THE TRILOBITE PAPERS 20

An international newsletter for and by trilobite paleontologists
August 2018

Dedicated to Rolf Ludvigsen

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Editorial:

From 1989 to 2007, Rolf Ludvigsen put out the a newsletter that was "An international newsletter for and by trilobite paleontologists published annually by Denman Institute for Research on Trilobites [DIRT]." Since 2007, when Rolf gave the newsletter a "decent burial" there has not been a newsletter tailored towards trilobite workers.

Just like a paleontologist, I just can't leave something buried. So I wish to resurrect the newsletter to facilitate communication between trilobite paleontologists, students, enthusiasts, and amateurs. Perhaps I just miss the newsletter, or I need something to do, but given the decline in paleontology during the last 3 decades, I think informal communication is sorely needed.

This newsletter, like the previous, is not even close to being formal (very light gray literature, perhaps even pink). Submissions about trilobites and/or trilobite workers are welcome from anyplace. Submissions should be relatively short, color pictures are fine. English is the required language, although the text can be presented other languages after the English text. Taxonomic comments can be presented, but no taxonomic notes that should be published formally.

This will not be a forum to promote the sale of fossils nor negative comments towards specific people and their work . I reserve the right to accept or reject any submission (sorry no peer reviews). However, I do have a very open approach.

If you would like to contribute, send me the files at:

freddeb85@cableone.net

Sincerely trilobitic,
Fred Sundberg
Show Low, Arizona

Fred Sundberg working the stage 4/5 boundary interval in the Kaili Formation (Cambrian) in South China, in 2009.

ROLF LUDVIGSEN (1944-2016)

Rolf Ludvigsen was an outstanding, internationally renowned Canadian paleontologist, with expertise in several Paleozoic invertebrate groups but particularly trilobites.

Rolf was born in Denmark and was intensely proud of his parents and his Scandinavian roots. His father fought on the Eastern Front with other Danish volunteers. After the war, however, this remained a stigma that he was unable to shake, and eventually the family immigrated to Canada, initially to Fredericton and later moving to Calgary. Rolf's early academic career took him from the University of

Cover photo: *Amecephalus laticaudum* (Resser, 1939) from the Spence Shale, Miaolingian Series, Wuliuan Stage, Cambrian. Specimen from American Museum of Natural History

Calgary (B.Sc., 1967) to the University of Western Ontario to work with Alf Lenz. Rolf did his M.Sc. on a variety of taxonomic groups in Lower Devonian strata from the Ogilvie Mountains of northern Yukon Territory, which led to five authoritative papers. His Ph.D. thesis on Ordovician trilobite biostratigraphy in the southern Mackenzie Mountains focused on distinguishing various ecological communities. About 13,000 exquisitely silicified trilobites were extracted and identified in order to undertake this analysis and establish the paleogeography of the region in the Ordovician.

Rolf joined the Department of Geology of the University of Toronto in 1975. He came highly recommended as a brilliant young scientist with a reputation for prodigious energy and personal intensity with strong likes and dislikes. Many years later one of his truly admiring research students summed it up much more succinctly, honestly, and clearly: *"Rolf was mercurial, confrontational, charming, demanding, maddening, entertaining, and tremendously intimidating. He challenged his students by expecting nothing but the best from us, and his approach got results."*

He established an unmistakable presence with his long hair, black beard, fumy pipe and the best coffee. He was a superb photomicrographer and his multitudinous photographs of trilobites – which are often quite tiny and not at all like the monsters so familiar in museum displays – were used to illustrate his scientific papers and monographs, of which he published upwards of one hundred altogether, including no fewer than 13 monographs, covering thousands of pages of text and illustrations. In 1984 he was awarded the Geological Association of Canada's Past-President's Medal (now the W. W. Hutchison Medal) for his research achievements as a young scientist. That same year he was promoted to Full Professor.

He was a dedicated professor but he was tough and expected a high level of interest and participation even at the introductory level. Those who rose to the challenge remember him as inspirational. Others just muddled through or foundered, much to his despair. He confided to one of his colleagues about his distress at the university policy of having to assess students whose lives could be badly impacted by poor marks in subjects they simply weren't interested in. He struggled with what for him was a conundrum for years, spent a lot of time soul-searching and improving his pedagogy, and eventually resolved the dilemma by quitting the university system entirely, in 1987.

Rolf hammering on the type section of the Rabbitkettle Formation, Mackenzie Mountains, Northwest Territories, in 1984.

By that time Rolf had established a strong cadre of trilobite graduate students – no mean achievement as good candidates were few even then. This included Ph.D. students Steve Westrop and Brian Pratt, and M.Sc. students Dave Rudkin, Pam Tuffnell and Graham Young. He was devoted to them as much as they were to him. They jointly co-authored a paper on biostratigraphy for the Paleoscene series in *Geoscience Canada*, which they wrote in the bar on College Street across from the Mining Building. Ed Landing and David Kopaska-Merkel were post-docs from the USA. Cross-pollination from Steve Westrop encouraged Rolf to dig deep into evolutionary theory which was experiencing a renaissance in paleontology, and this inspired his research and teaching at all levels. He also developed an abiding interest in the history of geology and paleontology, which he also brought to the classroom.

He was professionally active in national and international learned societies as a scientific leader, as an organizer/administrator and as an editor. He convinced the Geological Survey of Canada to acquire an extensive collection of trilobites from the Cow Head Group of western Newfoundland made and carefully prepared by Cecil Kindle, components of which are still under study. He was instrumental in establishing the worldclass monograph series on paleontology, *Palaeontographica Canadiana*, under the co-sponsorship of the Paleontology Division of the Geological Association of Canada and the Canadian Society of Petroleum Geologists. He was its first editor. There are now 35 volumes in this series; Rolf co-authored four of them, and two more were written by his graduate students.

After extinguishing his pipe for the last time, Rolf became an avid runner. One undergraduate was surprised to be invited on a weekend run with Rolf only to be more startled when the "jog in the park" transpired to be a half-marathon up and down the Don Valley Parklands. He famously led his graduate research team on lunch hour runs through the city. Brian Pratt remembers one time the two of them blundered into a parade on Bloor Street and joined the procession as if they were official participants, flexing their muscles and waving to the crowds before scooting into campus.

Following his resignation from the university, Rolf moved to the Gulf Islands [Denman Island]and founded the Denman Institute for Research on Trilobites (DIRT). From there he continued his work on trilobitology and published several monographs with Steve Westrop and his long- time collaborator Brian Chatterton of the University of Alberta. Rolf started an annual newsletter called *The Trilobite Papers* that published essays and research news submitted by contributors from around the world. It was a popular and unifying effort that ran for 19 years, until 2007.

Rolf was very interested in public education and helped establish programs with local museums covering various aspects of paleontology and his interests expanded well beyond the Paleozoic. He offered patient advice to many local amateurs in the Vancouver Paleontological Society, and not only was he a mentor to many who attended British Columbia Palaeontological Alliance symposia but he also edited their newsletter. Rolf is remembered fondly by the volunteers who assisted him in excavating the elasmosaur that now has pride of place in the Courtenay and District Museum and Palaeontology Centre.

Rolf's first foray into popularization of paleontology was the inaugural volume in the Fossils of Ontario series, on the trilobites (1979). After moving to British Columbia he co-authored with local amateur Graham Beard the well received *West Coast Fossils: A Guide to the Ancient Life of Vancouver Island* (1998). Before that he edited *Life in Stone: A Natural History of British Columbia's Fossils* (1996), having persuaded a long list of leading specialists to write the chapters on each fossil group, no mean feat as every book editor well knows. Rolf later collaborated with Brian Chatterton to produce a series of vignettes about Canadian paleontologists and the history of paleontology in Canada. These are housed on the NRCan website.

Rolf's science was exacting. The field context was always there and this included a solid understanding of the sedimentological framework and its role for understanding the temporal meaning of biostratigraphy. Besides describing and naming dozens of new species, in the mid 1970s he and Brian Chatterton established the trilobite biofacies approach that incorporated a novel use of statistical methods. In 1985 Rolf published his most controversial paper, with Steve Westrop. They bypassed convention and committee and proposed a stage-level classifi-

cation for the upper Cambrian of Laurentia. A dozen years later it was finally given the formal stamp of approval by the community at large.

In the late 2000s Rolf began to experience difficulties and eventually was diagnosed with Lewy body dementia, a disease that progressively destroys one's mental and physical capabilities. Rolf died peacefully on 16 December 2016.

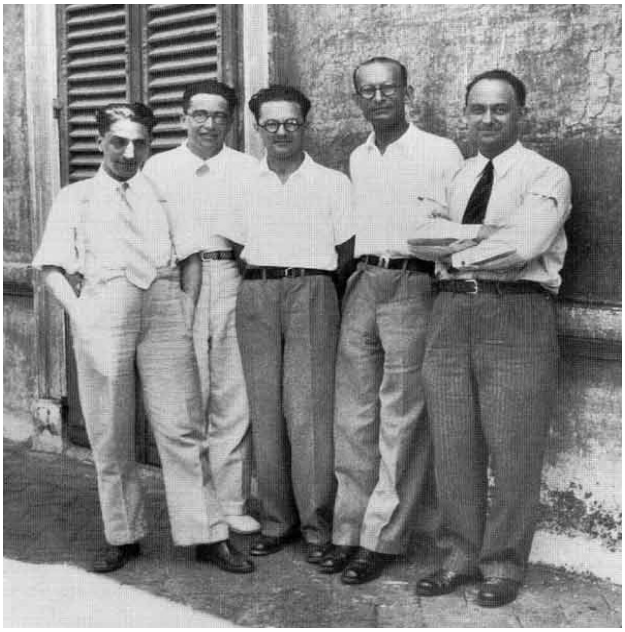
Geoff Norris and Brian Pratt
(from Geolog, v. 46, n. 4, 2017, with permission)

[Note from editor: all the print copies of Trilobite News were mailed worldwide by Ed Landing from the New York State Museum.]

TRILOBITE HALL OF FAME

Charles Doolittle Walcott in 1873

My intent here is to establish a list of the most important trilobite workers of the past and present. For example, Charles Doolittle Walcott or Pete Palmer. A picture and a very short biography would be presented.



Enrico Fermi and the Via Panisperna boys in the courtyard of Rome University's Physics Institute in Via Panisperna, circa 1930. From left to right: Oscar D'Agostino, Emilio Segrè, Edoardo Amaldi, Franco Rasetti and Enrico Fermi

FRANCO RASETTI HALL OF FAME

My intent here is to honor those trilobite workers that were trained in the Sciences (even Geology and Paleontology) but were not employed in a position that promoted trilobite research. Discover Magazine referred to these type of scientists as "garage scientist."
When it comes to trilobites, the one person that stands out in my mind is Franco Dino Rasetti (1901-2001), who's training was in physics. He was the chair in spectroscopy at the Physics Institute of the University of Rome (1930-1938); founding chairman of the Physics Department, Laval University Quebec City (1939-1947); and Chair of Physics Department at John Hopkins University (1947-1967). And yet, he provided excellent work on Cambrian trilobites in his spare time! [For more, see Rolf Ludvigsen and Brian Chattertons' paper on Rasetti in TTP 14, 2002.]

J. STEWART HOLLINGSWORTH (1936-2016)

Stew Hollingsworth's impact on Cambrian trilobites, biostratigraphy and stratigraphy is of the highest quality work, especially given that

Figure 1. Stewart Hollingsworth out at Montezuma West section, 1999.

his degree is in engineering geology. His and Bill Fritz's work in Nevada lower Cambrian led to the development of the Montezuman Stage by Palmer in1998. In 1999, Stew wrote three papers and helped lead the Laurentia 99, V field conference for the ISCS. He subsequently (2005, 2006, 2007) named 11 species and 5 genera from the lower Cambrian (Series 2, Stage 3) in the Goldfield area of Nevada. Again in 2011, Stew participated in the 16th Field conference in Arizona and Nevada, where he was the primary editor of the conference volume, co-leader of the field trip, and wrote five papers for the volume. Stew developed the trilobite zonation for the uppermost Begadean and lower Waucoban series, which had a significant impact on the international correlation of the lower Cambrian. In all, he published 13 Cambrian papers and several professional abstracts on the Cambrian. Not bad

Figure 2. Bill Fritz, Mary Hollingsworth, Judy Fritz, and Stew Hollingsworth at the trilobite pit TH discovered by Mary and Judy in 2003.

for a mining geologist who just wanted to work on trilobites. [Fred Sundberg]

Stew was born in Oklahoma, but at the age of four moved with his parents to Midland, Texas, where his dad owned a Paleontology Laboratory that identified fusilinids in core drilled by petroleum companies. As a high school student, Stew worked for his dad in this lab. After high school, he obtained a degree in Geological Engineering from the Colorado School of Mines. In 1959, he was hired by Union Carbide and for 30 years he traveled in the US and worldwide doing mining and exploration geology as well as management. Eventually he was promoted to Director of Exploration-North America.

All of these years Stew maintained a strong interest in paleontology and collected fossils every place he lived. In his spare time he studied fossils and accumulated an extensive library. After his mining career, he decided to give full time to his "hobby". In 1991 at a Geological Society of America meeting in Utah, Stew met Bill Fritz and asked if Bill needed a field hand (Bill said yes). From then on fossils were his passion.

I met Stew when he was evaluating a uranium property in the Northern Territory of Australia. His camp was by a billabong about 250 kilometers out of Darwin, down the track in the outback. I was working at a trailer motel/diner that was 100 kilometers down that same road. He would occasionally stop for a meal or to stay in the motel for a night. We were friends long before we married. I saw a lot of the world with him. Fossil collecting was fun for me especially since I had such a great teacher.

Mary Hollingsworth

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Hollingsworth Collection at the DMNS

The fossil, rock and mineral collections of the late Stew Hollingsworth have been moved to the Denver Museum of Nature & Science (DMNS), together with his field notes, his trilobite- and Cambrian-related library, and the geological and biostratigraphic collections of Stew's father, Richard Hollingsworth. The collection is diverse, but is anchored by Series 2 Cambrian trilobites of southwestern North America, a global reference collection of Cambrian trilobites, and an extensive suite of Eocene fossils from the Green River Formation. These materials are currently being inventoried and will soon be installed in the museum's new collections facility; there they will be available to the community for research, loan, or transfer. Thanks to Mary Hollingsworth, John Foster (Moab Museum) and the team of DMNS collections volunteers and staff for helping pack and shepherd the transfer of Stew's collections legacy.

James Hagadorn

Leonaspis williami Whittington Type A, Lower Devonian, Olkahoma from the Hollingsworth Collection

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Rasetti Remembered

Richard Fortey: When I was a young researcher at The Natural History Museum in London (then universally known in the trade as "The BM") we managed to negotiate the purchase of Rasetti's collection, the bulk of his trilobites excluding the type specimens he had mostly deposited at the USNM. This was a pretty large collection of trilobites all clearly curated by Franco himself, mostly in old tobacco tins with the lid replaced by glass. They now reside in the systematic collection in London.

I went to visit Rasetti in Via Salaria in Rome, as Rasetti had finally gone home to Italy after many years in North America. Of course, his professional work was in particle physics, in which he was quite renowned. And in retirement he had taken up the cause of European orchids, which he photographed, so he was certainly a man of many parts. In 1972 I recall going to his immaculate apartment, where I was received cordially by Franco and Mrs. Rasetti, and we discussed trilobites over supper. He was very polite, but he must have wondered about this precocious young man, still wet behind the ears, and then without a monograph to his name. He and Sir James Stubblefield were the senior trilobite figures of the time, and it was impossible not to be a little intimidated by meeting the great men.

Sir David Attenborough, who is arguably the world's best-known naturalist and television presenter, and Richard Fortey in Morocco at the Devonian trilobite localities (2010). Trilobites figured in a series called Attenborough's First Life, and Richard was along to smooth the way in Morocco during the filming.

The Rasetti Collection duly arrived in London, and we put it away in the appropriate drawers, arranged by family according to the 1959 *Treatise*. There it remains. It is perhaps still an underused resource. Not only does it contain many more specimens of species erected by Rasetti, but it includes topotypes from the same boulders at Levis as the types, and often includes better preserved specimens than the types, as well as associated sclerites. Cambrian and Ordovician trilobites are represented, and those researchers who would like to know more about the taxa Franco Rasetti erected should contact Claire Mellish at the NHM London, who would be happy to arrange a visit.

GUNTHER HALL OF FAME

The Gunthers are well known for their extensive collecting of localities in Utah and Nevada and making the material available to paleontologists. My idea is to place "amateurs" into this hall of fame, ones that have made a difference in science. Generally these would be people with no or little formal paleontological/ geological training and do it for pure fun. [Fred Sundberg]

Lloyd Gunther began hunting trilobites at a young age, possibly as early as 1931. As he began raising a family, his wife Metta, and then the rest of the family joined in with this exciting hobby. It wasn't long before it became a little more than a hobby. Unable to identify many of the fossils that they found, specimens were taken to the local universities near where they lived. Dr. Richard Robison became a fa-

Val, Metta and Lloyd Gunther, 1984

vorite destination for many of these unknowns. Frequently, these specimens were determined to be unknown to science and needed additional study. The Gunthers were pleased to learn that James Sprinkle, a Doctoral Student at Harvard, intended to name a new species in their honor.

Almost from that day on, the Gunthers collecting interests changed from collecting for themselves, to collecting for science. Over the years they have collected hundreds of new species and now have nearly three dozen named in their honor. They have shared their personal collection with many museums and universities over the years.

Shortly before Metta died in 1984, Lloyd, Metta and Val were honored be being named the first recipients of the Harrell Strimple Award, which was awarded by the Paleontological Society for outstanding contributions to science by a non-academic. Since then, other awards have followed. Most recently, Val and his son Glade were given a similar award by the Mid-American Paleontological Society.

There have been tens of thousands of fossils donated by the Gunthers. Their collection is open to any scientist to come and study or to have for research. No scientifically important specimens are in their possession. They are always turned over to various institutions where they can be properly studied. The Gunthers have also authored or coauthored numerous papers including two books featuring Utah trilobites.

Lloyd passed away in 2013 at the age of 96. When we told him that it wasn't safe for him to walk on uneven ground because we feared that he would fall and get hurt, it meant that he could no longer collect fossils. He decided that it was time for him to die. The Gunther Legacy continues into the next generation, with grandson Glade. He is an avid collector with his sixth sense for finding new localities and a physique for moving rock. The Gunthers are also eager to share their knowledge and experience anyone interested.

Val Gunther

A CENTURY AGO

Articles on trilobites or trilobite-related publications of 1918

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Why 1918 was a year with relatively few publications on trilobites remains puzzling. It was the first year after World War I, but this would have affected only continental Europe to some degree. The prime target region of trilobite research over the decade before 1918, however, had been decidedly North America. In 1918, trilobite publications from this region were not particularly frequent. Nevertheless, a few studies merit a short or longer glance.

The only article on North American trilobites of major impact in that year ranks among the classical trilobite articles of all time. Charles

D. Walcott's study on "Appendages of trilobites" was published in his perpetual "Cambrian Geology and Paleontology" series as number 4 in volume IV and is certainly well remembered by all readers of these lines. Walcott (1850–1927) was at about the peak of his career and abilities in 1918, although he was already 68 years old. Perhaps his second marriage with Mary M. Vaux in 1914 had provided him another push. However, Walcott's study on the trilobite appendages appears to have been the longest lasting project of his career. The introduction to this article starts with the following sentence: "In September, 1873, I said to Professor Louis Agassiz that if opportunity offered I would undertake as one bit of future research work to determine the structure of the trilobite. This promise has kept me at the problem for the past forty-five years, and except for the demands of administrative duties the investigations would have been advanced much more rapidly." We are probably grateful that Walcott persisted until the publication of the results (and even much longer). Nevertheless, it should be noticed that he had already published a short article on the topic in 1881. This article portrays the insufficient knowledge available at that time which prompted him to place the trilobites under the Class Pœcilopoda.

How much progress in 37 years: The main target of the 1918 study bases on material discovered in the Miaolingian (Drumian) Burgess Shale of the Stephen Formation of British Columbia collected by Walcott himself in his field campaigns 1910–1913 and 1917. The key species is of course *Olenoides serratus* (Rominger, 1887), which Walcott still listed as *Neolenus serratus* in 1918. The second trilobite species that provided anatomical details for a fairly complete reconstruction of trilobite appendages was *Triarthrus eatoni* (Hall, 1838) (dealt with as *T. becki* Green, 1832 in Walcott's study); a species from the Upper Ordovician Utica Shale near Rome, New York State. We know exactly, when and where the soft parts of the species were first discovered: This must be credited to an amateur collector and curator of the Museum of Rutgers College, William S. Valiant from Rome, NY, on September 24, 1892. Valiant found the first species with pyritized appendages in what became subsequently Beecher's Trilobite Bed (see Beecher 1893). However, it was in fact W.D. Matthew who had published the first article on the antennae and other appendages of *Triarthrus* from these strata in 1893.

Additional trilobites with at least partially preserved appendages dealt with by Walcott (1918) include *Ehmaniella burgessensis* Rasetti, 1951 (dealt with by Walcott as *Ptycho-*

Reproduction of Plate 18 from Walcott (1918): *Olenoides serratus* (Rominger, 1887), from Burgess Shale Member of the Stephen Formation, west slope of ridge between Mount Field and Wapta Pass, 1.6 km northeast of Burgess Pass, British Columbia.

paria permulta Walcott, 1918), *Kootenia dawsoni* (Walcott, 1888) (perhaps identical with *K. burgessensis* Resser, 1942), *Isotelus maximus* (Locke, 1838), *Isotelus covingtonensis* Ulrich, 1914, *Flexicalymene senaria* (Conrad, 1841), and *Ceraurus pleuroxanthemus* Green, 1832. Walcott illustrates this material on 29 plates with partly miraculously preserved specimens and with a number of *Cruziana* and *Rusophycus* traces that provide insight into the nature of the appendages as well.

Edwin Kirk (1884–1955) was paleontologist working for the U.S. Geological Survey until the year before his death, joining the USGS even before he had received his Ph.D. degree at Columbia University in 1911, being an Assistant to Amadeus W. Grabau. When Kirk joined the USGS, he became an Assistant to Edward O. Ulrich and concentrated in the study of Ordovician and Silurian sediments in the Appalachians. In 1918, he presented a first comprehensive summary of the complete stratigraphy of the White-Inyo Mountains of California and the adjacent areas in the Nevadan sector although the title of his publication refers only to the Inyo Mountains. The Cambrian and Ordovician sections with the trilobite occurrences originate from earlier articles by Charles D. Walcott, but Kirk's study is a first summary of the stratigraphy of the region.
Charles Butts published in 1918 a report on the stratigraphy and fauna of the Furongian Warrior Formation in central Pennsylvania, with notes on trilobites. The material collected by him was used by Tasch (1951) in his study on the faunas. Just a footnote is the short report by Branson and Greger (1918) on the Mississippian–Pennsylvanian Amsden Formation of Wyoming, which mention a first trilobite recorded from the formation.

One of the most productive trilobite workers of North America was George Frederick Matthew (1837–1923). Matthew, amateur scientist with pronouncedly proliferous interests, published 350 species of fossil and recent animals and plants. In 1918, he celebrated his 81st birthday and had been a retiree since 1915. No surprise that he had moved into a slow gear devoid of a trilobite article published in that year, but not without a publication with new fossils introduced. In 1918, these were Devonian land plants from Ireland.

Leaving North America for this retrospect brings us to Europe, and first to the classical trilobite region Scandinavia. G.T. Troedsson is usually cited as having published in 1918 his monograph on the (Upper Ordovician–Lower Silurian) "Brachiopodskiffer" (brachiopod slates) of Scania, which includes numerous trilobite descriptions not only from this region of southern Sweden, but also on Norwegian material. However, the monograph dates in fact from 1919.

A region that had not been under focus for trilobites before is situated in Poland. Jan Samsonowicz (1888–1959), presented one of his first articles on the geology and stratigraphy of the Lower Paleozoic of the Holy Cross Mountains in Poland, with special emphasis on the Cambrian rocks. This article reports the first finding of a lower Cambrian fauna with *Holmia kjerulfi* Linnarsson (now *H. marginata* Orłowski), *Holmia*? sp., *Ellipsocephalus nordenskioeldi* (identity uncertain), *Acrotreta* sp. and *Hyolithus* spp. in sandstones along the Koprzywianka River near Gieraszowie. Obviously, Samsonowicz was biased in his determinations by the publications of Holm (1887) and Moberg (1899) so that he identified a fauna nearly identical with that found in southern Sweden, but in fact his determinations and stratigraphic conclusions were a first recognition of a lower Cambrian trilobite fauna in Central Europe. The fauna discovered Samsonowicz had been born in the region and spent most of his career as the initial explorer of the Holy Cross Mountains after he had returned from his university education in St. Petersburg in 1914. He then became Assistant

Professor in 1915 and later Full Professor at Warsaw University.

The nearby Barrandean region of the present-day Czech Republic is one of the most proliferous trilobite areas. In 1918, Jaroslav Perner published a monograph on trilobites from strata which at that time had the strange stratigraphic signature D-d1γ and what now translates to the Middle Ordovician Šárka Formation, one of the amply fossiliferous units of the Barrandean near Prague. Jaroslav Perner (1869–1947) was a nephew of the renowned geologist Anton Fritsch (Antonin Frič, 1832–1913) as well as a student of Otomar Novák (1851–1892) and became curator at the National Museum in Prague in 1892. Together with his student Jan Kolíha (1890–1939) he accounts for a modern school of paleontology for Bohemia. Perner was not a specialist for trilobites, and in fact the 1918 publication was a revised and completed unpublished manuscript of Otomar Novák. Among the remarkable trilobites introduced in this monograph were the hungaiid *Dikelocephalina bohemica* Novák in Perner, 1918, later becoming the type species of *Hungioides* Kobayashi 1936; the cheiruriid *Areia barrandei* Novák in Perner, 1918, now the type species of *Areiaspis* Přibyl & Vaněk, 1964; and dalmanitid *Dalmania Barroisi* Novák in Perner, 1918, now the type species of *Vokovicia* Šnajdr, 1987. Novák also introduced a new genus, *Colpocoryphe* Novák in Perner, 1918, but based on the Middle Ordovician *Calymene* (*Synhomalonotus*) *arago* Rouault, 1849 from Ille-et-Villaeine in Brittany, western France. The work also introduces the new species *Ectillaenus benignensis*, Moroccan specimens of which are nowadays among the frequent objects of the fossil market.

Rudolf Richter and his former student and then wife Emma presented in 1918 one of their "occasional papers" with notes on trilobites from the Devonian of the Eifel Mountains in western Germany. As far as we know, most of this article was written by Emma Richter, but is was regarded as self-evident that Rudolf Richter acted as the senior author. Among the new species described in this article is the proetid *Proetus* (*Euproetus*) *dohmi* from the Middle Devonian/Eifelian Junkerberg Formation near Gerolstein, Eifel, which became subsequently the type species of *Dohmiella* Lütke, 1990 (now mostly regarded as a junior synonym of *Gerastos*; see Adrain 1997) and the lichid *Lichas* (*Euarges*) *mephisto*, one of the lichids with a spectacular morphology that provoked the Richters to choose the unusual species name. It later became the type species of *Mephiarges* Richter & Richter, 1930.

Among the important trilobite articles of 1918 ranks F.R.C. Reed's "notes on the genus *Homalonotus*," issued in two parts. Frederick Richard Cowper Reed (1869–1946) studied in Harrow and the Trinity College, Cambridge, and in 1892 was appointed assistant to the Woodwardian professor of geology in 1892 – a post which he retained for twenty-five years. His chief duties were curatorial in the Woodwardian Museum (later the Sedgwick Museum), a function that enabled him to work on a vast spectrum of fossils and excellent specimens. In this 1918 article, Reed revised the taxonomy of the Homalonitidae, which at that time were still more or less in the concept of Salter (1865). Reed introduced four new genera: (1) *Brongniartella* (type species *Homalonotus bisulcatus* McCoy in Sedgwick & McCoy, 1851, from the Caradocian Alternata Limestone Formation of England); (2) *Burmeisterella* (type species *Homalonotus* (*Burmeisteria*) *elongatus* Salter, 1865, from the Lower Devonian Meadfoot Group of England); (2) *Eohomalonotus* (type species *Asaphus brongniarti* Deslongchamps, 1825], from the Middle Ordovician May Formation of Normandy, northwestern), which replaces *Brongniartia* Salter, 1865); and (4) *Parahomalonotus* (type species *Homalonotus gervillei* Verneuil, 1850, from the Lower Devonian of Sarthe, France).

Trilobite Stamp collection. Provided by Scott Morrison.

Another two initial reports on fossiliferous Cambrian strata published in 1918 come from southern Spain. Eduardo Hernández Pacheco (1872–1965) was an eminent Spanish geologist and paleontologist with very diverse interest that partly swept into archaeology and included studies from the Cambrian into the Pleistocene. In 1918, he was already well-settled as the Chair of the National Museum of Natural Sciences, when he focused on the stratigraphy and fossils of the Sierra de Córdoba and published two studies on the Cambrian, one of them concentration on the stratigraphy in the area for the first time, the other dealing with archaeocyaths. Unfortunately, he was obviously unable to recognize the trilobite remains from the same sections, some of which rank among to the oldest known trilobites on a global scale.

Both studies were presented as short papers in the *Comptes Rendus de l'Académie des Sciences* of Paris, which were regarded (at least by non-British scientists) as the journal with the highest scientific impact of that time. It is

therefore not surprising that two other remarkable notes were published in the same volume. One is the first note on the presence of Cambrian (and Ordovician) in northwestern Africa, which is also the first recognition of trilobite-bearing Cambrian in entire Africa. The author was Georges Lecointre (1888–1972), an at that time young geologist working in Morocco for most of his life on very different aspects. Lecointre completed his thesis "La Touraine, géologie régionale" in 1926, with interesting aspects on the so-called "faluns" of Neogene age and bryozoans being involved.
Lecointre reported in his 1918 note that he had studied a section near Ilo't de Sidi Abderrahmane, a tiny village in the outskirts of Casablanca in Morocco, in July 1917. He had discovered trilobites, which he regarded as poorly preserved, but identified "a cephalothorax and abdomen without pygidium [sic!] reminiscent to forms of the genera *Ptychoparia* Corda or *Hicksia* Delgado, cephalothoraces seemingly similar to the genus *Anomocare* Angelin, and finally an abdomen with pygidium and cephalothorax od a *Paradoxides* similar to *P. Barrandei* Barrois and *P. mediterraneus* Pompeckj …" (my translation from p. 611). He correctly stated that the presence of *Paradoxides* indicates a middle Cambrian age ("Acadien") and discussed similar rocks from other localities in the Casablanca region, but without any fossil findings being mentioned. Findings of brachiopods brought him to suggest a possible Silurian age for the strata in which they were found, but the identification remained uncertain.mentioned. Findings of brachiopods brought him to suggest a possible Silurian age for the strata in which they were found, but the identification remained uncertain.

Joseph H. Sinclair (1879–1946), a well-known American consulting geologist, presented a note on the age of what was called at that time the "grès de la Guinée Francaise". Sinclair provided a precise age for a Paleozoic sandstone that crops out at a mountain range in the vicinity of Kindia and Télimélé in the present-day Republic of Guinea, in the border region to Sierra Leone. The age assignment as Silurian was based on the observation of *Monograptus priodon* to occur frequently within the rocks. However, he also noted that trilobite fragments are also observed within the formation, being the first note on trilobites from West Africa and also the first true report of fossiliferous Lower Paleozoic rocks from West Africa. Sinclair later became quite famous for his explorations in South America, and he became fascinated by the early colonial history of the South American countries and translated the "La Conquista del erú" (published 1534 in Seville, Spain) into English.

It is probably worth to mentioning that the graptoloids are preserved in shale intercalations of the sandstone that was subsequently termed the "Grès Siliceux Horizontaux" and was found to have an amazing extension into Sierra Leone and even Senegal. Gertrude Elles studied Sinclair's samples and determined not only *M. priodon* but also other graptoloid species that indicate a Wenlock age. This proves another staircase wit of science history: the eminent graptoloid workers Gertrude Elles (1872–1960) and Ethel Wood (1871–1946) saw in the same year 1918 the completion of their unexcelled and much admired comprehensive monograph series on graptoloids with the publication of the title page and index of their "Monograph of British Graptolites" that had seen the first part in 1901.

The well-known French paleontologists Charles Barrois, Pierre Pruvost and Georges Dubois presented in the in the *Comptes Rendus de l'Académie des Sciences* a note on the Silurian–Devonian transition in the Pas-de-Calais region, northern France. This stratigraphical study mentions the tremendously fossiliferous lower Gedinnian Schistes à Tentaculites de Méricourt with its trilobites such as *Homalonotus vialai* (now *Digonus vialai*), *Acaste spinosa* (=*Acastella spinosa*) and *Cryphaeus michelini* (=*Pseudocryphaeus mich-*

elini) and the upper Ludlowian Calcaire d'Angres with its rich trilobite assemblage with *Acaste downigiae* and *Calymene blumenbachi*.

Australia saw in 1918 the publication of a fairly comprehensive monograph on the Carboniferous trilobites from that continent. The author was John Mitchell (1848–1928), a school teacher and paleontologist born near Glasgow in Scotland. Mitchell arrived with his parents in Australia in 1849 and joined the Department of Public Instruction at Newcastle, New South Wales, in 1878. He started to collect fossils seriously in 1883 and published his first paleontological paper in 1886. 1898 he was appointed science master at Newcastle Technical College. He lectured on a wide range of subjects including geology, botany, chemistry and assaying, and continued his paleontological research. Mitchell's work focused on trilobites and brachiopods for which he was regarded as an authority. Between 1890 and 1917 he collaborated with Etheridge.

The 1918 publication is perhaps the most renowned of Mitchell's career. Most of the material came from the Lower Carboniferous of the present-day Flagstaff Formation of New South Wales. About 20 new species were described by Mitchell, but no new genus introduced. Among the new species were *Griffithides convexicaudatus*, now the type species of *Longilobus* Engel & Morris, 1995, and *Phillipsia superba*, now the type species of *Rosehillia* Engel & Morris, 1995.

The last article to mention is simply to acknowledge Cambrian research in Australia. London-born Frederick Chapman (1864–1943) published in 1918, during his 25-year period as a paleontologist at the National Museum, Melbourne, a study on "Ostracoda from the Upper Cambrian limestone of South Australia." This title may appear a bit droll from the present-day view because the subjects of this study were not ostracods, but bradoriids; the Upper Cambrian in fact turned out to be lower Cambrian; and "the limestone of South Australia" is the "Parara Limestone" and of course one of plenty of calcareous units in the region. Nevertheless, Chapman's article ranks among the early important studies on the bradoriids. It supplements the fauna with trilobites first described by Woodward (1884), Tate (1892) and Etheridge (1898, 1902, 1905). The three scientists described *Dolichometopus tatei* Woodward, *Microdiscus subsagittatus* Tate, *Olenellus*? *pritchardi* Tate, *Conocephalites australis* Woodward and *Ptychoparia howchini* Etheridge, testifying a very stumbling start to the lower Cambrian trilobitology of Australia. The first three of the listed trilobite species are now regarded as *Pararaia tatei* (Woodward), the two others as *Yorkella australis* (Woodward) thanks to the first global player in trilobite research, Teichi Kobayashi.

The last chapter of this overview deals with trilobites in an indirect way. In 1918, a sort of a crime affair took place in which trilobites play a considerable role. I will leave the readers with the task to do a bit of their own research, but would like to point to a book by Roger Osborne titled "The Deprat Affair. Ambition, Revenge and Deceit in French Indo-China." The publishing house adverts the book with the following text (shortened herein): "The Deprat Affair recreates the hothouse atmosphere of colonial Indochina in the early twentieth century. Among its cliques, its bitter rivalries, its nepotism and favours, how are we to disentangle the scientific, the moral and the legal 'truths' of the affair? Most of all, the story centres on one compelling individual – Jacques Deprat. En route to a golden future as one of France's greatest geologists, he is suddenly accused of fraud and plunged into a desperate fight to save his reputation. Convicted of placing European fossils among samples collected in Indochina, he is dismissed from his job, and expelled from the Société Géologique de France. Thrown out of the science to which he has given everything, he re-invents himself, changes his name, and begins two fascinating

new lives. And even in the manner of his premature death, Deprat proved his ability to shake the world. Eighty years on from his conviction, the truth of the Deprat affair is still in doubt." As in our case, the fossils in question are all trilobites. I would to emphasise Richard Fortey's review of this of this book under https://www.lrb.co.uk/v21/n23/richard-fortey/did-the-self-made-man-fake-it-with-bohemian-fossils.

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RESEARCH REPORTS

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In 2016, we started research on trilobites from the Lahn-Dill area (Rhenish Massif east of the river Rhine, Rhenohercynian Zone, Germany), which come mainly from around the Lower/ Middle Devonian boundary. This consists of revisions of former taxonomies as well as descriptions of the numerous new finds. Former authors tend to relate finds from that area taxonomically to species mainly from the Prague basin (Czechia). Our research, however, offers alternatives like relations to, e.g., Morocco, which does not necessarily excludes Pragian – Rhenish interactions. Current related projects

Paralejurus sp. n. from the Lahn Syncline, Germany

are dealing with the German occurrences of the scutelluine genus *Paralejurus*, with the first identification east of the river Rhine of the hitherto strictly Gondwanan scutelluine genus *Heliopeltis*, and with new proetines and warburgellines from the Lahn Syncline.

Basse, M. & Müller, P. (2016): Trilobiten aus dem Ober -Emsium und frühen Eifelium der südlichen Lahnmulde (Rupbach-Schiefer, Leun-Schiefer und Ballersbach-Kalk). – Abhandlungen der Senckenberg Gesellschaft für Naturforschung, 572, pp. 1–329.
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Basse, M., Müller, P. & Ahrens, M. (2017): Die Trilobitengattung Macroblepharum im Devon von Deutschland. Fossilien, Journal für Erdgeschichte, 06/17, pp. 20–27.

Basse, M. & P. Müller (2018): Phaetonellus aus dem Devon des Rhenoherzynikums (Trilobita, Emsium und Eifelium, rechtsrheinisches Schiefergebirge). Dortmunder Beiträge zur Landeskunde, naturwissenschaftliche Mitteilungen, 48, pp. 97–183.

Submitted:
Basse, M. & Müller, P. (2017): Status quo of the finds of Paralejurus in the German Variscides (Trilobita, late Silurian to early Middle Devonian). Mainzer geowissenschaftliche Mitteilungen, 45, manuscript 35 pp.

In preparation:
Basse, M. & Müller, P. (201?): Heliopeltis inexspectata n. sp., first discovery of this genus outside of Gondwana (Trilobita, Rhenohercynian Zone, Lower Devonian).

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Even now, at 81 years old, I am still greatly involved with research trilobites. After many years immensely enjoyable collaboration with British, Scandinavian, German, Argentine and Chinese friends, two main projects remain and continue. Firstly, With my Swedish colleague Kristina Mansson (Malmo) and other Swedish palaeontologists. I am working upon the upper Cambrian (Furongian) Alum Shales of Sweden. This is basically palaeobiology, especially the comparative ontogenies of the olenid trilobites, and their microevolution and ecology. Kristina and I very recently submitted a substantial revision of Raw's (1925) work on *Leptoplastides salteri* from Shropshire, England, to "Transactions of the Royal Society of Edinburgh" and we hope to continue with further studies of Swedish leptoplastines. Secondly, Brigitte Schoenemann (Cologne) and I have been much involved with the eyes and vision of trilobites and other arthropods, with many other colleagues. There is an accessible summary in our 2017 work 'Vision in fossil arthropods' in "Transactions of the Royal Society of Edinburgh; Earth and Environmental Sciences" . This refers to recent discoveries of sublensar sensory structures in schizochroal eyes, revealed by CT scanning, and regeneration of damaged eyes in Norwegian *Telephina*, with Magne Hoyberget. Brigitte and I are now studying the internal structures of schizochroal eyes especially the enigmatic filaments described by Stuermer & Bergstrom (1973), and revealed by x-radiography. Brigittre meanwhile continues with the physics of compound eyes.

I am very happy that Trilobite Papers has been resurrected – thank you to all – and let us keep up the good work.

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My work concentrates on the reconstruction of early and middle Cambrian earth history illustrated by rocks from different regions of this planet, but trilobites play a key role in these research activities. After finishing a taxonomic study on the earliest trilobites from Morocco (see reference below), I am continuing with the phylogenetic consequences and its impact on the Cambrian Series 2 lower boundary. Further research activities include the study of para-/neoredlichiids from the lower Cambrian of Morocco; the taxonomy of solenopleurids in general; the biostratigraphy and taxonomy of trilobites from the *Ornamentaspis frequens* through *Badulesia tenera* zones in Morocco; a monograph of the trilobites from the Wildenstein Member of the Tannenknock Formation in the Franconian Forest, Germany; ptychoparioids from Peary Land, Greenland; lower Cambrian trilobites from the eastern High Atlas (Morocco/Algeria) and their meaning for the depositional development and paleogeography of the northwestern Africa segments during the Cambrian; and others.

Geyer, G., in press. The earliest known West Gondwanan trilobites from the Anti-Atlas of Morocco, with a revision of the Family Bigotinidae Hupé, 1953. Fossils & Strata.

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Jim, with Roger Cooper and Chris Bentley, is continuing to work on the middle and late Cambrian trilobites from Northern Victoria Land, Antarctica. We are currently preparing a summary paper on this topic. Jim and Chris Bentley are continuing to work on the middle and late Cambrian faunas of Tasmania. Jim and Chris, along with John Laurie and Keith Corbett, have recently finished a paper on several isolated faunas from the Adamsfield Trough in south-west Tasmania, describing both trilobites and brachiopods. Jim is part of a team (including John Paterson, Diego Garcia-Bellido, Jim Gehling, Mike Lee, Greg Edgecombe, James Holmes, Alison Daley) working on the remarkably well-preserved Emu Bay Shale Konservat-Lagerstatte from Kangaroo Island. Jim was also a part of the group led by Glenn Brock (Macquarie University) that has led to some significant publications, with Marissa Betts and Sarah Jacquet as lead authors, on the early Cambrian correlations of South Australia

Recent Publications

BETTS, M.J., PATERSON, J.R., JACQUET, S.M., ANDREW, A.S., HALL, P.A., JAGO, J.B., JAGODZINSKI, E.A., PREISS, W.V., CROWLEY, J.L., BROUGHAM, T., MATHEWSON, C.P., GARCÍA-BELLIDO, D.C., TOPPER, T.P., SKOVSTED, C.B. & BROCK, G.A., (accepted for publication). Early Cambrian chronostratigraphy and geochronology of South Australia. Earth-Science Reviews, 185, 498-543.

JAGO, J.B., BENTLEY, C.J., LAURIE, J.R. & CORBETT, K.D. (accepted for publication). Some middle and late Cambrian trilobites and brachiopods from the Adamsfield Trough, Tasmania. Alcheringa.

SUN, X.W., BENTLEY, C.J. & JAGO, J.B., 2017. The significance of Cambro-Ordovician trilobites from the Kalladeina 1 drill hole, Warburton Basin, South Australia. Australian Journal of Earth Sciences 64, 471-485. http://dx.doi.org/10.1080/08120099.2017.1319420.

BETTS, M.J., PATERSON, J.R., JAGO, J.B., JACQUET, S.M., SKOVSTED, C.B., TOPPER, T. P. & BROCK, G.A., 2017. Global correlation of the early Cambrian of South Australia: Shelly fauna of the Dailyatia odyssei Zone. Gondwana Research 46, 240-279.

BETTS, M.J., PATERSON, J.R., JAGO, J.B., JACQUET, S.M., SKOVSTED, C.B., TOPPER, T. P. & BROCK, G.A., 2017. A new lower Cambrian shelly fossil biostratigraphy for South Australia, Reply. *Gondwana Research 44*, 262-264.

JACQUET, S.M., BROUGHAM, T., SKOVSTED, C.B., JAGO, J.B., LAURIE, J.R., BETTS, M.J., TOPPER, T.P. & BROCK, G.A., 2016. *Watsonella crosbyi* from the lower Cambrian (Terreneuvian, Stage 2) Normanville Group in South Australia. *Geological Magazine*, *131*, 767-783. doi:10.1017/S0016756816000704

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Although officially retired, I am still involved in research at Geoscience Australia where I worked for 32 years. I have been involved with calibrating the Permian of eastern Australia using a significantly more precise U-Pb dating technique and using it to calibrate endemic Australian palynostratigraphic schemes. Apart from that I have finally resuscitated a project on southernmost Tasmanian late Furongian agnostid and trilobite faunas (with Jim Jago and Kim Bischoff), as well as one on the agnostid and trilobite faunas from a fully cored petroleum well (Hunt 1) which penetrates the lowermost Cambrian Stage 5 in the Georgina Basin of central Australia. I am also mentoring a high-school student who is undertaking a small project on trilobite ontogeny.

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I have been slowly grinding away at several upper Cambrian and Ordovician projects. Most recently I have been collaborating with John Taylor and John Repetski on an agnostoid-olenid rich coquina from the upper Cambrian Windfall Formation of Nevada. The most abundant taxon is *Lotagnostus*. The taxonomy of *Lotagnostus* has been contentious, in part, due to taphonomic influences, small sample sizes, and the proposal to use a *Lotagnostus* species to define the base of Cambrian Stage 10. We have identified in excess of 1000, undeformed *Lotagnostus* specimens from the coquina that resolve cleanly into 2 morphologies, one strongly scrobiculate and one that is largely effaced. This dichotomy may impact proposals to use the concept of a highly variable *Lotagnostus americanus* to define the base of Cambrian Stage 10. In the time since the last volume of the Trilobite Papers I have published on the base of the Whiterockian Series (Ordovician of Nevada), contributed to and helped edit the guidebook for the post-meeting fieldtrip for the 12th International Symposium on the Ordovician System, contributed to the AAPG volume on the Cambro-Ordovician Great American Carbonate Bank, and published on some symphysurinids.

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Miller, J.F., J. D. Loch, and J. F. Taylor. 2012a. Biostratigraphy of Cambrian and Lower Ordovician strata in the Llano Uplift, central Texas (Extended Abstract): *in* J.R. Derby, R. Fritz, S. A. Longacre, W. Morgan, and C. Sternbach (eds.), The Great American Carbonate Bank: The Geology and Petroleum Potential of the Cambro-Ordovician Sauk Sequence of Laurentia: AAPG Memoir 98:187a-193a.-

Miller, J.F., J. D. Loch, and J. F. Taylor. 2012b. Biostratigraphy of Cambrian and Lower Ordovician strata in the Llano Uplift, central Texas *in* J.R. Derby, R. Fritz, S. A. Longacre, W. Morgan, and C. Sternbach (eds.), The Great American Carbonate Bank: The Geology and Petroleum Potential of the Cambro-Ordovician Sauk Sequence of Laurentia: AAPG Memoir 98:187-202.- (Presented as digital file on CD accompanying the printed volume).

Taylor, J.F., J.E. Repetski, J.D. Loch, and S.A. Leslie. 2012c. Biostratigraphy and Chronostratigraphy of the Great American Carbonate Bank: *in* J.R. Derby, R. Fritz, S. A. Longacre, W. Morgan, and C. Sternbach (eds.), The Great American Carbonate Bank: The Geology and Petroleum Potential of the Cambro-Ordovician Sauk Sequence of Laurentia: AAPG Memoir 98:15-36.

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Having now retired, I am now able to devote much more time to trilobite research, including completing numerous projects that were started long ago. In addition, I am editing an issue of *Fossils and Strata* with David Bruton (Oslo) containing some of the papers arising from the very successful 6th International Conference on Trilobites and their Relatives held in Tallinn in July 2017.

Significant progress is being made on the description of Upper Ordovician trilobites from the long-neglected Slade and Redhill Formation in South Wales with Lucy McCobb (National Museum of Wales, Cardiff) and Patrick McDermott (St Clears, South Wales). A paper on the taphonomy of the trilobites in an echinoderm Lagerstätte from there will appear in the Tallinn conference volume.

Work on Ordovician trilobite faunas from Ireland with various collaborators is being restarted and includes the trilobites of the Tramore Limestone, faunas from County Dublin and trilobites from terranes close to the Iapetus suture zone. The description of the trilobites from the Hirnantian at Dob's Linn and elsewhere in the Scottish Southern Uplands is being undertaken (with Keith Ingham, Glasgow) as is a long-delayed wider analysis of deep water Ordovician faunas.

I see that in the last issue of The Trilobite Papers, I noted that funding had been obtained for a PhD student, Clare Tormey (now Historic Environment Scotland), to work on the very fine scale chemistry, structure and crystallography of trilobite eyes, co-supervised by my colleague Martin Lee (Glasgow). That led to several publications and further papers are in preparation. The work also led to other collaborations, including one with Carys Bennett (Leicester) and hence the following recent paper:

Bennett, C.E., Williams, M., Leng, M.J., Lee, M.R., Bonifacie, M., Calmels, D., Fortey, R.A., Laurie, J.R., Owen, A.W., Page, A. A., Munnecke, A. & Vandenbroucke, T.R.A. 2018. Oxygen isotope

analysis of the eyes of pelagic trilobites: testing the application of sea temperature proxies for the Ordovician. *Gondwana Research*, 57, 157-169.

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Ongoing research continues to focus on early - middle Cambrian shelly faunas from North Greenland (Laurentia), with current emphasis on sponge spicule associations and other small shelly fossils.

The recent paper with Sebastian Willman documents additional trilobite material and the associated shelly fauna that occurs together with the type species of the olenelline trilobites *Limniphacos* Blaker & Peel, 1997 and *Mesolenellus* Palmer & Repina, 1993 in their type area of North Greenland. The material is derived from the upper member of the Buen Formation (Cambrian Series 2, mainly Stage 4) and its description complements published descriptions of the Sirius Passet Lagerstätten (Stage 3) which occurs in the lowest part of the formation. The fauna is diverse, but dominated by hyoliths, with numerous partially articulated specimens.

John S. Peel *and* Sebastian Willman, 2018. The Buen Formation (Cambrian Series 2) Biota of North Greenland. published online, Papers in Palaeontology 2018;doi: 10.1002/spp2.1112.

Frontal auxilliary impressions of glabellar musculature in *Mesolenellus hyperboreus* from the Buen Formation form the basis of the following paper:

Rudy Lerosey-Aubril & John S. Peel, 2018. Gut evolution in early Cambrian trilobites and the origin of predation on infaunal macroinvertebrates: evidence from muscle scars in *Mesolenellus*. Published online Palaeontology (2018)

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The most complete of the currently known Cambrian sections in the sediments of the open sea basin on the Siberian Platform is the section of the Ogon'or Formation on the Khos-Nelege River in the basin of the lower reaches of the Lena River in the north-eastern frame of this region, in the Chekurovka anticline, Tuora -Sis Ridge (Lazarenko et al., 2008a, b; Lazarenko et al., 2011, etc.). In 2008, this section was submitted to the International Cambrian Stage Subdivision Working Group as a potential stratotype of the stage subdivisions of the Furongian Series (Lazarenko et al, 2008a). Unfortunately, due to the weather conditions, it was not possible to visit the section itself at that time. One of the discussed levels of global correlation, which can serve as the lower boundary of the upper stage of the Cambrian, is the level of the first appearance (FAD) of the agnostoid *Lotagnostus americanus*. This species is widely distributed in the upper part of the Ogon'or Formation on the Khos-Nelege River, the left tributary of the Daldyn-Yoznigi River, where the upper part of the section of this formation is also uncovered. The most characteristic and some new representatives of the trilobite communities, distributed in the Ogon'or Formation, were imaged and described (Lazarenko et al., 2008a,b; Lazarenko et al., 2011). In 2010, I participated in an additional study of the upper part of the Ogon'or Formation on the Khos-Nelege and Daldyn-Yoznigi rivers. Based on the materials of these and previous studies, I am completing the study of polymerid trilobites, among which new species of *Parabolinites, Eurycarina, Pelturina, Bienvillia, Idiomesus, Promegalaspides, Macropyge, Rhadinopleura, Skljarella,* and representatives of the genera *Yuepingioides, Kujandaspis*, *Mansiella, Monosulcatina, Plicatolina*. The data obtained clarify the composition of trilobite communities in this part of the marine basin and allow for a wider and more reasonable correlation with the deposits of the upper Cambrian of a number of paleocontinents.

On March 29, 2018 Nadezhda P. Lazarenko, the discoverer of the Cambrian section on the Khos-Nelege River and one of the most famous explorers of Cambrian trilobites in Sibe-

ria, died at the age of 94.

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Lazarenko, N.P., Gogin, I.Ya., Pegel, T.V., and Abaimova G.P. The Khos-Nelege River section of the Ogon'or Formation: a potential candidate for the GSSP of Stage 10, Cambrian System. Bulletin of Geosciences, Vol. 86, No 3. 2011. Pp. 555 – 568.

Lazarenko, N.P., Gogin, I.Ya., Pegel, T.V., Sukhov, S.S., Abaimova G.P., Egorova, L.I., Fedorov, A.B., Raevskaya, E.G., Ushatinskaya, G.T. Excursion 1b. Cambrian stratigraphy of the northeastern Siberian Platform and potential stratotypes of lower boundaries of the proposed Upper Cambrian Chekurovkian and Nelegerian stages in the Ogon'or Formation section at the Khos-Nelege River; the boundaries are defined by the FAD of *Agnostotes orientalis* and *Lotagnostus americanus*. The Cambrian System of the Siberian Platform. Part 2: North-East of the Siberian Platform. Moscow-Novosibirsk, PIN RAS. 2008a. Pp. 60-139 [in Russian and English].

Lazarenko, N.P., Pegel, T.V., Sukhov, S.S., Abaimova G.P., Gogin, I.Ya. A typical section of the Upper Cambrian of the Siberian Platform – a candidate for the stratotype of the stages of the International Stratigraphic Scale (the Khos-Nelege River, Western Yakutia, Russia) /Cambrian sections of the Siberian Platform – candidates for the stratotype of the International Stratigraphic Scale subdivisions (stratigraphy and paleontology). Materials for the 13th International Field Conference of the Cambrian Stage Subdivision Working Group. Yakutsk, July 20 - August 1, 2008 Novosibirsk, SB RAS, 2008b. Pp. 3-58 [in Russian].

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I continue to work on various trilobite projects in western and northern Canada, as well as in western Argentina in collaboration with Osvaldo Bordonaro. PhD student Marcelina Labaj finished her doctoral thesis on the middle and early late Cambrian trilobites of the Abrigo Formation of southern Arizona, and a monograph manuscript is in preparation. Another PhD student, Julien Kimmig, studied the biota of a Burgess Shale-like deposit in northwestern Canada which I stumbled upon during my PhD field work in 1983. We have published several papers on it, the most recent one describing large coprolites containing ptychoparioids, agnostoids and hyoliths. We interpreted these to have been feeding on the organic matter in the feces, which argues that agnostoids and hyoliths were benthic deposit-feeders just like the ptychoparioids, and hyoliths were mobile rather than stationary suspension-feeders as has recently been claimed.

Kimmig, J., and Pratt, B.R., 2018. Coprolites in the Ravens Throat River Lagerstätte of northwestern Canada: implications for the middle Cambrian food web: Palaios, v. 33, p. 125–140.

Pratt, B.R., and Bordonaro, O.L., 2014. Early Middle Cambrian trilobites from La Laja Formation, Cerro El Molle, Precordillera of western Argentina: Journal of Paleontology, v. 88, p. 906–924.

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I've been working in the Conasauga Fm. in Georgia and Alabama for decades, including revising some of Resser's 1938 taxonomy in my 1989 paper (below). Currently I'm working with my field associate, Bill Montante, on a unique specimen from the Aphelaspis Zone in Georgia. A small clayshale specimen contains more than 180 Aphelaspis brachyphasis 5th and 6th stage meraspides in a ~28 x 30 mm area (Fig. 1) on a single bedding plane. The larvae are largely complete and packed together in apparently random arrangement. In addition, among the few oriented ventral-side up we found at least one with intact hypot-

Fig. 1. Overview of the claystone sample with > 180 meraspides of *Aphelaspis brachyphasis*

home (Fig. 2), which to my knowledge has not been previously observed. An additional detail in the specimen is the holaspid molt adjacent to the meraspides, including an upside-down free cheek which is under part of the cluster. The fact that these are largely complete meraspid individuals, at approximately the same

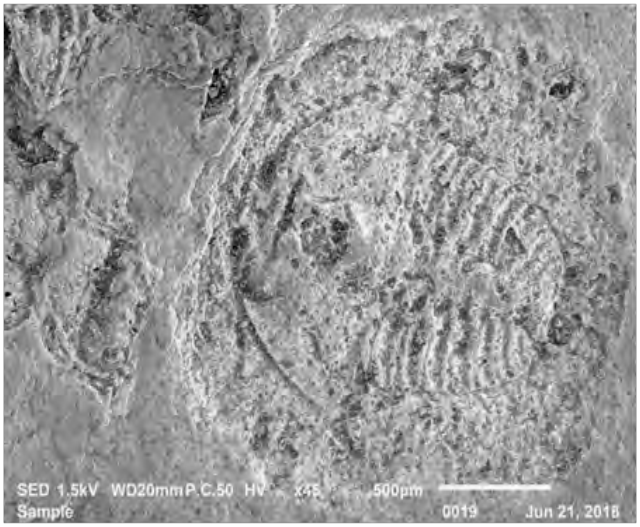

Fig. 2 SEM of ventral view of meraspid 5 with natant hypotome.

stage of ontogeny, and not oriented in a preferred direction, indicates this is not a current-winnowed accumulation. The best hypothesis to explain this occurrence is that these juveniles clustered gregariously, possibly at their egg-deposition site, either as protective behavior or in response to a homing instinct. The basic description of this specimen was presented at the GSA meeting in Seattle (as below), and a detailed discussion is in prep. for *Palaios*. I'd be interested in knowing if any similar material has been found, especially from the Cambrian.

Another note of interest: the 2007 paper includes a complete specimen of *Glyphaspis capella* from the Conasauga Fm. in western Georgia, which shows the imprints of the thoracic filamentous appendages. Apparently, these were preserved well enough to survive compaction in the clay matrix. It appears that the perfectly-sorted clays in the middle- to upper Cambrian Conasauga tend to preserve intact trilobites quite well. The reasons are not definitive, but it may reflect the location in a plate-edge recess at the time related to marine currents.

Conasauga publications:

Schwimmer, D. R. and Montante, W. M. 2017. A Cambrian meraspid cluster evidence of trilobite egg deposition. Abstracts, Annual Meeting Geological Society of America, v. 49(6), doi: 10.1130/abs/2017AM-295123.

Schwimmer, D. R. and W. M. Montante. 2012. An *Aphelaspis* Zone (Upper Cambrian, Paibian) trilobite faunule in the central Conasauga River Valley, North Georgia, USA. Southeastern Geology, v. 49 (1) p. 31-41.

Schwimmer, D. R. and W. M. Montante. 2007. Exceptional Fossil Preservation in the Conasauga Formation, Middle Cambrian, Northwestern Georgia, USA. PALAIOS, 22(3): p. 360-374.

Schwimmer, D. R., 1989. Taxonomy and biostratigraphic significance of some Middle Cambrian trilobites from the Conasauga Formation in western Georgia. Journal of Paleontology, 63(4): p. 484--494.

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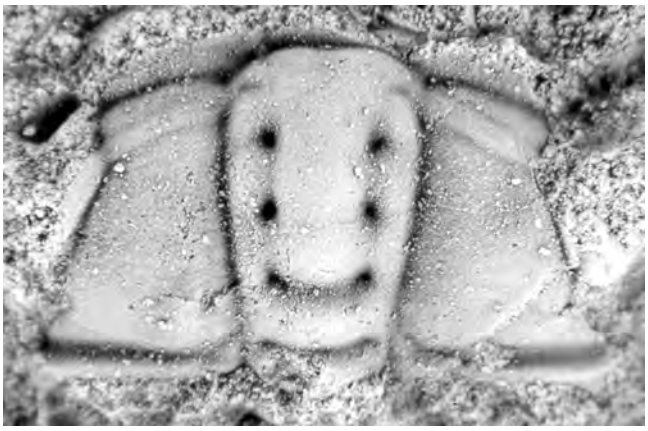
In my continuing efforts to clarify the taxonomic problems resulting from C. E. Resser's work on Cambrian trilobites, I am presently reinvestigating the trilobite faunas from the lower portion of the Lakeview Limestone, Idaho (Series 3, Stage 5 Cambrian). This consists refiguring the type specimens named Resser in 1938 and new specimens.

Taxa include *Pentagnostus*, *Pagetia*, *Orycto-cephalites*, *Kootenia*, *Athabaskia*, *Zacan-*



Oryctocephalites reynoldsi (Reed, 1899)

thoides, *Oryctocara*, *Thoracocare*, *Amecephalus*, *Elrathina*, and *Utia*.

In addition, Mark Webster and I are presently writing a paper redescribing *Oryctocephalites palmeri* Sundberg and McCollum, 1997, based on silicified remains from the Combined Metals Member of the Pioche Shale, Nevada (Series 2, Stage 4 Cambrian). Included in the discussions are the ontogeny of the species and the compaction distortion of shale specimens.

Sundberg, F.A., 2018, Trilobite biostratigraphy of the Cambrian 5 and Drumian stages, Series 3 (Laurentian Delamaran, Topazan, and Marjuman stages, Lincolnian Series) of the lower Emigrant Formation at Clayton Ridge, Esmeralda County, Nevada. Journal of Paleontology, Memoir 76, 44 p.

Wotte, T., and Sundberg. F.A., 2017. Small shelly fossils from the Montezuman-Delamaran of the Great Basin in Nevada and California. Journal of Paleontology, v. 91, p. 883-90.

Cuen-Romero, F.J., Valdez-Holguín, J.E., Buitrón, B.E., Monreal, R., Sundberg, F., Montijo-González, A., and Minjarez-Sosa, A., 2016. Cambrian stratigraphy of the San José de Garcia, Sonora, Mexico: El Gavilán Formation, a new lithostratigraphic unit of middle Cambrian open shelf environment. Boletín de la Sociedad Geológica Mexicana, vol. 68, pp. 429-441.

Sundberg, F.A., Geyer, G., Kruse, P.D., McCollum, L.B., Pegel', T.V., Żylińska, A., and Zhuravlev, A.Yu., 2016, International correlation of the Cambrian Series 2-3, Stages 4-5 boundary interval. Australasian Palaeontological Memoirs, 49, pp. 83-124.

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Despite my retirement from active faculty status in January 2016, I continue to push forward as an emeritus professor on numerous projects on Cambrian-Ordovician faunas in various areas of North America. Most are focused on trilobites and agnostoids of Furongian to Tremadocian age, but a few recent projects also involve somewhat older "middle Cambrian" (Miaolingian Series) faunas. The primary goal of every project is to refine the information the faunas can provide regarding the age and paleogeographic origin for the rocks that contain them, befitting the traditional and still critical role of the biostratigrapher for which I remain a staunch advocate (Taylor, 2009; Taylor et al., 2012). Examples of the middle Cambrian faunas I am studying include a new, *Elrathiella*-dominated, inner shelf fauna from the *Ehmaniella* Zone in Dinosaur National Monument in Utah, *Bolaspidella* and/or *Cedaria* Zone faunas from carbonate debris flows interbedded with deep marine volcanics in the Selwyn Basin of the Yukon, and faunas of Siberian aspect (Amgan Stage) in the central Brooks Range of Alaska. The unequivocally Laurentian faunas from the Selwyn Basin provided a helpful contrast with younger (Furongian), and only peri-Laurentian faunas associated with the Whale Mountain volcanics on the Alaskan North Slope that I describe in an article (Johnson et al., accepted) completed and accepted for publication in a GSA special paper to be published later this year or early in 2019. Among the taxa dealt with in that paper is a new species of the ceratopygid genus *Aplotaspis,* which is retained as a valid genus rather than a junior synonym of *Charchaquia* as proposed by Bao and Jago (2000).

Rich trilobite collections from the Nanook Limestone in the Shublik Mountains on the North Slope are also under study, and have already provided conclusive evidence (Strauss et al., 2013) in the form of uniquely Laurentian taxa (*Stenopilus armatus* and *Paraplethopeltis* sp.) to refute earlier claims that those strata originated on or near Siberia. Our Alaska-Yukon project also involves re-study of the faunas of the Jones Ridge Formation, expanding the work of Palmer (1968) through study of additional Furongian and Tremadocian collections made in three visits to the Ogilvie Mountains in 2010-2014. Our preliminary report on the Ordovician faunas from the Jones Ridge (Taylor et al., 2015) highlights previously under-appreciated species diversity within the *Symphysurina* Zone, an observation also made in an earlier paper with James Loch in which we describe several new taxa from that zone in Utah, New Mexico, and Texas

(Loch and Taylor, 2011). Many more new species of that genus in our collections from Wyoming, the southwestern USA, and elsewhere await description when (if?) I can find the time to return to them. One major, but worthwhile diversion from that initiative in recent years has been the description of faunas through the middle of the Sunwaptan Stage (upper *Illaenurus* and lower *Saukia* Zones) to document the extent to which trilobite genera and species change across the base of the *Eoconodontus* conodont Zone, a horizon that we have argued in a series of papers (e.g. Miller et al., 2011, 2015) is well suited to serve as the base of the uppermost global stage of the Cambrian System (Stage 10). Strongly divergent opinions regarding the suitability of the FAD of the agnostoid *Lotagnostus americanus* to serve that purpose, which are rooted in very different views regarding the range of morphologic variation that should be accommodated in that species (Peng et al., 2015 vs. Westrop and Landing, 2016), has provided the impetus for James Loch and me to scrutinize rich, *Lotagnosus*-dominated faunas that we collected a decade ago from cherty, distal slope deposits in the Windfall Formation in Nevada. That work, which is nearly completed, casts further doubt on the validity of the claim by Peng et al. (2015) that all of the species they have synonymized under that name represent a single, globally distributed species.

Other collections in my bulging cabinets that continue to taunt me include the extensive collections made across the bases of the Stairsian and Tulean Stages in the El Paso Group in Texas and New Mexico. Those spanning the Skullrockian-Stairsian boundary reveal that the faunal turnover during the first extinction that affected the Laurentian platform faunas in the Ordovician did not involve the virtual depopulation of the shelf and subsequent invasion of olenimorphs from deep water that characterize the biomere boundary extinctions in the late Cambrian (Taylor et al., 2012). The *Paraplethopeltis* Zone at the base of the Stairsian is not a true "critical interval" at the top of a biomere comparable to those in the upper Cambrian (Taylor, 2006), so the base of the overlying *Leiostegium* Zone is not a true biomere boundary. The collections from the uppermost Stairsian and basal Tulean allow detailed correlation into the classic Ibexian succession in Utah and Idaho, and confirm the presence of an unconformity that omits three of the eleven new, species-based zones established for the Stairsian Stage by Adrain et al. (2014). And despite a lengthy paper (Brezinski et al., 2012) on the lower Paleozoic stratigraphy of the central Appalachians that details the sequential development of the Cambrian-Ordovician stratigraphic units and major events that they record, we have many more papers to write on the trilobite and agnostoid faunas of the Gatesburg, Stonehenge, Conococheague, and Frederick Formations. So I'm finding no shortage of things to work on in my "retirement".

John Taylor, standing with left foot on the unconformity at the Sauk-Tippecanoe Megasequence boundary at Tumbling Run in the Shenandoah Valley of Virginia while leading the post-symposium field trip of the 12th International Symposium on the Ordovician System in June 2015. Photo kindly provided by Andre Dronov.

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In the last few years I have worked mainly on latest Furongian-Tremadocian trilobites from the Cordillera Oriental, northwestern Argentina, as well as on Cambrian trilobites from the Precordillera. In addition, a manuscript (with Arturo Taboada, Alejandra Pagani, Karina Pinilla and César Taboada) on Carboniferous faunas from the Tepuel-Genoa Basin, Patagonia, has been submitted for publication. New studies on latest Furongian-Early Ordovician trilobites are in progress, jointly with Susana Esteban, Fernando Zeballo and Daniela Monti.

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My research straddles the fields of evolutionary developmental biology, systematics/phylogenetics, and biostratigraphy, and has three major goals: (1) to determine whether and how development constrains morphological diversification, and on what timescale such developmental constraints operate; (2) to improve understanding of the initial radiation of trilobites during the Cambrian, and thus to provide insight into the nature of major evolutionary radiations; and (3) to refine the resolution at which biotic and environmental change can be studied within the Cambrian System, a time of exceptional evolutionary significance.

My primary study system is the Trilobita, a group offering outstanding opportunities for studying the details of morphological evolution in a tightly constrained phylogenetic, environmental, and temporal framework at microevolutionary and macroevolutionary scales. The work involves employing cutting-edge methods in morphometrics in order to conduct detailed comparative analyses of the morphological variation, ontogenetic development, and developmental biology of trilobite species. This results in unprecedented insight into evolutionary mechanisms and constraints in fossil organisms. High-resolution (sub-meter scale) stratigraphic collecting permits patterns of morphological evolution to be framed within paleoenvironmental and sequence stratigraphic context, thus producing an integrative approach to stratigraphic paleobiology. The research has far-reaching implications for the broader fields of evolutionary developmental biology, paleobiology, and the integration of stratigraphy and morphometrics with phylogenetic analysis, and also forms important contributions to Cambrian paleontology and biostratigraphy.

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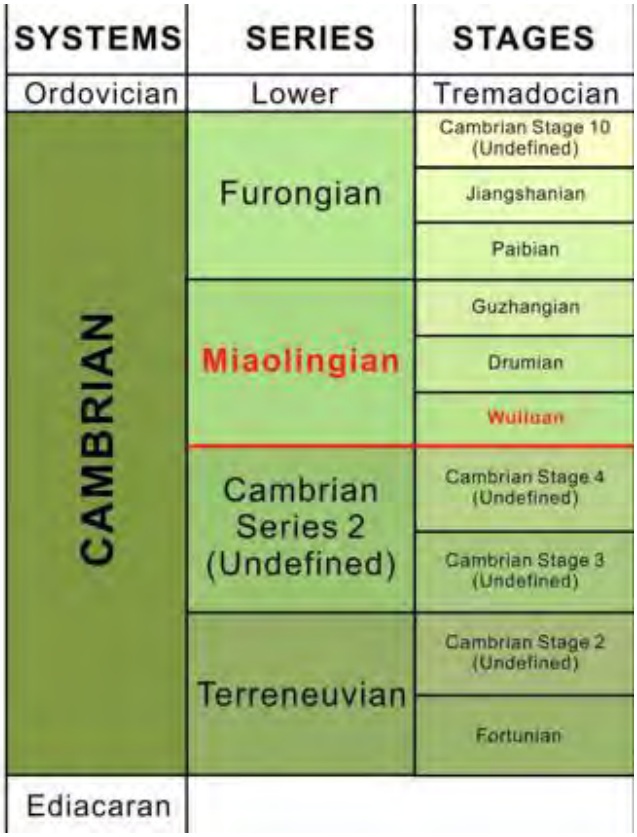
ANNOUNCEMENTS

The proposed GSSP at the Wuliu-Zengjiayan section of the Kaili Formation, at Balang Village, eastern Guizhou Province, China for the Cambrian Series 3, Stage 5 has been accepted by the International Union of Geological Sciences on 06/25/2018. This boundary, which is roughly equivalent to the lower/middle Cambrian boundary, is now known as the Miaolingian Series and Wuliuan Stage.



DID YOU KNOW?

Charles Resser in 1938a, b, 1939a, b papers (but not in 1942) considered Agnostids as a subclass parallel to Trilobita under Crustacea.

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NEW "ACADOPARADOXIDES" WEBSITE.

The Tarhoucht area in the eastern Anti-Atlas of Morocco is recognised as an important location for collecting stratigraphically useful trilobites of the Cambrian Series 2/Series 3 boundary transition. A new road, suitable for all vehicles, has recently been constructed between the local town of Tinejdad and Tarhoucht village, making the fine section in the Jbel Wawrmast Formation at nearby Bou Tiouit mountain easily accessible for visitors to Morocco. With this in mind, a new website entitled "Acadoparadoxides" has been published, devoted mainly to the controversial early species of that iconic trilobite genus encountered in the Tarhoucht area, in the hope of encouraging further studies in the early "Middle Cambrian" of West Gondwana as well as collecting for pleasure around Tarhoucht. The website provides notes on how to get there and what to expect, discussion of the issues surrounding the earliest species of *Acadoparadoxides*, a video and the opportunity to register questions and comments on the subject for consideration and debate on the website. Its address is: https://sites.google.com/view/acadoparadoxides

Tony Vincent

FIELD NOTES

Every field collector has sensed the Zen-like euphoria associated with being ensconced in a self-dug hole. There, as they split rock in the timeless rhythm of hammer-against-stone, they can truly feel content… at that exact moment all is right in their world. So there I was at the Ruin Wash trench line, twelve miles from the nearest paved road, which happened to lead to the small town of Panaca, Nevada. My goal was simple, to bring to light some of the lower Cambrian olenellids that, with a bit of luck, and a bunch of hard work, could be found there in abundance.

Suddenly, in the distance, breaking the silence and stillness, I heard the un-mistakable sound of tires grinding on patches of loose dirt and gravel. As the sound grew progressively louder, two large, ominous-looking black SUVs – each kicking up impressive plumes of dust in their wake – entered the grassy area fronting the trench line. As I slowly stood up to greet these unexpected visitors, the SUV doors opened and out stepped three distinguished-looking men, along with one older, somewhat frumpy, grandfatherly looking guy. Well, hell, if that older gentleman didn't turn out to be Professor **Riccardo Levi-Setti**, author of the "Bible" of trilobite lovers everywhere, TRILOBITES. For me, it was one of those " Moses coming down from the mountain" moments, something akin to Joe Montana

Collecting Trilobites at Ruin Wash, Nevada. Left to right are Kevin Durney, Riccardo Levi-Setti, George Ast, and Richard Kurewicz. Photo by Sony Mavia.

joining our neighborhood football game. Riccardo was in from Illinois, and he was accompanied by three of his physicist associates from the University of Chicago. After brief introductions and a bit of requisite small-talk, we all got down to the task at hand. Within minutes, I let out a hearty “Whoo Hoo!”, having split out a perfect *Olenellus gilberti* pos/neg. Riccardo inquired if I would kindly show him my prized find. He exclaimed, "what a beautiful medallion", as the positive side of the split showcased an almost perfectly circular calcite wafer covering the bug. Then the Professor proceeded to inquire in his typically soft-spoken, gentlemanly way if I would entertain the notion of an exchange. Of course I would, and did! He may have walked away with my prize find that day, but less than a week later I received a package from him featuring a large Moroccan *Crotalocephalus*, which he stated he had prepared himself.

The next year, on a spring dig with a couple of my Western Trilobites Association buddies, we found ourselves once again at Ruin Wash. As if on schedule, the black SUVs with Professor Levi-Setti, his crew and son, emerged like some sort of fossil-fueled apparition. Unbeknown to me, it turns out that Ruin Wash, as remote as it is, had turned into the Grand Central Station of "in the know" trilobite collectors. Over the ensuring years, many other collectors, scientists and enthusiasts have made the pilgrimage to this Nevada locale. Other notables I met there included Val and Glade Gunther, paleontologist Andrew Milner, and iconic New York collector Eugene Thomas. Later that day, Riccardo brought our WTA guys to the near-by Klondike Gap locality to do some collecting.

Richie Kurkewicz
Western Trilobites Association
San Francisco, California

50 AÑOS DE PASIÓN POR LOS TRILOBITES

JOAN CORBACHO, teacher of gemmology and paleontological fakes in the International School of Criminology (Barcelona, Spain) and responsible for the certificate of authenticity on trilobites at the Geological Museum of the Seminary of Barcelona. www.elfosil.com; fosilart@hotmail.com

The fondness for fossils came from my father´s hands. Since I can remember I have seen fossils in my house. When I was 10 years old, my family moved to live to Canyelles, a small village surrounded by mountains in NE of Spain, Europe, and it was there where I found my first fossils that at that moment I did not know that they belonged to an important Cretaceous site. One of those fossils has been described as a new species and devoted to me recently, *Psilothyris corbachoi*, by Calzada & Moreno, 2015.

Figures 1-2.Joan at the Canyelles outcrop in 1968.

During my childhood in 60s, it was really hard to find books on fossils in Spain and I did not have the opportunity to meet any palaeontologist near my village,

but this did not discourage me from studying fossils. My father fed this curiosity on fossils buying some books to identify them. I started my first collection that later it was donated to my village´s Museum and the school where I was studying. This small collection included ammonites, bivalves, gastropods, etc., but no trilobites. It was not until many years later that I was able to exchange fossils with a friend of Murero (Zaragoza, Spain) when I obtained a trilobite.

In 1990 I saw for first time a fossil shop in my home town that was managed by a Moroccan fossil dealer, Tayed Ettaiek, who was selling a few precious trilobites from Morocco. I did not think twice and I bought half of his shop! This visit was followed by many more others and was the beginning of our friendship. One day Tayed and I realised that we had a common friend, Lluis Pont, this helped me to have the doors of Morocco open for me and I started to buy and study Moroccan trilobites.

Since I started to go to Morocco in 1991, I have returned to this beautiful country at least once per year. The more I go, the stronger is the attraction I have for their culture and trilobites. After many trips I have made many friends who are fossil dealers and hunters such as Brahim Tahiri who owns a museum of palaeontology in Erfoud (Drâa-Tafilalet region) that has his name. Other fossil hunters from the same arena are Mahomet and Osaid Ben Moula of Taichoite (Alnif), all of them very popular within the scientific community. I cannot forget my friends Scott Morrison (USA) and Keith Hammond (UK) who have collaborated in my work.

At present I have more than 40 papers mainly on Moroccan trilobites and fossil fakes; 10 papers on Spanish invertebrate fossils; and one on a Canadian Cambrian trilobite. This work mainly represents the description of more than 30 new taxa in trilobites and a new one hyolithid.

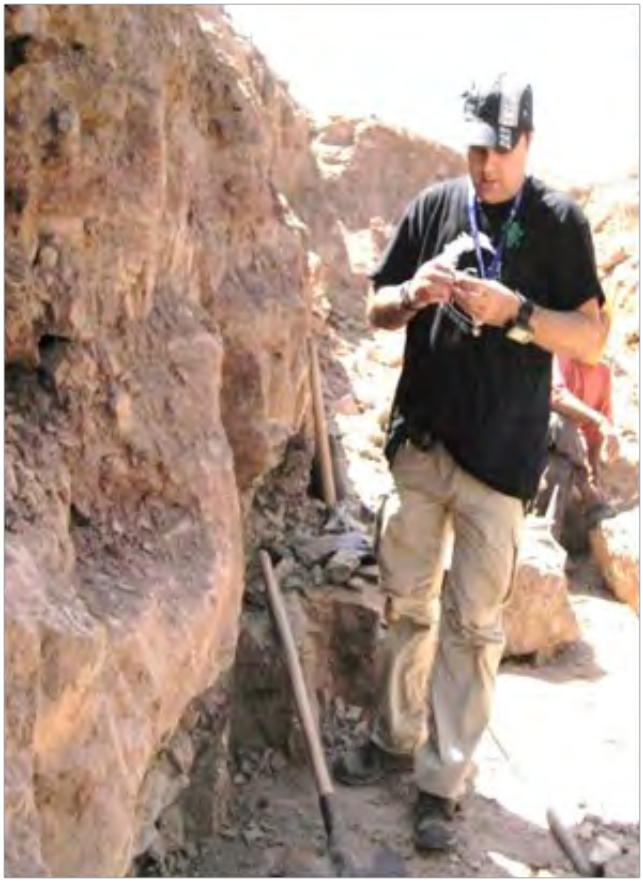

Figure 3. Joan 50 years later in the Moroccan Devonian site El Achana.

My immediate future includes collaboration with Dr Sebastian Calzada on bivalve taxonomy of the Geological Museum of the Seminary specimens without forgetting my research on Ordovician trilobites. The latter will be on taxonomy, systematics and palaeocology in an evolved context of the group and their origin in the palaeocontinent Gondwana.

My research will continue with the revision and update of other fossil arthropods from new sites recently discovered in Catalonia, Spain.

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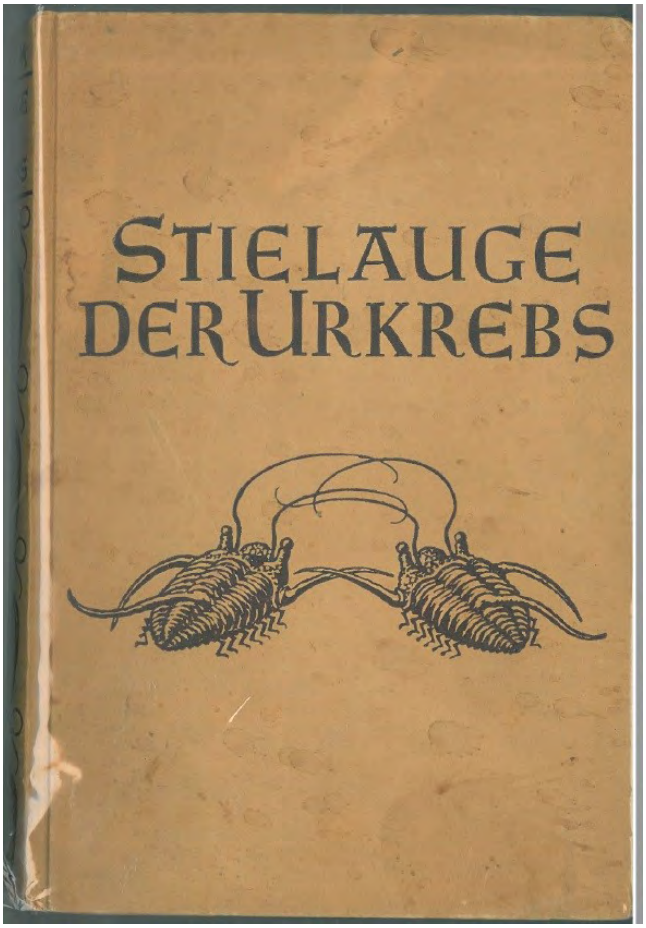
'STIELAUGE' [STALKED-EYE] OR PASSION IN AND FOR SCIENCE

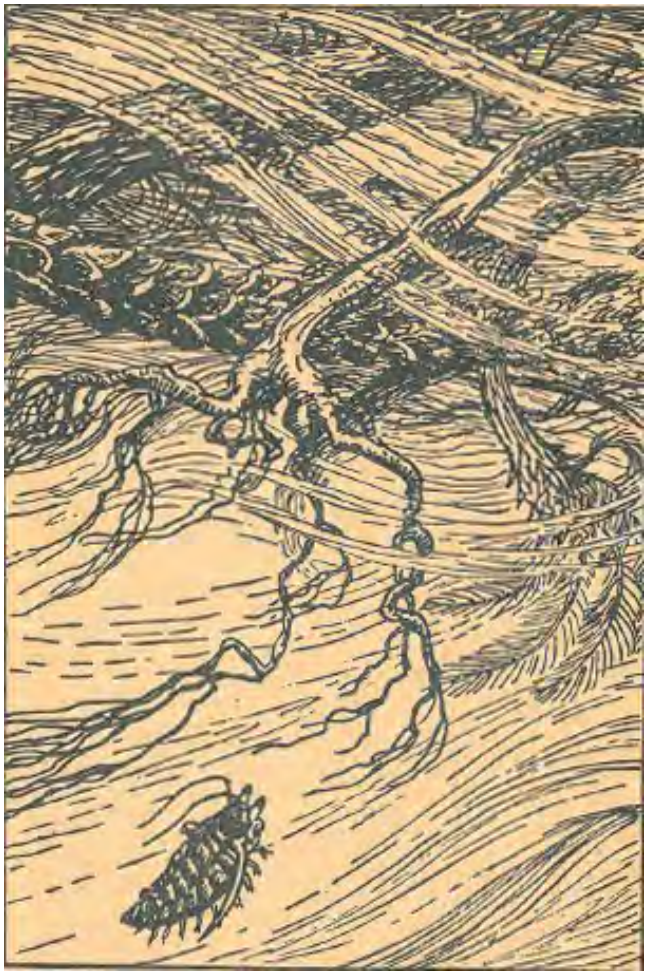
Brigitte Schoenemann

Some times ago I was given a strange book – 'Stielauge der Urkrebs' [Stalked-Eye the primordial crustacean], written by Dr. Baptist (Batti) Dohm, in 1933. It came from a student and he said I might find it interesting, because it is a trilobite book. Now then, I found it quite difficult to read, in its powerful, sometimes even pathetic speech Dohm describes in form of a novel the adventures of a little proetid trilobite, which today we would name *Cyphaspis ceratophthalmus* (Goldfuss 1843), through the course of time. *C. ceratophthalmus* is a small spiny trilobite, typical for the famous "Trilobitenfelder" [Trilobite Fields] where during the times of Dohm and Rudolf and Emma Richter especially phacopid trilobites with brilliant shell preservation were very abundant.



So Stielauge on his journey through the times and oceans of the world meets a lot of creatures, most of them bigger than himself, as the malacostracan, sea spiders, a half meter long millipede, a horseshoe crab, dinosaurs (dragons) and even humans. Stielauge suffers by natural disasters, when he is dropped off by a storm to the middle of a desert, or when big hails indicate an upcoming ice age. So the little trilobite passes many cataclysms, fighting against monsters and so even his romantic love to a female trilobite ends tragically, because after having fought for her and he, severely hurt he forgets her – because he had, as an arthropod, no brain. Today, from our point of view there are more ideas mistaken, as the tropical 'Atlantis', an element of the beginning theories about plate tectonics of the Austrian geologist Eduard Suess (1888: Das Antlitz der Erde [The face of earth]), which plays in the novel an important role, and the sunk continent 'Lemura'. The novel also is influenced by the Welteistheorie of H. Hörbiger (1860–1931) published in 1913. Following this all elements of the universe underlie a dualism to be sun or ice, causing an eternal cycles of catastrophes

Dr. Batti (Baptist) Dohm 1897 1977



and new creation. By this the novel also is a mirror of earlier conscience of earth history. The last chapter finally tells, how a strange professor, with a hammer in his hand (!) and dirty shoes, hastens across the fields of Gerolstein, highly excited and far from being noble and distinguished, collecting 'figure'-stones. He pays a Taler to the women on a beet field, to take of their socks that he could collect his fossils therein. It is Professor Goldfuss from Bonn (1782–1848), who finally finds Stielauge, and gives him his name: *cerat/ophthalmus*.

Now then – what may be the relevance of such a book? It has nice illustrations, made by Magnus Weidemann, and what else? Batti Dohm was born in Gerolstein in 1897, his father was a primary school teacher, who probably had the most excellent collection of trilobites of his time. He founded the 'Gegnostische Museum' in Gerolstein, which became destroyed by bombs in 1944 completely. Baptist returned safely from a first World War and studied Chemistry in Bonn, later Geology and Palaeontology in Greifswald. As a freelance his life was not free of material needs, and collecting fossils and as an excellent preparer he cooperated with museums in all the world, well renown by his expertise and brilliant knowledge about geology and earth history. When after the second World War the Gerolsteiner Verkehrsverein (Tourist Office of Gerolstein) was established, he was entrusted with its management. Dohm wrote many articles, especially about his home landscape, the Eifel, and its fossils, and two novels: 'Madame' (1948) and 'Stielauge, der Urkrebs' (1933, 2nd ed. 1942, 3rd ed. 1997), which he dedicated to his Jewish wife Liselotte. The NS-era he conceived as dark and demoniacal time, Baptist himself was arrested by the Gestapo for a while. When he died in the midsummer of 1977, his wife gave his collection to the city of Gerolstein, where it is exhibited in the “Dohm-Stübchen” of the local museum.

For me the most important is the preface of the book:

Aus frühen Jugendtagen iſt mir die Liebe zu den ſagenhaften Geſchöpfen geblieben, deren Bilder in Stein gegraben die Sintflut überdauerten. Meine Liebe wurde zu quälenden Fragen um das Rätſel ihres Lebens, ihrer Reiſe in das meerferne Eifelland und um ihr Untergehen auf ewig. Tage und Nächte ſuchte und forſchte ich, wühlte ich in den Äckern, die nach ihnen Dreilapp-Felder heißen. Oder ich lag, dem Geheimnis nachgrübelnd, am Ufer eines kleinen Eifelbaches, umweht vom Duft der wilden Minze und dem einſchläfernden Geruch des faulenden Schlammes, verfolgte Liebesſpiel und Kampf der Bachkrebſe. Stunden um Stunden ſtand ich vor den Glaswänden der Aquarien in zoologiſchen Gärten, hinter denen die gepanzerten Ritter unſerer Meere ſich tummeln. So erſtand mir langſam ein Bild deſſen, was ich zu ergründen ſuchte.

[From the early day of my youth onwards I feel inside me the affection to the fabulous creatures, engraved into stones their views outlasted the Floods. My affection changed to the agonising questions about the enigmas of life, their journeys to the land of the Eifel (German landscape, Devonian uplands) and their perish for ever. Days and nights I sought and searched, scrabbled in the fields, which are named after them “Trilobiten-Felder” [Trilobite fields]. Or I lay, musing

about the secrets, at the banks of a small Eifel stream, wafted by the scent of wild mints and the narcotic savour of rotting mud, following the mating games of crawfish. Hours and hours I stood in front of the tank´s glass walls in the aquaria of the zoological gardens, behind which the armed knights of our seas romped about. So slowly emerged an image of what I wanted to plumb/figure out/comprehend.]

Today we have our differential equations, our synchrotrons and x-ray-machines, our cladistic programs, transcription factors and 3D-reconstructions to describe everything precisely, tools to make everything more understandable. The novel itself is a child of its time, and bound somehow therein -what I would like give especially our young students along is an hour (or more) at a small stream, the excitement of finding a trilobite in the field, and the passion of risk to dream a bit about what may have happened, let´s say, several hundred of million years ago in the wide oceans of the Cambrian, Ordovician, Devonian, …, and the affection of feeling science.

The novel of Stielauge´s adventures ends when the boys wake up in the morning and it all was just a dream … was it completely? Dream!

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LATE DYERAN OLENELLOID FAUNA FROM ELLENDALE, S. MONITOR RANGE, NEVADA – A REPORT ON USGS COLLECTION 4233-CO.

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Introduction: A late Dyeran trilobite fauna reported from the Zabriskie Quartzite near the ghost town of Ellendale, Nevada, is apparently still the only report of trilobites from this unit. In their report on the geology of Northern Nye County, Nevada, Kleinhampl and Ziony (1985) recorded the occurrence along with a 1963 report from A. R. Palmer based on USGS collection 4233-CO. At this locality, the Zabriskie Quartzite is apparently intertonguing with the more offshore Harkless Formation; the formational terminology has received varying interpretations. The current report includes a brief discussion, and photographic documentation of the better material in the collection.

The material is too scrappy for formal description but is interesting because it apparently represents a poorly known stratigraphic interval just below the Carrara Formation and Mule Spring Limestone in the Great Basin.

Location: (Nevada: S. end of Monitor Range) N. Nye County, near ghost town of Ellendale; Field No. 917-1; in the "S1/2 of SW1/4, sec. 10, T. 2. N., R. 47 E.; Ellendale Mining district, Monitor Hills, s. of U.S. Hwy. 6, Monitor Range, Nye Co., Nevada." (Kleinhampl and Ziony, 1985, p. 36) The locality is apparently still accessible and lies outside the Nellis Air Force Range. The present author has not visited the site.

Stratigraphy and previous Comments: Kleinhampl and Ziony (1985, p. 36) state that this occurrence is in the Zabriskie Quartzite, described locally as an 80m-scale unit of primarily quartzite which is commonly fine-grained, with local intercalations of shale, phyllite, argillite, and shaly or quartzitic siltstone. Horizontal traces are reported in some of the shale. The underlying strata are assigned by the authors to Wood Canyon Formation; no Carrara Formation is reported above the Zabriskie but a slaty unit crops out above the quartzite which might be equivalent in part to the Carrara. It is reported that, due to the silty nature of the Zabriskie interval, J. H. Stewart prefers the terminology of Harkless, with Zabriskie tongue, at this section which lies not far east of Esmeralda County.

No stratigraphic data within the quartzite unit are given, nor is the precise position of the fauna. The same paper reports that the current collection is the only diagnostic collection reported from the Zabriskie, a conclusion that apparently still holds today.

A. R. Palmer's comments from the same paper (ibid., p. 36 - written comm. of Sept. 1963) are given here in full: "The olenellid fragments in this collection include reticulate pieces probably of a species of *Wanneria*, and many cephala of a small olenellid that seems to be undescribed. Its form, however, is similar to an undescribed species of the Carrara and they may represent the same genus. *Wanneria* at present is known only from the Saline Valley (=Zabriskie plus lower Carrara) Formation, or beds that Stewart mapped as Harkless. The sandy Saline Valley with *Wanneria* may actually be a temporal correlative of part of the Zabriskie, so the chances are reasonably good that the quartzite at 917-1 is related to the Zabriskie."

Lithology: Most of the collection appears to be in an identical host rock – a bleached, originally dark quartzite with pockets of dark, apparently carbonaceous material, which leaches out to pale orangish to white. The rock is inferred to be light tan on outcrop. The trilobites are black on the unbleached parts and limonitic

on the bleached parts. The lithologic uniformity of the collection may indicate that the collections are from a single horizon, but no information regarding the horizon(s) of the collection is available. The material is very difficult to prepare and several cephala in the collection are still mostly buried beneath matrix. The collection is believed to have been collected by Kleinhampl.

Fauna: None of the olenelloids appear to be assignable to any described or undescribed species known to the author (including basal Carrara forms); the fauna seems to be basically unknown apart from the present collection.

The faunal list includes:
Fremontia? sp.
Arcuolenellus? sp.
Olenelloid gen. & sp. indet (possibly 2 or 3

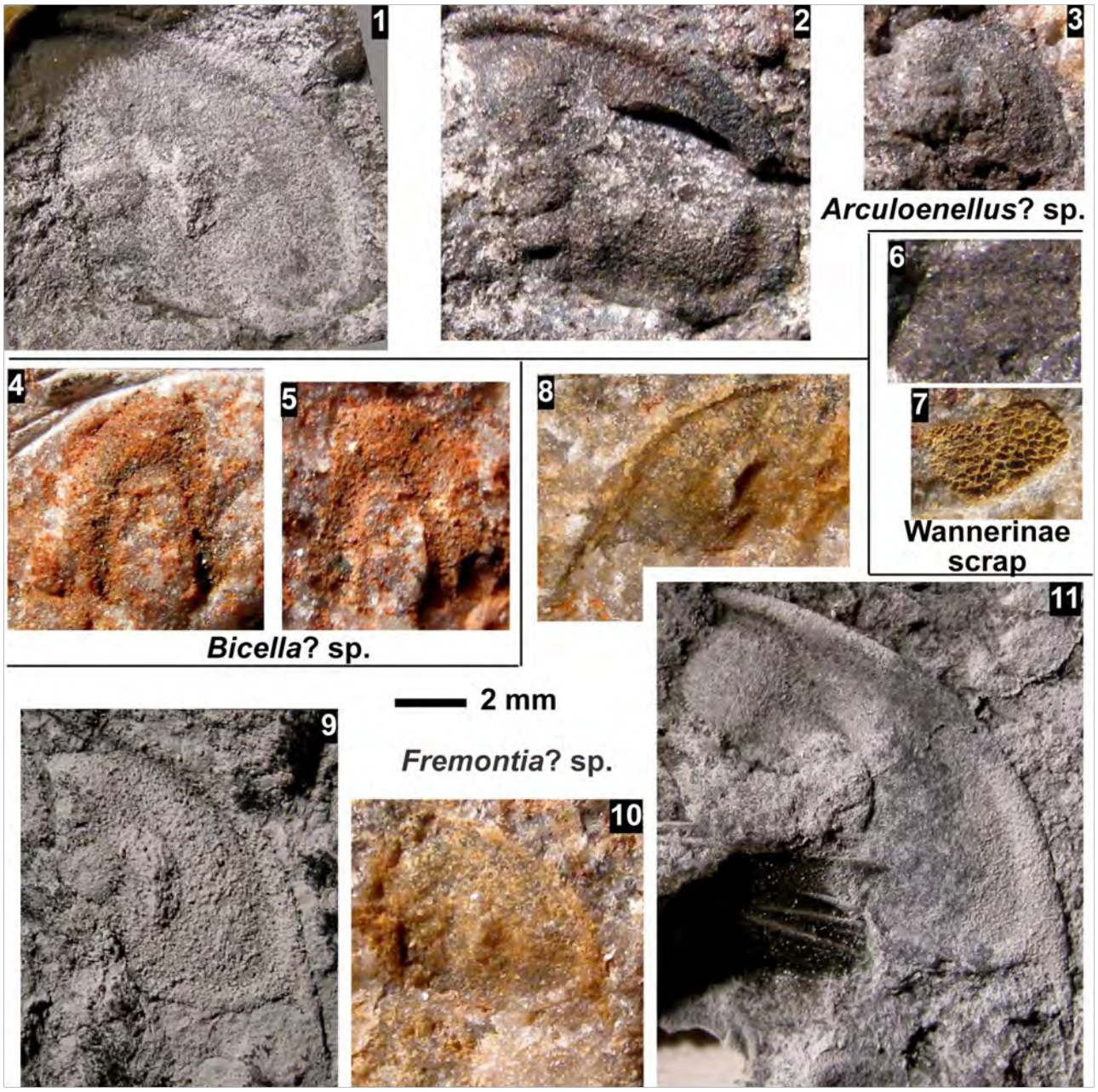

Figure 1 – trilobites from USGS collection 4233-CO; informal specimen numbers; all specimens positive molds unless otherwise indicated). Scale bar=2mm. Abbreviations: CL = cephalic length (sag.); L = length. *Arcuolenellus*? sp: 1-2. EL-L1a, latex cast (1), showing IGS, and positive mold (2), showing front of glabella and PGF (CL=est. 8.9mm). 3. EL-11 (CL=~4.1mm). *Bicella*? sp: 4-5. EL-10a, positive (4) and negative (5) molds (CL=est. 6.0mm). Wannerinae scraps: 6. EL-6c (L=~5mm). 7. EL-9a (L=~4mm). *Fremontia*? sp: 8. EL-15c, negative mold (CL=5.0mm). 9. EL-L5, latex cast

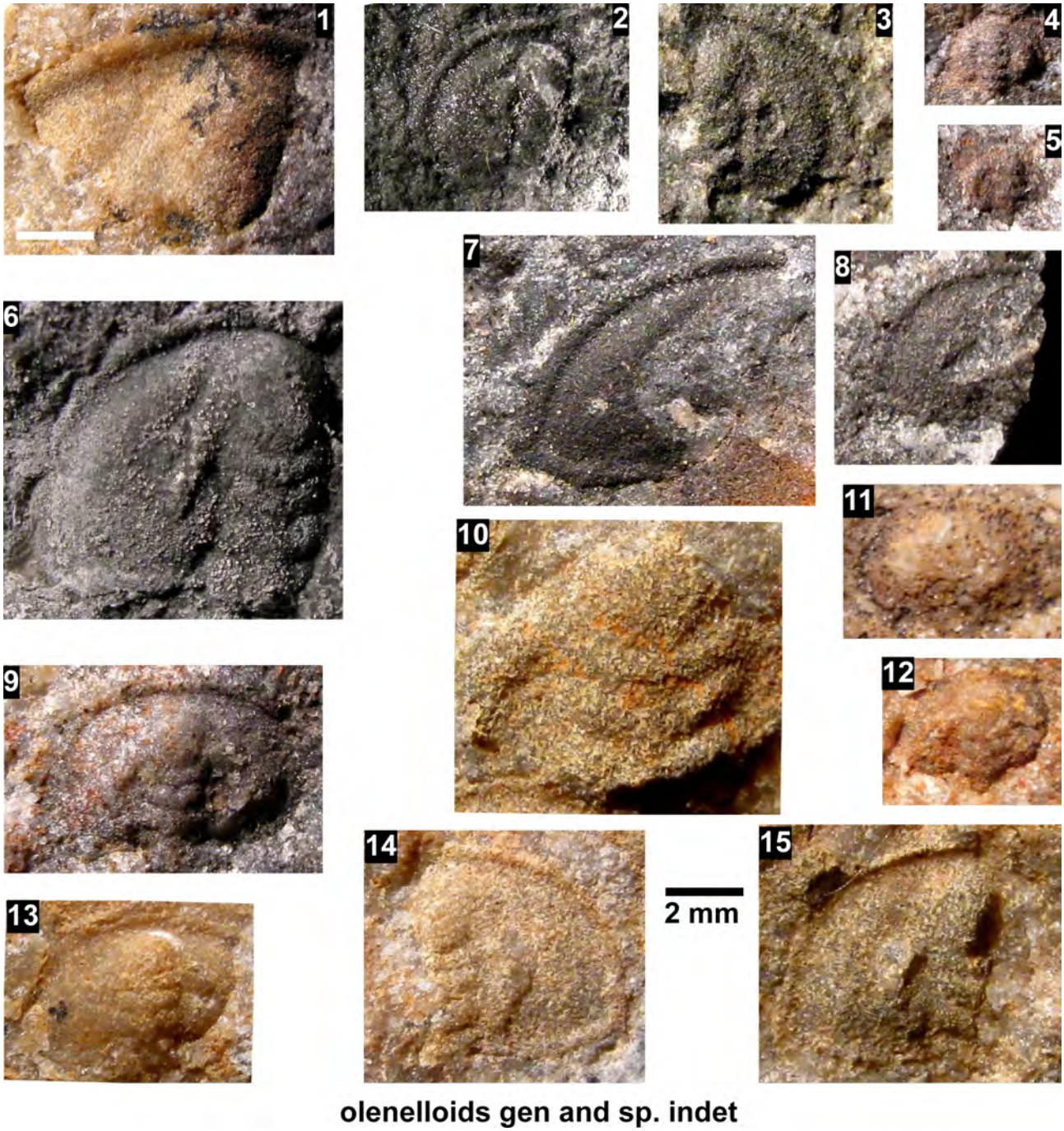

Figure 2 – olenelloids, gen. & sp. indet., from USGS collection 4233-CO; informal specimen numbers; all specimens positive molds unless otherwise indicated). White scale bar = 4mm (fig. 2.1 only), black scale bar = 2mm (figs 2.2-2.15). Abbreviations: CL = cephalic length; L = length. 1. EL-9b (preserved length (sag.) of scrap roughly 11mm). 2-3. EL-L3, latex cast (2), showing PGF and AA, and negative mold (3) (CL=4.6mm). 4. EL-L1b (CL=1.8mm). 5. EL-16 (CL=2.1mm). 6. EL-L2, latex cast (CL=7.9mm). 7. EL-7 (CL=est. 5.9mm). 8. EL-14 (CL=4.3mm). 9. EL-6a, showing PGF (CL=4.3mm). 10. EL-15b, negative mold (preserved length (sag.) of scrap = 6.4mm). 11. EL-13 (CL=3.1mm). 12. EL-10b (CL=2.9mm). 13. EL-6b (CL=4.0mm). 14-15. EL-15a, positive mold (14), showing AA, and negative mold (15)

forms)
Wanneriinae gen. & sp. indet (scraps)
Bicella? sp. indet

The beds are quite jumbled and only forms with more rugged shells, and smaller cephala, have survived at all intact. The scrappy and poorly preserved nature of the collection makes definite ids difficult. It appears that perhaps 4 or 5 olenelloid species are present of which only one can be fairly confidently assigned to a known genus *Fremontia* (which genus is recognized here as distinct from both *Mesonacis* and *Olenellus*, owing primarily to

unpublished thoracic data, but also following Raw 1936, Harrington 1956 and Bohach unpub. 1997). This *Fremontia?* evidently differs from other species of the genus in the shorter genal spines. Another form may be assignable to *Arcuolenellus*, but that is uncertain due to possible glabellar differences. Other forms show some similarity to *Mesonacis* s.s. (here restricted to forms similar to *M. vermontanus*).

Also in the collection are polygonally-sculptured scraps of Wannerinae, and a ptychoparioid cranidium possibly representing *Bicella* (Fred Sundberg, pers. comm.). Several hypostomes occur which are not illustrated.

Correlation: Faunas in Dyeran quartzite facies are not well known, so caution should be applied. Also, as mentioned above, the stratigraphic control of the collection is not precise. Nevertheless, faunal considerations suggest a correlation to strata just below the Carrara Formation and/or Mule Spring Limestone in the Great Basin.

In the Amargosa region (E of Death Valley), the basal 10m of Carrara Formation contains assemblages that seem similar to Ellendale at a generic level, including fairly common forms assigned to *Fremontia*, *Arcuolenellus* and *Mesonacis* ss (unpublished data; see also Fowler 1999), but no Wanneriinae have been identified to date, nor have any species overlaps with Ellendale been identified. The Ellendale fauna therefore probably predates the base of the Carrara, but not by too much. This would suggest a correlation with the underlying Emigrant Pass Member of the Zabriskie Quartzite, a unit which has not yielded trilobites to date. This indicates a position of 130m or more below the top of the Dyeran (in siliciclastic strata) in this region.

In W. Sonora, a general correlation with the 75m-scale Buelna Formation is likely, since that unit has yielded both *Arcuolenellus* and Wanneriinae.

In Esmeralda County, the upper limit for correlation of the Ellendale fauna is estimated at 25m below the base of the Mule Spring, by inference from the Amargosa data stated above and from data in Webster 2011 and Fowler 1999. At Split Mountain, this yields an upper limit point estimated at more than 250m below the top of the Dyeran (in mostly carbonate strata) (see Webster 2011).

A lower limit for correlation is more speculative, given the poor knowledge of the faunas below the upper limit point. The Gold Point fauna of Palmer (1964), which yields *Wanneria* with a diverse associated fauna which appears to lack *Arcuolenellus*, *Fremontia*, or *Mesonacis* ss, is inferred to probably predate the Ellendale fauna, but the quite different facies weakens this assumption. Thus, the Gold Point fauna provides a more tentative lower limit point for the correlation.

The Gold Point occurrence has been given as 100m below the Mule Spring (Sundberg 2014, fig. 9). These upper and lower limit data points delimit a roughly 75m window, (estim. 25-100m below the Mule Spring), for correlation with the Ellendale fauna. At different localities this window is within either the uppermost Harkless Formation (in the Saline Valley Tongue where present) or the uppermost Saline Valley Formation, which grades southward into the Emigrant Pass Member in the Last Chance Range (Palmer & Halley 1979).

An occurrence of *Wanneria* 75m to 80m below the Mule Spring at Cucomongo Canyon (Stewart 1970, Locality 5, p.76; Palmer and Halley, 1979, pl. 17) apparently still represents the LAD for Wannerinae in the Great Basin; the Ellendale fauna might end up pushing this LAD upwards. This Cucomongo fauna seems to be in a similar lithology and position to the Gold Point fauna.

The possible *Bicella* from Ellendale, if con-

firmed, would be an interesting data point as regards correlation with eastern Laurentia, since that distinctive genus is known in situ only from Ville Guay, Quebec (Landing 2002), where it occurs in a slope facies along with eodiscoids and agnostoids. The *Bicella bicensis* assemblage at that locality has been well correlated into the *Pagetides elegans* zone in the Taconic allochthon (E. New York) based on several shared eodiscoids and agnostoids and other data (Rasetti 1967, Landing 2002).

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TRILOBITE LITERATURE ONLINE

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Trilobite Conferences

The 4th International Trilobite Conference, June 16-24, 2008. Proceedings, Post Field Trip

The 5th International Trilobite Conference, July 1-4, 2012. Abstracts

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Has >6,000 author uploaded publications on trilobites. Using it requires giving them your login address/password for Gmail, Facebook or other email account. This gives them full access to your account and contacts list. It is recommended that you use a separate account for doing this.

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Has 58 publications on trilobites in American Museum Novitates and Bulletin of the American Museum of Natural History.

Arthropods in Paleontology (Trilobites)

A list of new trilobite genera and species by year, and references to papers they are in. May not cover all foreign geoscience publications. Earlier years back to 2009 may be selected at the top of the web page.

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different results at different times. Copyrighted papers from major publishers cannot be downloaded, but you may get a partial view, or a link to a publisher who may let you view the abstract free.

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PaleoArchive

Has high-quality digital scans of older literature. Has some publications on trilobites, mostly Scandinavian.

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Has notifications of recent publications in paleontology, including trilobites, in the last month.

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Researchgate.net

Thousands of papers on trilobites, uploaded by authors. One interesting item is a Catalog of Trilobite Species by private researcher Ulrich Lemke. With that you can see the current genus assignment and author.

United States Geological Survey Publications Warehouse

Has US Geological Survey Bulletins, Open-File Reports, Professional Papers, many with information on trilobites and trilobite biostratigraphy.

University of Kansas ScholarWorks

Has 102 publications on trilobites, some from University of Kansas Paleontological Contributions, and some from other sources.

WorldCat.org

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POLAND - Acta Palaeontologica Polonica Palaeontologia Polonica (see Archive)
RUSSIA - www.ipgg.sbras.ru www.geokniga.org www.ginras.ru F.Schmidt "Revision der ostbaltischen silurischen Trilobiten" series
SPAIN - Dialnet.unirioja.es Estudios Geologicos Geologica Acta Universidad Complutense Madrid
TURKEY - Turkish Journal of Earth Sciences
UK - Bulletin of the British Museum (Natural History) EThOS Electronic Thesis Online Service direct.bl.uk/bld/AdvancedSearch.do Phil.Trans.Roy.Soc.Lond.B
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Bioone.org (Annals of Carnegie Museum, Journal of Paleontology, Paleobiology, Palaios)
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ences; Lethaia; Neues Jahrbuch für Geologie und Paläontologie - Abhandlungen; Newsletters on Stratigraphy; Palaeontology, Palaeogeography, Palaeoclimatology, Palaeoecology; Transactions of the Royal Society of Edinburgh; Zeitschrift der Deutschen Gesellschaft für Geowissenschaften)
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Wiley (BioEssays, Biological Journal of the Linnean Society, Biological Reviews, Cladistics, Evolution & Development, Geological Journal, Lethaia, Palaeontology)

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Museums and Organizations
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AMNH has a Gallery of Trilobites from a few private collections, organized by time period and countries. Almost 1000 excellent specimens, many extremely rare, with detailed information. Trilobite Files contains many articles on trilobites. Trilobite Locations contains articles on famous trilobite collecting locations, and galleries of trilobite photos from those locations.
Digital Public Library of America (DPLA)
Need to see a trilobite type specimen at the Smithsonian Institute, quickly?
Browse/Search
The Smithsonian has been adding photographs of type trilobites to the DPLA. At present, some 1,579 trilobite specimens have been put online. The pictures have scales, color, zoomable, and can be copied into graphics programs. The only unfortunate problem is the specimens have not been whitened, which makes seeing morphological details difficult. Most specimens do not have details on formation/location.
Database of Palaeontological Fossils in China
The Institute of Geology and Palaeontology, Chinese Academy of Sciences has a database of trilobites that have been described in some Chinese journals. The easiest way to find them is to search by genus (English name) in the 拉丁属名 field. All information except the trilobite name is in Chinese.
Fossiilid.info - Paleodiversity in Baltoscandia
This website has many photos of Baltic trilobites from: Institute of Geology at Tallinn University of Technology, Natural History Museum - University of Tartu, Estonian University of Life Sciences, Finnish Museum of Natural History, Swedish Museum of Natural History
GB3D Type Fossils
The British Geological Survey has a collection of photos of 2262 trilobites, mostly from the UK.
Geoscience Collections of Estonia
The Institute of Geology at Tallinn University of Technology has a collection of more than 5000 trilobite specimens from the Baltic area.
Houston Museum of Natural Science
Wikipedia has a collection of 99 photos of tri-

lobites in the Houston Museum of Natural Science.

The Hunterian, University of Glasgow, Scotland

The Hunterian has some trilobite photos. Most specimens do not have photos. Search on "trilobite" or genus name.

Muséum National d'Historie Naturelle

Has some photos of trilobites from France and Morocco, including some holotypes.

Muzeum Rokycany

Has some photos of trilobites from the Czech Republic.

Náodní Muzeum (Czech National Museum)

Has about 300 trilobite specimens with photos, many of which are holotypes.

Natural History Museum, Oslo, Norway - Trilobitter

NHM has some photos of trilobites from around the world.

Perkins Geology Museum at the University of Vermont

Perkins Geology Museum has many photos of trilobites from the USA and elsewhere.

Royal Ontario Museum - Burgess Shale

The ROM in Ontario, Canada has a gallery of photos of fossils from the Burgess Shale, including some trilobites.

University of Birmingham Online Collections

The University of Birmingham, England has photos of 115 specimens of trilobites, mostly from British Columbia.

University of Georgia Stratigraphy Lab

UGA has photos of some trilobites from the Eastern USA.

UMMP Michigan Basin Specimen Database

The Friends of the University of Michigan has a database of 162 photos of trilobites from Michigan, Ohio, New York and eastern Canada. You can search by "trilobite", trilobite name, or formation.

Virtuální Museum - České geologické služby

This website, by the Czech Geological Services, has photos of many trilobites from the Czech Republic. Navigate by selecting a letter of the alphabet at the bottom of the page to select a species name.

White Mountain Research Center, University of California

WMRS has a website on Lower Cambrian Trilobites from the Inyo-White Mountains, Eastern California, including a Digital Archive of Inyo-White Mountain Trilobites

Individual Websites

Note: This does not include commercial websites that sell trilobites, unless they have a separate museum section, and it does not include websites that only have photos with no information.

A Guide to the Orders of Trilobites

This website, by Dr. Sam `Ohu Gon III, is an excellent starting point for a study on trilobites. It has trilobite photos, lists of trilobite genera by order/families, as well as many articles about trilobite morphology and paleobiology.

Bienvenue sur le site fossilifère de Didier Lelubre

This website, by Didier Lelubre, has galleries of trilobites from Europe, Morocco, Russia, and USA.

Biolib.cz [in English]

This website, by Ondřej Zicha and others, has many photos of trilobites from the Czech Republic.

Black Cat Mountain Trilobites

This website, by Bob Carroll, features trilobites from Oklahoma in the Haragan and Bois d'Arc Formations.

Deiphon.cz

This website, by Štěpán Rak, has many photos of trilobites from the Czech Republic. Navigate by selecting an age in the pulldown menu Sbírka.

Dicranopeltis - Paleontologem v Barrandienu

This website has many photos of trilobites from the Czech Republic. Navigate by selecting an age in the menu.

Devonian Trilobites - Fossilien aus dem Devon der Eifel und anderen regionen

This website, by Norbert Höller, has many photos of trilobites from the Eifel region, Germany.

Dry Dredgers
Dry Dredgers has some drawings and photos of Ordovician trilobites in the eastern US states in the Cincinnatian Trilobites section.
Elfosil
This website, by Joan Corbacho, has a collection of trilobite photos from Morocco, and elsewhere. It also has links to papers by him.
Fossils - Crinoids and Trilobites, Ordovician, Devonian of Ontario, Mississippian of Alabama, Mazon Creek, Formations - Bobcaygeon, Verulam, Burlington, Arkona, Hungry Hollow, Bangor and many more
This website has many photos of trilobites from Michigan, Ontario, Canada and elsewhere.
Fossils In Death Valley National Park
This website has information on fossils, including trilobites, found in Death Valley. There are separate sections of this website on: Marble Mountains, Nopah Range, Waucoba Springs, Westgard Pass
Les Trilobites Ordoviciens de Bretagne [in English]
This website, by Christophe Guillou, has many photos of trilobites from Bretagne, France.
Los Trilobites en Bolivia
This website has many photos of trilobites from Bolivia, and a bibliography of papers on trilobites in Bolivia.
Midwest Paleo
This website, by Al & Caleb Scheer, has a photo gallery of trilobites from Illinois, Iowa, Minnesota, and Wisconsin organized by formations: Decorah, Galena, Maquoketa, Platteville.
Musee De Paleontologie De Villeneuve Minervois
This website has about 40 photos of trilobites from France in a private collection.
Paleontica - Fossiel.net
This website has a Trilobite Group section. There is extensive information about fossils in many locations. You can search by genus and/or species, or just browse about 280 trilobites, mostly from Morocco.
Per Hansson's Trilobite Gallery - Trilobites from Sweden
This website has many photos of trilobites from Sweden.
Primitive Worlds
This website features Silurian trilobites from the Rochester Shale found in Caleb Quarry, New York. The Classic Photos - Trilobites section has a gallery of trilobites found there.
Saint-Petersburg Paleontological Laboratory - Trilobites Gallery
This website has photos of Ordovician Trilobites from the Saint-Petersburg, Russia area.
Steinkern.de
This website has self published articles with photos on fossil preparation, with many articles on trilobites.
The Trilobite Observer - Trilobites from the Ardennes, Eifel and Morocco
This website, by A.P. van Viersen, has many Devonian trilobites photos from the Ardennes (Belgium, Luxembourg, N-France), Eifel (Germany) and southern Morocco.
Trilobita-trilobiti
This website has many photos of trilobites from the Czech Republic and foreign countries. The first menu section has lists of Czech trilobites by age/location.
Trilobites de Marruercos
This website, by Manuel García Ávila, has many photos of Moroccan trilobites.
Trilobites.naturalforum.net
With this website in France you can search for photos and information on trilobites by genus and/or species by clicking on the link "Rechercher". You can also see forum postings about trilobites by clicking on "Accueil". There you can browse trilobites by families.
Trilobites of Norway
This website has photos of trilobites from Norway and Morocco.
Trilobiti - Barrandien
This website, by Václav Vokáč, has many photos of trilobites from the Czech Republic. Navigate by selecting an age in the menu. It also has some of his publications that can be downloaded.
Virtual Fossil Museum

This website has many photos of trilobites organized by order, US Trilobites, and Canadian Trilobites.

Western Trilobites Association

This website has many photos of trilobites from the western US states and western Canada, as well as lists of trilobites in formations, and links to a number of papers.

www.trilobita.de - Eine Einführung in die Welt der urzeitlichen Meeresbewohner

This website, by Michael Kipping, has a main Gallery of trilobites from around the world, a guest gallery of Moroccan trilobites by Dieter Holland, and articles about trilobites.

Zkamenělý svět

This website has many photos of trilobites from the Czech Republic. Navigate by selecting an age in the menu.

Other Websites

Facebook Trilobites Group

This is the main online forum for amateur trilobite collectors and diggers. Most posts have photos. It is necessary to join Facebook and the group to add posts and reply to posts.

Fossil Forum

You can find posts, many with pictures, about trilobites. Search on "trilobite". It is necessary to join the group to add posts and reply to posts.

Twitter.com

Twitter has many individual postings about trilobites, many with photos. Search with Google or join.

Youtube.com

Many videos on trilobites or trilobite related things. Some by Bob Carroll, Richard Fortey,

2018 TRILOBITE REFERENCES

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