

## Hans-Peter Schultze, a great paleoichthyologist for whom work is synonymous with enjoyment

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With 4 figures and 2 tables

In the summer of 1982, Hans-Peter Schultze and Gloria Arratia were invited to a small museum located on a fossiliferous site of the Devonian Escuminac Formation in Miguasha, Quebec, eastern Canada. Hans-Peter was to work with Marius Arsenaault, the director of the Miguasha Museum, on the skull of the elpistostegid *Elpistostege watsoni*, a species closely related to basal tetrapods. In addition, he went through the collections to describe and measure numerous juvenile specimens of the osteolepiform *Eusthenopteron foordi*. As expected, these two projects turned out to be important contributions in lower vertebrate paleontology and systematics: one on the origin of tetrapods (1985), and the second one on growth patterns of a Late Devonian fish (1984). During his visit to Miguasha, Hans-Peter also spent time digging for fossils and drawing numerous specimens in the collection. In addition, in order to help the personnel of the museum to identify some of the Escuminac fishes, he created an identification key based on the gross morphology of the scales. For a small group of undergraduate students, hired at the museum during the summer as naturalists, it was a unique opportunity to discuss paleontology with a leading researcher. We were amazed by his willingness to talk to us, even if then most of us only spoke French! For the first time, we were exposed to Hennigian methodology and its usage in vertebrate paleontology during an evening lecture that Hans-Peter prepared for us. His lecture was delightful; it was an intensive course in lower vertebrate anatomy, and an intellectual journey among the philosophers Karl Marx and Karl Popper, the entomologists Willy Hennig and Lars Brundin, and “The Band of Four” (Rosen et al. 1981). It was for most of us our first exposure to science, as it should be done. We were all impressed by his knowledge and

above all by his simplicity and friendliness. Two years later I started my Ph.D. at The University of Kansas, under the supervision of Hans-Peter.

Compared to his long career, these two weeks that Hans-Peter spent in Miguasha represent an extremely short period of time. Some might say that this little anecdote is insignificant when introducing a vertebrate paleontologist (Fig. 1A) who published 132 papers and books (a total of 2977 published pages) in addition to more than 80 abstracts, book reviews and obituaries. However, this brief story is representative of Hans-Peter’s personality and contributions. He is a great scientist with numerous interests in science, art, and history. Hans-Peter enjoys digging for fossils, looking at fossils and describing fossils, and he loves sharing his knowledge and experiences with people, independent of their academic training.

### Pre-retirement years

Hans-Peter was born in 1937 in the small coastal town of Swinemünde, in northern Germany (now Poland). His childhood was in a turbulent economic, political and historical period – World War II. Initially, he attended elementary school in Thorn/Westprussia (now Poland) and then in Ernsleben, Harz, which was in the Soviet Zone at that time. In 1949, his mother and four children moved to West-Germany, taking up residence in Offenburg, Baden-Württemberg, where Hans-Peter attended high school, finishing the German “Abitur”, in 1956.

From 1956 to 1958, Hans-Peter studied geology at the University of Freiburg im Breisgau, Germany, completing his Diploma (M.Sc.) in geology at the University of Tübingen in 1962. In 1965, Hans-Peter was awarded a Ph.D. at the

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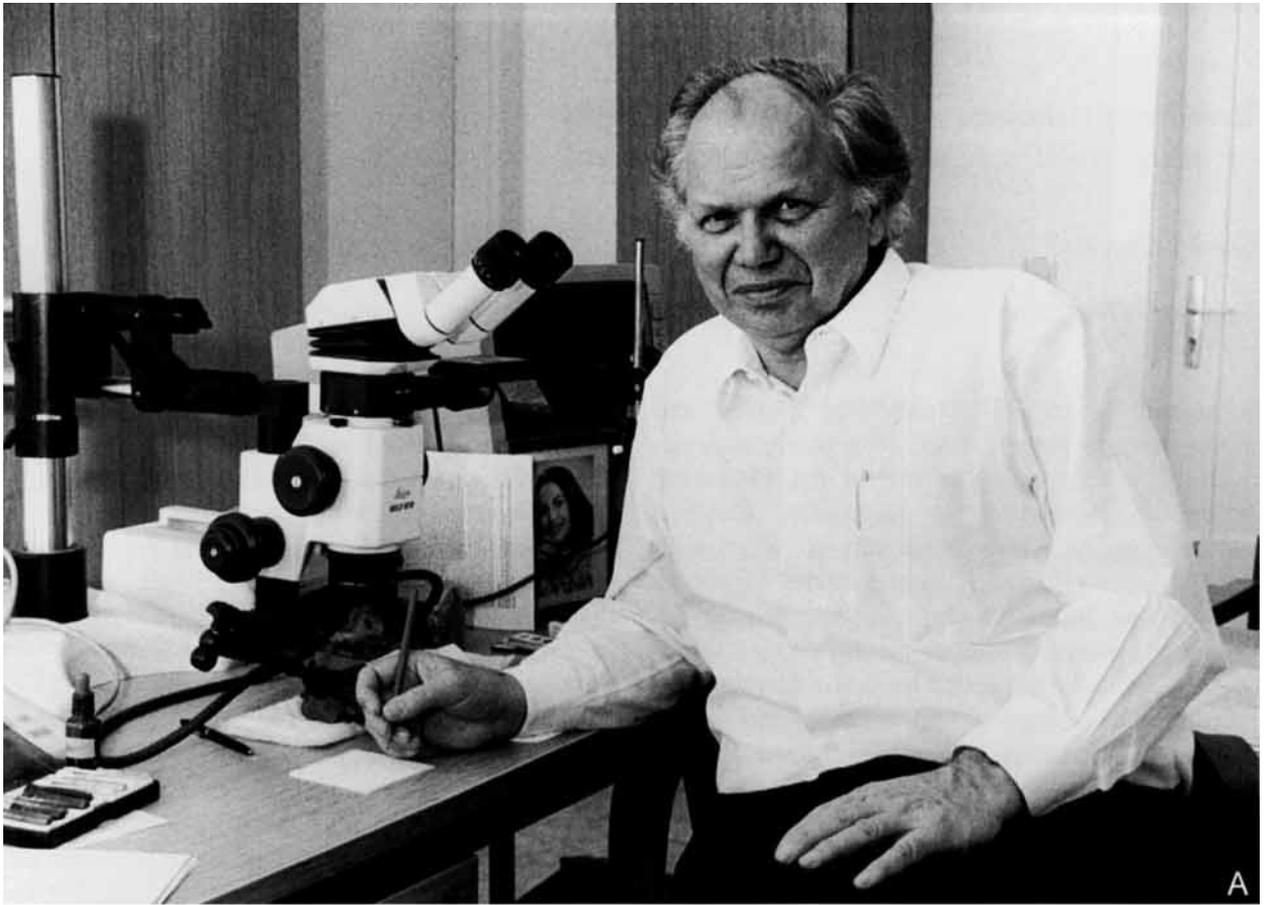


Fig. 1. Hans-Peter Schultze at work in his office in the Institut für Paläontologie der Humboldt University, Berlin, May 2000 (Photo W. Harre) (A), and with the staff of the Institut, Winter 2001 (Photo C. Radke) (B).

Abb. 1. Hans-Peter Schultze in seinem Arbeitszimmer im Institut für Paläontologie der Humboldt Universität zu Berlin, Mai 2000 (Foto W. Harre) (A) und mit den Mitarbeitern des Instituts, Winter 2001 (Foto C. Radke) (B).

University of Tübingen, for his project on the morphology and histology of Mesozoic actinopterygian scales, a continuation of the work begun by his supervisor Prof. Dr. Walter R. Gross (1935). Gross only accepted two graduate students during his entire career: K. Fahlbusch, in Berlin, and Hans-Peter in Tübingen. As a student of Gross in the early 60s, Hans-Peter received training on the histology of scales and teeth of Paleozoic and Mesozoic fishes. The results of his Ph.D. dissertation were published in 1966, in an impressive and widely cited monograph in which he demonstrated both the evolutionary change from rhombic to round scales in halecostome actinopterygians and the systematic significance of the scales.

From 1965 to 1967, Hans-Peter spent a crucial period of his career at the Naturhistoriska Riksmuseet in Stockholm, Sweden. During this time he worked closely with Erik Jarvik (who was then the director), Erik Stensiö, and Tor Ørving, a group of paleoichthyologists that eventually came to be referred to as the "Swedish School". At that time, Stockholm was one of the leading centers for paleoichthyology and numerous researchers were trained in the Department of Paleozoology. This group of researchers including Hans-Peter, became friends, and have greatly influenced the field of lower vertebrate paleontology during the past 40 years.

From 1967 to 1978, Hans-Peter was at the Geologisch-Paläontologisches Institut und Museum of the University of Göttingen. During this period, he described material from the collection in Göttingen including placoderms from Iran, collected by Prof. Dr. O. H. Walliser (1973) and the Keuper sauropterygian *Nothosaurus*. He also collected fossils in the Lower Devonian of Germany. Hans-Peter then spent two years (1970–1971) in the USA as a fellow of the German Academic Exchange Program. During this long journey he visited numerous vertebrate collections throughout the country, drawing an impressive number of specimens and preparing histological acetate peels that later were used in various publications.

In 1970, Hans-Peter took over the editorship of the prestigious *Handbook of Paleoichthyology* continuing the original work begun by Prof. Dr. O. Kuhn. Since he began his mission as editor, six volumes have been published and Hans-Peter is currently contributing to volumes 1 (Agnatha) and 7 (Sarcopterygii II) and writing volume 6 (Sarcopterygii I: Dipnoi). Critically, Hans-Peter has played an important role in developing the

broad scope of the Handbook while maintaining a rigorous framework. Indeed, his tenacity and dedication are crucial to the realisation of this series and many of us are very familiar with that famous line "So, when will you finish your part of the handbook?"

In 1978, Hans-Peter left Germany in order to pursue his career in the USA. Lawrence, Kansas was to become his Land of Oz. He was promoted to the status of Associate Curator in the Division of Vertebrate Paleontology at the Museum of Natural History and Associate Professor for the Department of Systematics and Ecology at the University of Kansas in 1981, and subsequently to Curator and Professor in 1987. From 1988 to 1990, Hans-Peter occupied the position of Chairman for the Department of Systematics and Ecology. During his many years in Lawrence, he invested a great deal of time and energy in expanding the lower vertebrate paleontological collection, increasing collection storage space, cataloguing the collection, and in having the collection computerized. In addition to his teaching and research tasks, in 1990, he organized the 50<sup>th</sup> Annual meeting of the Society of Vertebrate Paleontology in Lawrence which included a symposium on phylogenetic relationships in vertebrates, the first one in the history of the society.

During his stay in Lawrence, Hans-Peter recruited a dynamic group of graduate students and developed an active research program in lower vertebrate paleontology (Fig. 2). He taught at both undergraduate (e.g., comparative anatomy) and graduate (e.g., lower vertebrate paleontology, structure and evolution of fishes, actinopterygian interrelationships, biology of dinosaurs) levels. His courses (frequently team-taught with Linda Trueb, and occasionally with G. Arratia) were highly valued by the students and considered to be most stimulating and informative. An example of his enthusiasm is worth mentioning. In the spring of 1987, Hans-Peter and Linda were responsible for a graduate seminar series entitled *Topics in Evolutionary Morphology*. With a tremendous amount of effort they managed to invite a series of prestigious paleontologists (John R. Bolt, Robert L. Carroll, Chang Mee-Mann, Philip J. Currie, James A. Hopson, Nicholas Hotton III, Farrish Jenkins, John H. Ostrom, Alex L. Panchen, Samuel Tarsitano, and Emilia Vorobyeva) to present their ideas and hypotheses on the origins of major groups of vertebrates. As graduate students enrolled in this seminar we were encouraged to question the



Fig. 2. Hans-Peter Schultze and the staff members and graduate students of the Division of Vertebrate Paleontology, University of Kansas, Lawrence, Winter 1989. From left to right, first row: J. McAllister, H.-P. Schultze, L. Martin, R.W. Wilson, M. Green, and G. Arratia. Second row: X. Wang, D. Miao, J. Herst, C. Westermann, J. Hall, J. Neas, and R. Cloutier. Third row: M. Gottfried, T. Goodwin, C. Cunningham, J. Chorn, T.J. Meehan, C. Bennet, and B. Foreman.

Abb. 2. Hans-Peter Schultze im Kreise von Mitarbeitern und Studenten der Abteilung Wirbeltierpaläontologie an der Universität Kansas, Lawrence, Winter 1989. Erste Reihe: J. McAllister, H.-P. Schultze, L. Martin, R.W. Wilson, M. Green, und G. Arratia; zweite Reihe: X. Wang, D. Miao, J. Herst, C. Westermann, J. Hall, J. Neas, und R. Cloutier; dritte Reihe: M. Gottfried, T. Goodwin, C. Cunningham, J. Chorn, T. J. Meehan, C. Bennet, and B. Foreman (jeweils von links nach rechts).

speakers and challenge their ideas, and I remember Hans-Peter sitting among us and smiling during several highly animated discussions. As a result of this exciting adventure the book *“Origins of the Higher Groups of Tetrapods. Controversy and Consensus”* was published under the co-editorship of Hans-Peter and Linda Trueb in 1991.

After a most fruitful period of 16 years in Lawrence, Hans-Peter took early retirement from the University of Kansas. This “first retirement” was an initial step toward the third major part of his career – a return to Germany. In the summer of 1994, he accepted the directorship of the Institut für Paläontologie at the Museum für Naturkunde in Berlin and was awarded the position of Professor of Paleozoology at the Humboldt-Universität. The Museum für Naturkunde is the largest German natural history museum in the new, as well as the old, capital Berlin. After the reunification of East and West Germany, the Institut für Paläontologie was revitalized by Hans-Peter as director with the help of the staff

members. Hans-Peter set himself an ambitious goal, to develop an internationally acclaimed program at the Institute after 45 years of post-Second World War social and economic restrictions. Five years later, he was acting director for the Museum and finally in 2000 was promoted to full director. During his stay in Berlin, Hans-Peter fulfilled his goal in bringing the Institut für Paläontologie to a standard never reached before. Hans-Peter and his collaborators (Fig. 1B) are proud to have diversified their research to include collaborative national and international efforts, to have created professional academic training programs for researchers abroad (in, for example, Argentina, China, Mongolia, Spain, Switzerland), and to have organized national and international meetings, conferences, and special symposia in Berlin and further afield (e.g., Jahrestagung des Arbeitskreises für Paläobotanik und Palynologie; Phylogenetic Symposium; Mesozoic-Cenozoic Bioevents: Possible Links to Impacts and other Causes) all of which have furth-

ered the study of paleontology. During Hans-Peter's residence, the researchers of the institute have published 369 papers and 224 abstracts in international scientific journals, and seven widely cited books. Furthermore, a new scientific journal – *Mitteilungen aus dem Museum für Naturkunde in Berlin, Geowissenschaftliche Reihe* – was founded and is now well established.

### His scientific contribution in a nutshell

For those of us working on lower vertebrates, Hans-Peter Schultze's contribution is ubiquitous. His papers have been published in more than 70 different scientific journals and books and are cited exhaustively (see the ISI Web of Science). Approximately half of his contributions are co-authored with some 30 different authors of whom Gloria Arratia (10 papers), John Chorn (8 papers) and Chris Maples (5 papers) represent the most productive collaborations. Joint work between H.-P. Schultze and G. Arratia started in 1985 on Late Jurassic teleosts from Northern Chile and Cuba and subsequently led to a series of important contributions on the homology and development of the urohyal (1990), the palatoquadrate (1991), the caudal skeleton (1986, 1988, 1989, 1992), and the ver-

tebral column and associated elements (2001, also with Jorge Casciotta). These papers are considered as milestones in the interpretation of morphology and homology in fishes.

Whether it is an invertebrate, a fish, an amphibian, or even a *Nothosaurus*, Hans-Peter is curious about nature, and has described more than 25 lower vertebrate taxa ranging from acanthodians to sauropterygians (Table 1). Nevertheless, he is primarily interested in the phylogeny and morphology of sarcopterygians and actinopterygians and has published 47 papers dealing with various aspects of lobe finned fishes (the majority of which are highly cited and have strongly influenced our understanding of sarcopterygians and basal actinopterygians). As early as 1970, Hans-Peter was conscious of the possibility of using cladistics to study the origin of tetrapods and his willingness to adopt new perspectives made him one of the first vertebrate paleontologists to use the cladistic method. By examining histological details such as the infolding of the dentine of sarcopterygian teeth, he demonstrated the monophyly of tetrapods and suggested that osteolepiforms were their sister-group. In 1986, he published an important paper that was to start a long debate on the interrelationships of sarcopterygians. Subsequent papers by Hans-Peter on this subject focused on comparisons of

Table 1

Taxa described by Hans-Peter Schultze

Acanthodii	<i>Latviacanthus ventspilsensis</i> Schultze & Zidek, 1982	gen. sp.
Actinopterygii	<i>Paramicrodon volcanensis</i> Schultze, 1981	sp.
Actinopterygii	<i>Dialipina salgueiroensis</i> Schultze, 1968	gen. sp.
Actinopterygii	<i>Dialipina markae</i> Schultze, 1977	sp.
Palaeonisciformes	<i>Indaginilepis rhombifera</i> Schultze, 1970	gen. sp.
Palaeonisciformes	<i>Ligulalepis toombsi</i> Schultze, 1968	gen. sp.
Palaeonisciformes	<i>Illiniichthys cozarti</i> Schultze & Bardack, 1987	gen. sp.
Palaeonisciformes	<i>Nozamichthys contorta</i> Schultze & Bardack, 1987	gen. sp.
Palaeonisciformes	' <i>Elonichthys</i> ' <i>wolffi</i> Schultze & Bardack, 1987	sp.
Palaeonisciformes	' <i>Elonichthys</i> ' <i>remotus</i> Schultze & Bardack, 1987	sp.
Semionotiformes	<i>Lepidotes tendaguruensis</i> Arratia & Schultze, 1999	sp.
Pycnodontiformes	<i>Paramicrodon volcanensis</i> Schultze, 1981	sp.
Teleostomorpha	<i>Atacamichthys greeni</i> Arratia & Schultze, 1987	gen. sp.
Teleostei	<i>Domeykos profetaensis</i> Arratia & Schultze, 1985	gen. sp.
Teleostei	<i>Protoclupea atacamensis</i> Arratia & Schultze, 1985	sp.
Sarcopterygii	<i>Ventalepis ketleviensis</i> Schultze, 1980	gen. sp.
Dipnoiformes	<i>Westollrhynchus lehmanni</i> (Westoll, 1949)	gen.
Dipnoiformes	<i>Iowadipterus halli</i> Schultze, 1992	gen. sp.
Dipnoiformes	<i>Griphognathus sculpta</i> Schultze, 1969	sp.
Dipnoiformes	<i>Megapleuron zangerli</i> Schultze, 1977	sp.
Dipnoiformes	<i>Chirodipterus onawayensis</i> Schultze, 1982	sp.
Actinistia	<i>Miguashaia bureaui</i> Schultze, 1973	gen. sp.
Onychodontida	<i>Grossius aragonensis</i> Schultze, 1973	gen. sp.
Porolepiformes	<i>Quebecius williamsi</i> Schultze, 1973	gen. sp.
Porolepiformes	<i>Holoptychius jarviki</i> Cloutier & Schultze, 1996	sp.
Porolepiformes	<i>Nasogaluaquus chorni</i> Schultze, 2000	gen. sp.
Osteolepiformes	<i>Rhizodopsis hanbuchi</i> Schultze & Heidtke, 1994	sp.
Amphibia	<i>Euryodus bonneri</i> Schultze & Foreman, 1981	sp.
Sauropterygia	<i>Nothosaurus edingerae</i> Schultze, 1970	sp.

controversial hypotheses based on reanalyses of a few selected characters (1991), or on phylogenetic analysis of large data matrices (1992, 1994, 1997, 2001). Following the description of the enigmatic Lower Devonian osteichthyan *Psarolepis*, Hans-Peter and Zhu Min (1997) reinterpreted the phylogeny of sarcopterygians proposed by Cloutier and Ahlberg (1996), suggesting that actinistians, rather than dipnomorphs, were more closely related to tetrapodomorphs, although this hypothesis was to be challenged by the discovery of new material. In 1995 and 1997, Hans-Peter participated in two major field expeditions in the Canadian Arctic with the Canadian Museum of Nature of Ottawa, Canada. Among the material discovered were exceptional specimens of the Early Devonian actinopterygian *Dialipina salgueiroensis*, a species that Hans-Peter (1968) had described almost 20 years earlier, when it was only known from isolated scales. New phylogenetic analyses including *Psarolepis* and *Dialipina* were published recently in order to determine the relationships of basal actinopterygians (Schultze & Cumbaa 2001) and among basal osteichthyans (Zhu & Schultze 2001).

Although Hans-Peter shifted from a classical usage of the Hennigian methodology to numerical cladistics in the mid-1980, he remains aware of the importance of proper definition of characters in order to analyze homologous structures. When performing his PAUP analyses on various data sets, he frequently reminds graduate students and colleagues of a comment made by David Swofford when introducing his program at The University of Kansas, in 1982, "and if you get only one tree, but you cannot explain it biologically – start all over again!" And this is exactly what Hans-Peter is doing.

Hans-Peter is not only interested in the relationships among taxa, but also in the environments in which these organisms lived and evolved. He considers that detailed taphonomic investigations and comparison of total fossil assemblages are the most reliable methods for paleoenvironmental interpretation. The identification of freshwater and marine Paleozoic assemblages and environments have occupied a large part of his interest since 1985 when he first published on marine to onshore vertebrates in the Lower Permian of Kansas. Starting in 1996, Hans-Peter and various collaborators studied Devonian and Carboniferous faunal assemblages using cluster analyses in order to infer paleoenvironment and paleogeography. These statistical methods have often been used in invertebrate

paleontology, but are rarely utilised in vertebrate paleontology. Hans-Peter's contributions yielded new interpretations of the Late Devonian Escuminac Formation of Quebec, as a coastal marine environment rather than a freshwater setting, and a lagoonal environment for the Carboniferous tetrapod assemblage of the Hamilton Quarry in Kansas. These new interpretations have initiated a re-evaluation of other Paleozoic localities and assemblages worldwide.

Because of his field experience and interests, Hans-Peter has visited Paleozoic and Mesozoic sites around the world. Among the Devonian sites that he has investigated in more detail is the world famous Escuminac Formation from Quebec. In 1972, he contributed to the field guide for one of the excursions of the International Geological Congress that was held in Montréal, Québec, and subsequently he worked on the majority of the fishes from this locality. In the initial phase of planning of the 7<sup>th</sup> International Symposium on the Study of Early Vertebrates held in Miguasha in 1991, Hans-Peter and I came up with the idea of editing a volume with the aim of providing an updated interpretation of the geology, paleobiology and paleobotany of the Escuminac Formation. This book, entitled "*Devonian Fishes and Plants of Miguasha, Quebec, Canada*", with 26 chapters including systematic revisions of all fish species and plants as well as a great deal of information on taphonomy, paleoecology and paleogeography, was published in 1996. Hans-Peter contributed to four chapters including those on a revision of the porolepiforms, *Elpistostege*, and a paleoenvironmental interpretation of Middle-Late Devonian fish assemblages throughout the world. He did a fantastic job of editing, resulting in a final product that is of superb quality and a fundamental source of information for those working on questions of Paleozoic paleobiology and paleoenvironments.

In 1993, Gloria initiated the symposium "*Mesozoic Fishes – Systematics and Paleoecology*." Following a successful first meeting in Eichstätt, and the publication in 1996 of the proceedings of this event, a second meeting was held in 1997, at Buckow, near Berlin. Scientific papers resulting from this meeting were compiled in another excellent and widely cited book "*Mesozoic Fishes 2 – Systematics and Fossil Record*" edited by Gloria and Hans-Peter and published in 1999.

### A field man

One of Hans-Peter's greatest pleasures is to plan and carry out field work, which has resulted in the collection of much new material for his students research projects and his own research, and the enrichment of museum collections with (thousands of) valuable new specimens. In 1970, he started his Arctic quest with an expedition that he organised with five colleagues and graduate students. This expedition led them to Prince of Wales Island and Ellsemere Island where they collected in the Devonian. In 1995 and 1997, Hans-Peter participated in two major expeditions with a team from the Canadian Museum of Nature, Ottawa, Canada (S. Cumbaa and R. Day) in the Northwest Territories of Canada. While in Lawrence, Hans-Peter organised an impressive number of field seasons including visits to the Lower Devonian of Wyoming, the Middle Devonian of Nevada, the Upper Devonian of central and SW Colorado, the Devonian and Carboniferous of eastern Canada, the Carboniferous of



Fig. 3. Hans-Peter Schultze during a field trip in the Atacama Desert in the north of Chile, April 1994.

Abb. 3. Hans-Peter Schultze auf Sammelexkursion in der Atacama-Wüste im Norden Chiles, April 1994.

Kansas and Illinois, and the Permian of Kansas. He also participated in major expeditions to collect fossils in the Mesozoic of northern Chile (Fig. 3). Most of these field seasons provided Hans-Peter with the opportunity to spend time with his graduate students. Whether it is in the Canadian Arctic or in the middle of a desert in Chile, Hans-Peter is easily recognisable in the field with his "Bavarian trousers" (Fig. 3), his eternal field book, and a bag loaded with fossils.

Indeed, it takes a lot to stop Hans-Peter from going in the field. At the 45<sup>th</sup> Annual meeting of the Society of Vertebrate Paleontology held in Rapid City, North Dakota, Hans-Peter went collecting fossils on crutches. Not surprisingly, he found more material than most of us (obviously without broken legs) during this afternoon field trip.

### A great advisor

His scientific research, as reflected in his publications, is not the only achievement of Hans-Peter. His contributions to education are also especially valued. During his career, Hans-Peter knew and still knows how to share his love for research. As students, I believe that we first selected Hans-Peter as an advisor because of his impressive contribution to the field of paleontology, his encyclopaedic knowledge of natural sciences, his thorough knowledge of fossil material, and his equally broad knowledge of old and recent literature. Since 1980, Hans-Peter wisely and faithfully supervised ten Ph.D. students (in vertebrates) from different universities in the USA and in Germany, and nineteen postdoctoral research fellows (12–24 month period) from different countries. He has also co-advised numerous masters and doctoral students.

The door of Hans-Peter's office is always wide open, not only during the day, but in the evening and frequently during weekends. Whenever you walk by his office, he is always happy to invite you in and discuss a recently published paper, to look at an enigmatic fossil, or to bounce around some new ideas. He knows how to be present when it is necessary and to give time when it is needed. During the final weeks I spent correcting my dissertation, I remember that Hans-Peter read the newest version of each chapter overnight and not only did he make corrections, but he also carefully checked the coding of large data matrices. The next evenings, over some cheese and cold wine, he would spend hours explaining and discussing his comments.

For those of us who had the privilege to have Hans-Peter as our advisor, he was not only a scientific figure, but our confidant and friend. After having married Gloria twice (because of political and bureaucratic differences between the USA and Chile) he assisted some of us with our own weddings, even if sometimes it required travelling half way around the world.

In summary, Hans-Peter possesses all the qualities of a great mentor; he likes sharing his knowledge, provides judicious advice, and knows when it is time for his students to leave the "nest."



Fig. 4. Gloria Arratia and Hans-Peter Schultze waltzing, Black Forest, Summer 1991.  
Abb. 4. Gloria Arratia und Hans-Peter Schultze beim Tanz, Schwarzwald, Sommer 1991.

### A man who enjoys life

Beyond his scientific contributions, Hans-Peter is a man who enjoys life and friends. He is not only a great man of science, but also a great man for people. Besides paleontology, Hans-Peter likes the outdoors (hiking in the Rockies), gardening (around the Kansas house he renovated years ago), visiting cultural and historical sites (it is always an enlightening event to travel around the world with him), collecting art, masks, and stamps (recently he even published a paper with Oliver Hampe on stamps illustrating fossil fishes), listening to classical music (nothing like the pop, or alternative music that Gloria enjoys so much), ballroom dancing (Fig. 4), and above all social gatherings. Hans-Peter loves to invite people to his place, and to organize receptions for graduate students, colleagues, visiting scientists and friends. There is always a good reason to get together to share some cheese, cold cuts and a bottle of white wine (even though he is German, Hans-Peter does not drink beer). Every year for Christmas, Hans-Peter and Gloria organized a party for paleontologists, a tradition started in Lawrence and kept up in Berlin. One of the high points of this celebration is the Feuerzangenbowle. This holiday tradition comes to life when Hans-Peter lights a rum drenched sugar cone that melts in a mixture of red wine, orange juice, and spices. It is worth being a paleontologist simply to enjoy the harmony of this beverage.

Hans-Peter Schultze has and continues to contribute greatly to our understanding of lower vertebrate systematics and morphology. Indeed, several authors have recognized his important contributions by naming species in his honour (Table 2) including two more new species described in this volume, and I am convinced that Hans-Peter's second retirement is only the beginning of another productive period that our field will remember for centuries.

Table 2

Taxa described in honour to Hans-Peter Schultze

<i>Ellesmereia schultzei</i> Vieth, 1980	Lower Devonian	Canada
<i>Unarkaspis schultzei</i> Elliott, 1983	Lower Devonian	Canada
<i>Platysomus schultzei</i> Zidek, 1992	Upper Carboniferous	USA
<i>Adelargo schultzei</i> Johanson & Ritchie, 2000	Upper Devonian	Australia
<i>Soleidarum schultzei</i> Nolf & Lapierre, 1979	Eocene	France
<i>Spinoaequalis schultzei</i> deBraga & Reisz, 1995	Carboniferous	USA

## Acknowledgements

The editors gave me the opportunity to write this paper on a great man of science and a good friend, Hans-Peter. Gloria Arratia provided valuable assistance with biographical details, David Unwin improved the English of earlier versions, and Mrs. Elke Siebert helped with the illustrations.

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