INQUA Congress 1995

The Commission is involved in the following symposia:

3.1. Tracing the future development of climate on the basis of paleoclimatology

Symposium no. 1, 3-4 Aug. 1995

3.2. Milankovitch and Quaternary Climate History

Symposium no. 5, 5 Aug. (a.m.) 1995

3.3. Palaeoclimate of the Southern Hemisphere during the last 140,000 years

Symposium no. 6, 7-8 Aug. 1995

3.4. Climate of the Middle Pleistocene: land and ocean records

Symposium no. 7, 5 Aug. (a.m.) 1995

3.5. Pleistocene loess and Palaeoclimate

Symposium no. 54, 8 Aug. (p.m.) 1995

3.6. Simulation of Past and Future Hydrological Evolution of NW-Europe

Symposium no. 23, 5 Aug. (a.m.) 1995

4. Why paleoclimate research? A viewpoint from the President of the INQUA Palaeoclimate Commission, 1987-1995.

The quantitative study of past climates allows the entire range of natural climatic variability to be reconstructed. Studies of the past have demonstrated abrupt changes occurring within the the span of a human lifetime, and with a severity much more severe than any known to occur during the instrumental period of measurement. These data must be used in testing the reliability of models that aim to simulate situations different from those of present-day

climate.

Because instrumental data describe only the detailed behaviour of the current state of the climate, and because significant changes are expected to occur within the coming centuries, it is essential that our data base be enlarged to include information about different climatic regimes. These have to include those climatic states that occurred during the extreme conditions of the recent geological past. It has been well established that the peak glacial and interglacial states were accompanied by abrupt climatic changes. Palaeoclimatology has clearly demonstrated its ability to reconstruct the gross features of such past climatic situations and has elucidated the approximate range of the natural variability of the climate system at timescales from years (e.g. ice core) to hundreds of millenia in a broad worldwide geographical setting. It is now the objective of the palaeoclimate research community to provide more complete spatial and temporal information on past climate states, required by the modeling community, and to address key questions raised by the IPCC exercise.

A. BERGER

President

COMMISSION ON APPLIED QUATERNARY RESEARCH

On the occasion of the Beijing Congress, the Board of the Commission on Applied Quaternary Research was re-organised, as was the membership. A great many people expressed interest in membership of the Commission, but many of them proved to be inactive such that the membership was limited to 40 person. Very few more than 40 eventually proved to be active.

This situation proved symptomatic of the whole programme of the Commission. We were unable to cajole our members into preparing manuals for distribution at the Berlin Congress. Equally, there proved to be little active interest in two planned symposia: one in northern Italy in 1994, and the other in Greece in the spring of 1995. In all this, tribute must be paid to the great organisational efforts made by Mario Panizza and Ilias Mariolakos, efforts that were sadly disappointed.

Despite these events, all was not negative within the Commission. There was useful co-operation between the Commission and the International Association of Engineering Geology's Commission on Maps of Engineering Geology, at a joint meeting in Bratislava, Slovakia, , and with the UNESCO Working Group on Geology and Land Use Planning with Co-Geoenvironment and the University of Santander, Spain. One product of the latter meeting was Lecture Notes on Earth Science volume 42 (Cendrero, edited by Lüttig and Wolff, 1992).

Another success was the Second International Aggregates Symposium at Erlangen, the result of which may be found

in Lüttig, G.W. (1994 "Aggregates: raw materials' giant". We were fortunate in this case to have received a level of financial and technical support from industry that was well beyond the capacity of INQUA. Perhaps this underlines a particular problem, namely that of any academic body aiming to restrict itself to researching applied questions. As things stand at present, there appear to be greater opportunities for Quaternarists to undertake work of this kind within IAEG, IAH or other strictly geological bodies. It is in this frame of mind that I retire as President, and concur with the Executive Board's proposal to dissolve this Commission, as first recored publicly in *The Quaternary Perspective* for 1995.

G.W. LÜTTIG President

INTER-CONGRESS COMMITTEE ON GLOBAL CHANGE

Background

The establishment of a Global Change Committee (GCC) was recommended by the 1987-1991 INQUA Executive Committee in order to establish links and participate in the IGBP: A Study of Global Change -- specifically in the PAGES (Past Global Changes) core project. At the INQUA Congress in Beijing, the International Council approved the establishment of the Committee with the past President of INQUA acting as Chairman. It was to be a sub-committee of the Executive Committee consisting of a Chairman and three co-opted members, one of whom must be a member of the Executive Committee. The President of INQUA served as an ex officio member. (See Appendix A - Terms of Reference). The terms of reference were essentially to establish INQUA Global Change Projects within INQUA commissions, to foster co-operation between Commissions, to establish projects independently of Commissions, to develop joint projects with PAGES, and to co-operate with other global change groups and, in general, to promote the global change initiative. A budget was approved of 5000 Swiss Francs per year, in order to hold meetings at least once a year, and to aid in developing projects when the budget allowed. From time to time additional funding was approved for various projects. The statement of finances and Global Change Committee meetings are available in Executive Board papers.

Activities 1991 - 1995

It was established early on by the sub-committee, that with the personnel and the limited funding available that it was better to support a few important projects well, rather than trying to be "all things to all people". Our first priority was to establish joint projects with PAGES. After protracted discussions with PAGES, two joint projects were

established:

1. Climatic Impact of Explosive Eruptions, co-ordinated by H. Machida. Essentially, this was a project of the Commission on Tephrochronology; and
2. INQUA-PAGES Paleomonsoon Project, co-ordinated by S. Kröpelin. This was established and organized as a separate project outside the realm of the Commissions.

These two projects were therefore considered to be joint INQUA-PAGES Projects. The Committee felt that linking with PAGES in joint projects was an important accomplishment, demonstrating INQUA's interest and force in the global change community.

The projects functioned well as demonstrated by workshops, scientific papers and work implementation plans published by PAGES. It is recommended that the Paleomonsoon project remain as an independent project, whereas The Climate Impact of Explosive Eruptions should remain as a project of the Tephrochronology Commission, and both should continue to be supported.

Three other projects were initiated by the Committee. These were entirely INQUA initiatives and independent of PAGES. They were developed, keeping in mind what best INQUA could effectively carry out, and what activities could best aid the objectives of PAGES. They were:

1. Paleoclimates of the Southern Hemisphere, co-ordinated by T. Partridge. This project is recognized by PAGES as an important project which should contribute significantly to the PAGES-PANASH (PEP) Project. This is an independent INQUA project.

Considerable progress has been made in planing and establishment of mapping protocols. In both South Africa and Australia Quaternary scientists are entering data into central databases, focussing on specific time slices spanning the period from isotope stage 7. The aims are to produce palaeo-environmental maps for the last glacial cycle. A major meeting in Australia in early 96 will update the CLIMANZ maps, the first attempt to produce a Quaternary palaeo-environmental compilation for the region from Papua-New Guinea to New Zealand. The rapid developments of digital data base compilation, with the need to standardize entry procedures, represents a substantial contribution already achieved.

To improve PASH we now need a detailed strategic plan covering the next inter-Congress period. We recommend the new executive contact the three co-ordinators (Partridge, Iriondo and Kershaw) to ensure that forward planning is clearly defined. PASH now needs to establish structural links with other palaeo-environmental mapping projects (Palaeogeographic Atlas, Terrestrial Carbon).

2. Paleogeographic Atlas Project (Northern and Southern Hemispheres), co-ordinated by M. Pécsi. Because of its global nature and paleoclimatic implications, PAGES recognizes this as an important project and supports and encourages its activities. This project is part of the Committee on the Palaeogeographic Atlas.

Following publication of the palaeo-environmental maps of the northern hemisphere, this former Commission was accorded the status of a Committee under the Global Change program at Beijing. The skills of this team should not be lost to INQUA. Their proposals to prepare comparative palaeo-maps of the last glacial events between the northern and southern hemispheres have obvious merit. The strategy for achieving these complex objectives has not been clearly defined. These objectives depend heavily on attempts to improve and co-ordinate data, especially in the southern hemisphere. Thus, there are obvious and close parallels with the objectives of PASH that seeks to establish time-slice maps for that region of the globe.

We recommend the next Executive Committee invite the leaders of the palaeogeographic mapping program (Palaeogeographic Atlas and PASH) to co-ordinate their objectives on schedules planned to deliver results to the next INQUA Congress.

3. Influence of the Terrestrial System on the Global Cycle during the Late Quaternary, co-ordinated by H. Faure. This was the first approved INQUA Global Change project made at the Executive Meeting of INQUA in Washington, D.C., in 1988. PAGES recognizes this as an important contribution to the entire carbon cycle problem and considers the project an input into PAGES and GCTE (Global Change and Terrestrial Ecosystems). At the present time this is an independent INQUA project.

Members of this project have identified objectives, held workshops and have published scientific results and have now presented documents to the International Council to change their status to a full INQUA Commission. The current proposal before the Executive must now be evaluated in terms of the proposals for new Commissions now being put to the International Council.

We draw the Executives' attention to the basic methodology involved in achieving the objectives outlined, namely the production of palaeo-maps focussing on time-slices of the last glaciation cycle. Again we note the common interest of three Global Change projects in this same mapping strategy (Terrestrial Carbon, Palaeogeographic Atlas and PASH). We suggest the Executive might formulate a recommendation that these mapping projects co-ordinate their activities on schedules to be submitted to the new Executive to ensure delivery of new datasets for the next INQUA Congress.

The five projects the Committee initiated were thought to be enough of an undertaking for the inter-Congress period. The Committee has monitored and aided the projects the best it could. It must be emphasized that this is the first attempt by INQUA to develop specific, high profile, in-depth projects under scrutiny by the international community. The Committee feels that the co-ordinators and members of the projects should be formally congratulated on the progress made so far. In the future it is recommended that projects be reviewed and evaluated by the Executive Committee for consideration by the International Council. Successful projects should be financed by INQUA at the highest level possible. This is especially true for INQUA-PAGES joint projects. PAGES has shown concern for this lack of monetary support for joint projects they are financially supporting (for such things as workshops).

Now that we have established our ties with PAGES, and our projects are in the implementation stage, there is a spirit of co-operation between PAGES and INQUA, so that less effort has to be expended in this direction. The Committee discussed the possibilities of a project on glaciation, a natural target for INQUA and a notable omission in the various PAGES projects. Another is developing projects that consider the human influence or reaction of global change. Nothing has been formally approved. Besides projects, closer links should continue to be made with other groups involved with global change programs. The list is too lengthy to present here, but greater linkage would provide new ideas and a chance for INQUA to influence and participate in other important endeavours.

One topic not discussed in this report is the initiative taken by R. Paepe on Education, Research and Training. It is obvious that a major contribution to Quaternary science and to global change can be achieved *via* training and education. Dr. Paepe has had considerable success in training highly qualified scientists in Quaternary science in developing countries. This initiative was placed in the hands of the GCC, and included a request that Dr. Paepe develop a plan. However, it became apparent to the Committee that this initiative, although commendable, was not within the Committee's mandate and would best lie outside the GCC. The INQUA Executive agreed with this and suggested that Dr. Paepe approach the INQUA Executive with a proposal.

Other GCC activities include a symposium at the IUGS Congress in Kyoto in August 1992 and one planned for the IUGS Congress in Beijing in August 1996. We also have a symposium here in Berlin, where co-ordinators and commission representatives will present results of their projects and activities. In addition, Committee members participated in many Global Change symposia at conferences around the world.

Recommendations on the future of the Global Change Committee

Since the Committee has essentially met its mandate by establishing important, focussed projects within and outside of INQUA, and has established links with other organizations, it is recommended that the inter-Congress Committee on Global Change be dissolved.

This decision was further predicated by the following:

1. The current initiative by the Executive Committee to increase the level of research achievement of INQUA by financing and promoting relevant, well focussed projects both within and outside the Commission realm dealing with, among other things Global Change related projects.
2. The necessity of reducing bureaucratic expenses in order to better finance INQUA projects and Commissions.
3. The Executive ensures that commission expertise and resources in Global Change will continue to be utilized.

The Committee on Global Change warmly thanks the members of the various projects for their ongoing co-operation and enthusiasm, and members of the Executive Committee for their support.

N. RUTTER, Chairman
N.A. MÖRNER, Secretary
J. BOWLER
J. MANGERUD
T.S. LIU

COMMISSION ON GLOBAL CONTINENTAL PALAEOHYDROLOGY (GLOCOPH)

Organisation of the Commission

The Commission was formed on 7 August 1991 in Beijing, having been proposed by L. Starkel (Poland) and V. Baker (USA). Since that time it has been active in holding meetings and conferences, promoting publications and producing a Newsletter. The President is L. Starkel (Poland) and the secretary is A. G. Brown (U.K.). Some changes will be made at the Berlin Congress in August 1995. The details of the organisational structure and changes earlier this year are contained in the Commission's report on its reappraisal of aims and structure submitted to the INQUA Executive Committee.

Aims of the Commission

The aims of the Commission, although refined in 1994 at Southampton, remain broadly the same as in 1991.

The main aim is to analyse the nature of global hydrological changes, fluxes and storages during the last

20k years, using the time resolution of $10^2 - 10^3$ years with emphasis on those areas that have the greatest human population and are most sensitive in terms of water resources.

The main objectives of the first inter-Congress period were:

- a. To establish the major changes which have occurred in the water balance of the four main zones: humid tropics, semi-arid, temperate, and polar over the last 20,000 years.
- b. In each of those four zones to reconstruct major trends and sequences of river flows for selected rivers as well as the water balance for selected closed lake basins.
- c. To require each sub-Commission and each working group to satisfy at least one or two precise objectives by the next INQUA Congress.
- d. To compile a state-of-the-art volume entitled "Global Continental Palaeohydrology".
- c. To organise a meeting of the Commission in the U.K. in 1994 with the theme of databases and models in palaeohydrology.

As this report shows, these aims have been met. The aims have recently been modified and updated in accordance with the report to INQUA on reappraisal of the Commission.

3. Internal Structure

As requested in 1994-95, the Commission reviewed its aims and organisational structure. This resulted in some change to the internal structure of the Commission. There are now four sub-Commissions (Polar Zone; Temperate Zone; Arid Zone; Humid Tropical Zone), and six Working Groups (Databases; Global Water Cycle Changes; Palaeoflood Hydrology; Palaeodischarges; Palaeohydrology and the Carbon Cycle; Palaeogroundwater).

Reports from these Working Groups have been summarised in the Newsletters and minor amendments are currently in hand in respect of the INQUA review of Commissions.

Meetings

Business and Organisational Meetings

The Commission has held business and organisational meetings on a regular basis, including at the IUGS Ecological Congress in Kyoto, Japan in 1992; the Geographical Congress in Washington D.C., U.S.A. in 1992; the INTER-INQUA Conference on the Quaternary of Australia in Canberra in 1993; and the International Geomorphological Conference in Hamilton, Canada in 1993.

Thematic Conferences and Symposia.

The Commission has held four scientific meetings over the last four years. These are listed below, and a full report of each meeting can be found in the GLOCOPH Newsletters.

1. *Workshop on Paleoflood Hydrology, Flagstaff, Arizona, U.S.A.* (May 1992 organised by V. Baker). This meeting had both a paper and field content and was devoted to the development of methodology and theory in the estimation of palaeoflood magnitude and frequency.

2. *Symposium on Global Continental Palaeohydrology, Cracow, Poland* (September 1992 organised by L. Starkel). There were 25 participants from several European countries. A volume of abstracts was produced and discussions were held on the production of the Global Continental Palaeohydrology book (see below). The meeting consisted of papers, and a field visit.

3. *GLOCOPH'94, Southampton, U.K.* (September 1994 organised by J. Branson and K Gregory). This was a four-day meeting with a three-day fieldtrip in September of 1994. This meeting attracted over 50 participants, the majority from outside the U.K. Forty four papers were given and about 20 participants attended the field excursion to the English Midlands and Northeast. A publication from this meeting is now in advanced stages of preparation and has been advertised.

4. *Global Continental Changes: the Context of Palaeohydrology, London, U.K.* (September 13th organised by K. Gregory and J. Branson). This was a one-day meeting that attracted several eminent keynote speakers including a fellow of the Royal Society and a representative of PAGES. Papers from this meeting are also in the volume currently being edited by Branson, Gregory and Brown (see below).

Episodes of High Variability in the Hydrological Cycle, INQUA Congress, Berlin, Germany (August 1995, convened by L. Starkel, V. Baker and Y. Enzel). This symposium has now been organised.

6. *The Palaeocarbon Cycle, INQUA Congress, Berlin, Germany* (August, 1995 organised by H. Faure). Twenty six papers have been submitted for this symposium. After the meeting there will also be a business meeting of the Palaeocarbon Cycle working group.

7. *Palaeohydrology of the Last Millennium, INQUA Congress, Berlin, Germany* (August 1995, convened by K. Gregory, L. Starkel, A. Anenkov and A. Brown). This symposium has now been organised.

8. GLOCOPH is now planning an international meeting on *The Palaeohydrology and Modelling of Environmental Change* to be held in Toledo, Spain in September 1996 and organised by Dr M. Garzon, Madrid.

7. Commission Publications

The Commission has produced or supported several publications over the last three years:

1992 Starkel, L. (Ed.) *Papers and Abstracts of the GLOCOPH Symposium, Cracow*. Mogflany, Poland.

1994 Branson, J. (Ed.) *Abstracts of GLOCOPH '94*. Papers from the Southampton Palaeohydrology Meeting, Southampton.

1995 Gregory, K. J., Starkel, L. and Baker, V. (Ed.) *Global Continental Palaeohydrology, Wiley*, Chichester (a collection of state of the art papers from GLOCOPH members).

1996 (in press) Branson, J., Gregory, K. J. and Brown, A. G. and Branson, J. (Ed.) *Global Continental Changes: the context of palaeohydrology*. Special Monograph of the Geological Society of London.

1991-1995 GLOCOPH Newsletter 1-5

The GLOCOPH network has been maintained by a Newsletter edited by Dr A G Brown (Secretary) of which five have been produced and another is being planned. There is a database of GLOCOPH members which holds over 250 names, all of whom receive the Newsletter by mail.

Future Developments

(a) Palaeohydrology and Modelling of Environmental Change. A symposium to be held in Toledo, Spain (September 1996, organised by G. Benito). This will be a five-day meeting with both paper sessions and a fieldtrip.

(b) The completion of the Palaeohydrological database being compiled at Southampton by J. Branson, under the direction of K. J. Gregory.

(c) The establishment of a transect of basins across Europe for palaeohydrological research and promotion of funding from a variety of sources.

A.G. BROWN
Secretary

THE INTER-CONGRESS COMMITTEE ON THE PALAEOGEOGRAPHICAL ATLAS OF THE QUATERNARY (NORTHERN AND SOUTHERN HEMISPHERES)

The Committee was established at the XIII INQUA Congress by the Executive Committee. Its purpose is to create the methodological basis for the preparation of an atlas of palaeoclimates and palaeoenvironments of both the Northern and the Southern Hemisphere and to make a project proposal concerning its publication.

The resolution of the Executive Committee was based on the fact that, at the XIII (Beijing) Congress printers' proofs of the "Atlas of Palaeoclimate and Palaeoenvironments of the Northern Hemisphere (Late Pleistocene-Holocene)" were on display. The atlas was the result of co-operation between the INQUA Commission on the Palaeogeographic Atlas of Quaternary and the Commission on Loess for over ten years. During the sessions of the Congress the maps and the explanatory texts of the Atlas were discussed intensively and the suggestions that were made during these meetings were taken into consideration during the final phase of editing. The Atlas published in 1992 was evaluated by revisers and users as a pioneering and worthwhile INQUA effort, and also as a contribution to the Global Change Programme.

There was general consensus similar mapping should proceed for the whole globe. Thus the Commission on the Palaeogeographic Atlas of the Quaternary, terminating its activity in 1991, was encouraged to initiate a new committee and to ask for the approval of the Executive Committee. The newly-formed Committee of the Palaeogeographic Atlas of the Quaternary (Northern and Southern Hemisphere) received its mandate for the inter-Congress period 1991-1995 to fulfil the tasks mentioned above.

The activities of the Committee focussed on two separate topics:

1.) During 1991-1992 the Committee acted as the editorial board for finalisation of the edition and publication of the Atlas of Palaeoclimates and Palaeoenvironments of the Northern Hemisphere. In this phase the maps were checked and corrected, new explanatory notes were written, and the list of references completed.

The drawing, lithographic work and printing of the Atlas was performed entirely at the Laboratory of Cartography of the Geographical Research Institute, Hungarian Academy of Sciences. To streamline and to focus these activities the staff of the Committee had two meetings at the turn of 1991-1992 in Budapest and in Stuttgart-Hohenheim.

The editorial board and the new Committee had to cope with the following responsibilities concerning the printing and distribution of the Atlas:

- a) To organise sponsorships in order to cover the expenses of the publication (films, printing paper, binding);
- b) To make a contract with the co-publisher;
- c) To advertise the Atlas and deliver reviewers' copies.

Some 800 copies of the Atlas were bound. The expenses of its preparation and mailing costs amounted to about 200,000 DM. About half of this sum was provided by sponsors while the other half was covered by revenues from selling copies to subscribers and marketing by the co-publisher, Gustav Fischer Verlag. Only 45 copies of the Atlas now remain. Furthermore, 3000 separate map sheets are to be attached to a review on the Atlas in a forthcoming issue of *Geo Journal*.

2.) During 1993-1994, the Committee was engaged in the elaboration of the contents and the solution of methodological issues of the projected palaeogeographic atlas.

a) Taking the theoretical aspects and methodological solutions of the Atlas published in 1992 into account and developing them further, a Project on the Palaeogeographic Atlas (Northern and Southern Hemisphere) was elaborated and sent to the INQUA Global Change Committee and (seeking support) to the PAGES SSC (Switzerland), the Bundesministerium für Forschung und Technologie (Germany), the Mainz Academy of Sciences and Literature (Germany) and the Hungarian National Academy of Research Fund (OTKA). Regrettably, the financial support and, consequently, the projected mapping activities have been delayed, although methodological and scientific studies have continued without interruption. This work focussed on the following problems:

The preparation of the maps, from drawing the first drafts by hand to final printing. This process has taken several years. It was important to check the data contained in the already-published maps on the Northern Hemisphere by means of the international literature currently available. This was time-consuming work. It turned out that strong efforts will have to be made to amalgamate the Russian and the German versions of several maps, as far as possible. Even so, the different ways of reconstructing past climate open to us will be explored and they will be unified as far as possible in the interests of a consistent result.

The originally CLIMAP data of the sea surface temperatures in the pleniglacial oceans did not always turn out to be correct. Thus they had to be calculated anew, using better transfer functions and for comparison with the Russian data. This will require a great deal of time in order to ascertain the best procedures. From 1991 to 1994 several German expeditions went to the Tibetan Plateau and to Inner and Outer Mongolia. The observations made and the results obtained enabled us to refine hitherto published data for Central Asia and to compare them with data on the western part of the Tibetan Plateau, the adjacent Central Asian Mountains, lowland China and the surrounding oceans, obtained by other nations. It turned out that the data in the Atlas of

Palaeoclimates and Palaeoenvironments in the Northern Hemisphere are generally correct but require amendment in some cases. As a result of the mutual co-operation of the U.S.A., Canada, Norway, Germany and Russia in the North Atlantic and the Polar Oceans, much better palaeoceanographical and glaciological data from these regions are now available compared to the situation at the time of the preparation of several maps making up the published Atlas. These data must now be included in the new maps, a process that has already begun.

In order to better focus on palaeoclimatological and palaeoecological problems of the Southern Hemisphere, and thus to be in a much better position to discuss these problems with colleagues from the Southern Hemisphere, vigorous efforts were made within the framework of the German Palaeoclimate Research Project (Marine and Terrestrial Paleoclimatology) to investigate certain palaeoclimatological and palaeoecological problems in Central and Southern Africa, off the west coasts of Africa and in Australia. In general, this work focussed on the last 140,000 years or so, although the marine palaeoclimatology also investigated older parts of the Pleistocene.

b) A fundamental theoretical and methodological issue of the Atlas edition is the reconstruction of palaeoclimates and palaeoecological conditions based on multi-disciplinary investigations into the periodic sequence of (young) Quaternary sediments with special reference to their characteristics. The Working Group on the Global Synthesis and Methods for Palaeogeographic Reconstructions within the Committee (convenors: B. Frenzel, M. Pécsi and A. Velichko) was formed to evaluate palaeoclimates through global and regional analyses. These pilot activities aimed at a methodological investigation and used the experience accumulated heretofore. They are to be discussed at the XIV Congress in Berlin in August 1995.

Publications

Frenzel, B. (1995): An atlas on the global change in the Northern Hemisphere (Methodological explanation: *Geo Journal* 36: 2/3.

Frenzel, B. (ed.) (1994): Evaluation of land surfaces cleared from forests in the Mediterranean region during the time of the Roman Empire. *Paläoklimaforschung/Paleoclimate Research*. Vol. 10, Gustav Fischer Verlag, Stuttgart-Jena-New York, p. 170 with 48 figures and 2 tables

Pécsi, M. (1993): Quaternary and Loess Research. *Loess InForm*, N2. p. 82

Pécsi, M. and Velichko, A. (eds.) (1995): Principles, methods and criteria of loess-paleosol and paleoclimatic investigation. *Geo Journal* 36.2/3 (33 papers and reviews)

Pörtge, K.-H., and Li Jian (1994): Beiträge zur Tibetforschung. -Göttinger Geogr. Abhandlungen 95: 282 pp. E.Goltze GmbH. Göttingen.

Velichko, A. (ed.) (1993): Razvitie landshaftov i klimata Severnoj Evrazii (Environmental and Climatic Changes in North Eurasia), Late Pleistocene-Holocene, Elements of Prognosis, I - Regional Palaeogeography, Ser. Global Change, IGBP Russian National Committee.

Velichko, A. (ed.) (1994): Korotkoperiodnye i rezkie landshaftno-klimaticheskie izmeneniya za poslednie 15 000 let. (Short-term and abrupt environmental and climatic changes over the last 15,000 years), RAS, Institute of Geography, Moscow.

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