Dance of the Cave Bear: Honouring the Scientific Legacy of Björn Kurtén

Double exposure: recollections of Björn Kurtén

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Received 22 Jan. 2024, final version received 22 Mar. 2024, accepted 22 Mar. 2024

Fortelius, M. & Werdelin, L. 2024: Double exposure: recollections of Björn Kurtén. — Ann. Zool. Fennici 61: 47–55.

The thriving school of palaeontological research that Björn Kurtén surprisingly established at Helsinki came about through a unique combination of Swedish and Finnish traditions that were merged in Kurtén's personal history, inclination and personality. Late in his life, the authors experienced him as a teacher and Ph.D. adviser in the many-splendoured scientific and cultural circumstances that his international recognition as scientist and writer had generated. Here, we share recollections of those days and look back, trying to understand how the seemingly unexpected establishment of successful palaeontology in a nearly fossil-free environment grew through the choices and activities of a very special individual.

Introduction. How could it even happen?

It seems unexpected, to say the least, that a lively centre of mammal palaeontology could develop where few mammalian fossils are to be found. Yet this is what happened in Finland and Sweden when two ephemeral historical strands unexpectedly came together in the person and work of Björn Kurtén (1924–1988). As the contributions to this volume amply testify, his palaeontological legacy remains lively to this day, however improbable it may have seemed at the time. This legacy not only remains, but keeps growing stronger as his scientific grandchildren and great grandchildren continue to flourish and reproduce.

The Finnish strand begins with Alexander von Nordmann (1803–1866) from what today is

southwestern Finland, who enrolled at the University in Turku in 1821 to study natural history. Only six years later, Turku burned down almost completely and most of the biological collections were lost. This, together with the death of his father, gave von Nordmann the decisive impulse to go abroad. His first destination was Berlin, where he excelled in the microscopic investigation of invertebrates (Donner 2014). On these merits, he was offered a professorship in 1832 at the Richelieu Lyceum in Odesa in today's Ukraine. Most likely the very same post had previously been indirectly rejected by the young Swede H.B. Palmær, who responded to well-intentioned teachers that he would rather take a job in Hell for 2000 roubles per month than in Odesa for 4000 (Ahnfelt 1886: 8). Finnish palaeontology remains forever grateful to the notoriously lazy and hot-headed Palmær.

Luckily for Finnish palaeontology, von Nordmann thrived in Odesa. During his years there he conducted 14 scientific expeditions in the southern parts of the Russian empire (Moring 1984). He also collected fossils and over the years amassed a large collection, mostly of Ice Age mammals from two caves in the region. When von Nordmann returned to Finland in 1849 to take up the chair of natural history at the University, which had by then moved to Helsinki, he brought half of his fossil collection with him. This includes a large sample of cave bears as well as material of 23 other mammal species, mostly representing interglacial conditions but with a smattering of cold-adapted species such as reindeer and woolly mammoth (Kurtén 1975). The other half of the collection remains in Odesa, where Mikael was able to study it in 1984.

It was in Helsinki that von Nordmann prepared his four-part monograph on the *Fossils of Southern Russia* (Nordmann 1858–1860), based on the fossils he had brought with him. The collection remains in Helsinki today, in the Finnish Museum of Natural History. Critically, it was there in the years after the Second World War, when the young Björn Kurtén was looking for a suitably large fossil sample to study with the quantitative methods of the "modern synthesis", the new trend in biology that was only beginning to reach Finland at the time (Kurtén 1958).

The Swedish roots are in the history of exploration of central Asia and China. This was initiated in the last years of WWI by Johan Gunnar Andersson (1874-1960), member of the Swedish South Pole Expedition 1901-1903 and later director of the Geological Survey of Sweden. Seeking new worlds to explore he developed contacts in China and moved there to found the Geological Survey of China (1914). The main work of the survey was to search for exploitable mineral deposits, but in the course of this work numerous fossil occurrences were mapped out. This led to the beginning of excavations in the Late Miocene red clay of Shanxi (Shansi as it was then), for which Andersson employed an Austrian-cum-Swedish palaeontologist, Otto Zdansky. The excavations were spectacularly successful and, by agreement with Carl Wiman, professor of palaeontology at Uppsala University, numerous crates were shipped back to Sweden for study. For this work a number of students were recruited, including Torsten Ringström (rhinos), Ivar Sefve (horses), and Birger Bohlin (giraffes - more about him later). The extensive material of carnivores was studied by Zdansky himself, the main publication of which was a landmark in the history of carnivore palaeontology: Jungtertiäre Carnivoren Chinas (Zdansky 1924). In order to carry out this descriptive work (as well as most of the preparation) Zdansky left China and was replaced by Bohlin. He, in turn, was involved in the excavation of a new site discovered by Andersson, located just outside Beijing: Zhoukoudian (Chou Kou Tien). This resulted in some teeth of "Peking Man" being shipped to Uppsala - the only pre-WWII fossils of Peking Man still in existence as the Chinese material was lost during the war.

When his contract came to an end, Bohlin (1898–1990) was recruited by the Asian explorer Sven Hedin as the vertebrate palaeontologist of his Sino-Swedish Expedition (1927–1935). During his time in China, Bohlin spent several years traveling as the lone European through western China in search of new fossil sites. His work resulted in a number of now classic site discoveries, including Tabenbuluk, at which excavations were reopened about a decade ago.

Upon their return to Sweden and the end of their respective projects, neither Zdansky nor Bohlin were appreciated as the important palaeontologists they were. Zdansky became professor in Cairo in 1926 but left after WWII and eventually came back to Uppsala, where he mainly worked as an assistant, preparing a guide to the collections. Bohlin was employed as a Docent (non-tenured associate professor) for six years and then became a high school teacher. However, during their time in Uppsala post-WWII, both Zdansky and Bohlin met and influenced a young, active and creative palaeontology student from Finland: Björn Kurtén.

We do not know exactly how Björn came to study with Bohlin and Zdansky in Uppsala but with hindsight it was a decisive event for his career. Certainly Björn was already fascinated by Ice Age fossils, and the mammal palaeontologists in Uppsala were those nearest at hand. That the Chinese collections they knew and worked on were older than the Ice Age, being mostly from the Miocene and thus millions of years older, was probably no big deal for Björn. In fact, there seems to have been an even earlier episode involving far older fossils, but that apparently left no other trace than an early paper on the functional morphology of trilobites (Kurtén 1949).

From his supervisor Pontus Palmgren in Helsinki, Björn had a background in cutting edge ecology and a quantitative, variability-oriented approach in general. The Chinese mammals in Uppsala afforded a fertile substrate for this. Already in his Master's thesis The Chinese Hipparion fauna (Kurtén 1952), Björn applied several quantitative approaches, including an exploration of the geographic distribution of the "steppe" versus "forest" communities that had been previously recognised in the fossil material but not explained. For this reason, his Master's thesis remains an actively cited reference to this day. His monograph Ph.D. thesis the following year, On the variation and population dynamics of recent and fossil mammal populations (Kurtén 1953), went a long way to establish him as a leading figure in the palaeontology community of the Modern Synthesis. The title still rocks, we think. Among other things, the thesis contains an early embryo to the concept of modularity that is very popular today.

The culmination of the idea that fossil collections retain information about the population dynamics of extinct species was perhaps *Life* and death of the Pleistocene cave bear (Kurtén 1958). This paper was published exactly 100 years after the first part of von Nordmann's monograph (1858–1860), describing the cave bears. The twist of fate that brought the Swedish and the Finnish palaeontological legacies together thus had everything to do with the personality, the choices and the gifts of one unusual individual.

As Björn liked to explain, after experiencing the meaningless destruction of the Second World War, he was determined never to engage in "anything useful" in his life. And the least useful thing he could imagine was the study of fossils. That he was able to flourish as a result of this defiant choice and to quickly establish world class palaeontology *de novo* at Helsinki is a marvel that we will try to explore in the rest of this paper.

Life with Björn part 1. The salad days

Lars found Björn through a somewhat tortuous and multinational route, beginning with collecting fossil fish in Lebanon as a child. He experienced a brief distraction into egyptology after seeing the Tutankhamun exhibit at the Cairo Museum but landed in the evolution of fossil mammals (carnivores!) after reading Istidens Djurvärld (Kurtén 1964) (the Swedish language precursor to Pleistocene Mammals of Europe (Kurtén 1968)) at ca. 13 years old. After that, the biggest obstacles were the strenuous attempts by presumably well-meaning university faculty to convince Lars that there was no future in mammal palaeontology. This was compounded by his reluctance to contact his childhood hero in the (mistaken) belief that he would not have the time to answer letters from a lowly student in another country. The contact was instead mediated by Niall Mateer (then at Uppsala University), who had been communicating with Björn around 1975-1976. Mateer suggested that Lars contact Björn because he had an interesting project on Lynx available. This led directly to Lars' Ph.D. thesis on Lynx (Werdelin 1981) formally supervised by Tor Ørvig in Stockholm, who generously agreed to stand by while Lars' de facto supervision came from Helsinki. During the four graduate student years Lars only met Björn once (and Mikael at the same time), with most supervision being by (snail) mail. After defending his dissertation in 1981, Lars spent a year in Helsinki as a postdoc. This resulted in a number of collaborations with Björn, then with Mikael, and ultimately led to where we are today, 40+ years later.

Lars' first meeting with Björn also resulted in an instructive sideline translating popular science books. At the time Björn was pushing for a Swedish translation of Stephen Jay Gould's essay collection *Ever since Darwin* (Gould 1977). He felt that Lars' bilingual background and paleontological training would be ideal for such a task and suggested this to publisher Daniel Hjort. The deal was made and resulted not only in this translation but a further 21, including more by Gould as well as books by Richard Leakey and Jared Diamond, among others. In this way Björn's invaluable help materially assisted Lars financially through the postdoc years.

Another important step in Lars' future research career took place when in 1982 he was awarded a postdoctoral scholarship to study systems ecology under the supervision of Jeffrey Levinton at Stony Brook University. When Björn heard this he pointed out that this isn't too far from the American Museum of Natural History, where there is an extensive unstudied collection of Chinese Miocene hyenas matching that amassed by Zdansky in Uppsala. "Why don't you take the opportunity to study these while in the area?" he suggested. This sage advice was taken and resulted in a research stream that continues to this day.

In Mikael's final school years in the early 1970s, in Vaasa on the Finnish west coast, Björn's grandfather was remembered as a prominent banker and one of the modern city's founders. Björn's name was well known and his books were prominently displayed in the local bookshops. Against an early childhood fascination with fossil mammals, Björn aligned in Mikael's young mind with the Leakey family, known to Mikael primarily from National Geographic Magazine, as a person of note and interest. In that small town setting, the thought that one might oneself one day have a direct connection with such luminaries just wasn't there. The question where they might actually live or work never even arose. It consequently came as a complete surprise to Mikael that Björn turned out to be one of the regulars in the zoology curriculum at the University of Helsinki. Mikael had enrolled there with a vague intent to study biology and chemistry, a choice that had less to do with a burning interest in those subjects than with his reluctance to give up a summer's sailing to cram for the entry exam to medicine, which had been his original plan.

In those days in the 1970s, Björn offered two basic lecture courses, Fossil Vertebrates and Fossil Invertebrates, one in fall and the other in spring. Those were systematic courses, designed to give the students a general grasp of the major groups represented in the fossil record and their main morphological features. He also gave courses on fossil mammals, human evolution and basic statistics of a similar kind, rather dry and heavy on facts, with few but dedicated students. As a lecturer, Björn certainly didn't aim to entertain but then we didn't ask to be entertained, we were more than happy to learn almost anything about fossils and always attended the lectures. We were never many, often just two or three. This was a consequence of the fact that Björn lectured in his native Swedish, as part of the Swedish language zoology curriculum.

Exactly when and how we were first invited to Björn's home we cannot now recall but we do remember the warm reception, with Björn's wife Ruth kind and welcoming, offering delicious food. Björn also brought Mikael into his world by sharing his thoughts and advice on writing and writers in general, especially on the art of storytelling. "The wastepaper basket is your best friend," he would often say, or "kill your darlings". Another oft-repeated piece of advice was to write ideas down immediately, so that "then it's in the bag". During a memorable phase, Björn brought Mikael one by one Arthur Ransome's books of the 'Swallows and Amazons' series, which were new to him and which he devoured with relish. At some point, probably during Lars' postdoc in Helsinki, we started to have lunch regularly with Björn, often in the teacher's cafeteria of the university's main building, just across the Senate Square from the old department of geology. At that time it was a place where students (evidently at least some of them!) could mingle with academics of all ranks, including rectors and chancellors of the university. Many valuable connections were established there. These lunches, which in Mikael's case continued for years and years, also provided a channel for exchanges of all sorts, including most of the supervision of Mikael's Ph.D. thesis (Fortelius 1985).

Although Björn was a well-known figure in palaeontology at the time we came to study with him, he was by no means famous locally and it was a rare occasion that somebody would recognise and address him in the street. To understand Björn's position in Finland and Finnish academia, one has to appreciate that Swedish is an official language of the country, with a fully developed education system, despite being spoken by only some 5% of the population. Just as Björn's lectures at the university didn't really reach the Finnish-speaking students of the bilingual University of Helsinki, news of his growing international popularity reached the Finnish public slowly if at all. Although the English and Finnish translations of *Istiden* (Kurtén 1969) were both published in 1972 (Kurtén 1972a, 1972b), it wasn't until his best-selling novels and late essay collections were translated into Finnish in the 1980s, just years before his death, that he became a figure known to the Finnish-speaking population.

Life with Björn part 2. Of mammoths and men

Being Björn's student involved much more than taking his courses. He was in constant touch with people in his international network and visitors were common. Several students came to Helsinki over the years to do a Ph.D. with Björn but he also attracted established researchers. Particularly inspiring among these were Alaskan palaeontologist-artist Dale Guthrie and Welsh wildlife artist Hubert Pepper. As Björn's students, we were immediately pulled into informal interaction with both of them. We learned much this way that wasn't part of the curriculum, both about the reconstruction of Ice Age mammals and the interpretation of Ice Age art. Pepper was in Helsinki on multiple shorter visits, working intensely with Björn on the Ice Age documentary Of Mammoths and Men, centred on the meeting between Neanderthals and modern humans as described in Björn's novels. The project was sadly truncated, as Pepper succumbed to pneumonia in the middle of the effort. A version of it was nevertheless co-produced by several Scandinavian TV channels, with Björn as the narrator, and aired on Finnish Mainos-TV in the final months of his life. Guthrie also came on several visits, including a long one as part of a sabbatical in Europe that eventually produced his magnificent book The Nature of Paleolithic Art (Guthrie 2005). Both of these artists also produced portraits of Björn. Pepper's was in the

form of a live painting set in an icy Pleistocene landscape, while Guthrie's bronze bust was created posthumously. Both are now in the University of Helsinki's official collection of portraits.

Of the local community that these visitors encountered, we must mention at least Björn's early collaborator Joakim Donner, prominent Quaternary geologist, at that time head of the sub-department of Geology and Palaeontology of the University of Helsinki. There was also Björn's former student Ann Forstén, at that time curator of vertebrates in the Finnish Museum of Natural History, and Eirik Granqvist, head of the museum's conservation department. Ann specialised on fossil horses and, as Mikael was also from the very start oriented towards ungulates, they had several topics of common interest. One of Ann's and Mikael's joint efforts with Björn was the supervision of Mahito Watabe, who came to Helsinki from Kyoto for his Ph.D. project, formally under Ann's supervision, after Mikael had met him during a memorable visit to Kyoto. One of Björn's last Ph.D. students was the Canadian mammalogist Phillip Youngman, who spent several years in Helsinki in the late 1970s and early 1980s, and also collaborated on papers with Ann.

At this time, Mikael also got involved, in the footsteps of Ann Forstén and Leif Blomqvist (another Kurtén student), in identifying burnt bone from archaeological sites. This in turn led him to the taxidermy lab of the museum for preparation under the tutelage of Eirik Granqvist of comparative material that was lacking in the collections. The focus on details of skeletal anatomy that this work entailed turned out to be a critical prerequisite for the palaeontological field work that he would soon become involved in. Among several archaeologists involved in this research we must mention Cuban-born Milton Nuñez, who was at that time busy introducing novel, scientific methods to Finnish archeology (Nuñez 2024).

In addition to these major figures, there was a constant stream of visitors passing through Björn's office: scientists, some of them world names, artists, journalists and all sorts of people who had been fascinated by his books and wanted to meet him. In this environment, we soon acquired a taste for palaeontology as a cosmopolitan sort of activity. In this, Björn considered himself lucky. "Only the palaeontologist who doesn't have a collection of his own gets to see the big picture," he used to say. "People who have big fossil collections of their own end up fossilised themselves." By example, Björn also taught us the art of scientific correspondence, including how to keep your correspondence organised according to the Dossier system.

By the time we entered Björn's sphere in Helsinki, he was already a well-established figure with a long history of former students and collaborators. Prominent among them was his former Ph.D. student Elaine Anderson, with whom Björn was still in our days engaged in producing *Pleistocene Mammals of North America*. Another name that often came up was that of Alan Turner, an English archaeozoologist who had contacted Björn for advice on hyaenas. Mikael visited him for collection work and a field trip at Sheffield in 1978 and we were to interact with Alan later on several occasions.

Directly out of Björn's collaboration with Elaine Anderson arose the then new-fangled idea to compile an electronic database of Ice Age mammals for statistical studies of their evolution. Lars and Mikael were both part of this, and although nothing came of that first attempt it proved seminal for later database-oriented work that both of us would engage in (Fortelius et al. 2023). This was a late phase of something that had been characteristic of Björn's work since early days: compilation and analysis of large amounts of information. He had a gift for the big picture that was rare. We have both heard people express their perplexity regarding things that Björn set down in his synthetic books that supposedly weren't knowable at the time. Did he guess? We doubt it. More likely is that he just noticed details others had overlooked and made connections that hadn't been made before.

A keen sense of observation was one of Björn's chief qualities and must have been one reason for his successful collaboration with artists. Indeed, until illness left him with a shaky hand he was a skilled draftsman himself. We never directly experienced his early collaboration with Margaret Lambert but we saw the magnificent new illustrations she produced for *Before the Indians*, unfortunately printed in black and white in the end. We were there during the intense collaborations with Hubert Pepper and also part of it, experiencing first hand the flux and reflux of drafts and comments that step by step gave rise to a reconstruction in line with our best understanding of the fossil evidence. But Björn clearly had more than that. He was himself a creative writer of fiction, and so must have found it easy to communicate with the artists he was working with. It was this whole that made Björn's contribution so much greater than its parts, a synthesis of science, fiction and art. For a detailed treatment of Björn's celebrated popular writing *see* Toivonen (2024).

Life after Björn. Crisis and recovery

Björn's position at the university was a personal chair, in his case especially aptly named: "extraordinary personal professor". This meant that after his unexpected and premature death in 1988 at only 64, there was no academic platform in place to continue palaeontology at the professorial level. The only other explicitly palaeontological job in the entire country was the one Mikael held at that time, curator of palaeontology in the Finnish Museum of Natural History. Lars was already back in Stockholm, as a curator at the Swedish Museum of Natural History. During Björn's illness, Mikael had stood in for him as a lecturer and after Björn's death he held the vacant slot temporarily while it was being filled (in physics, as it turned out). Lars and Mikael also jointly took on the supervision of Suvi Viranta's Ph.D. thesis when Björn was no longer available. Suvi would have been a perfect student for Björn, with her special interest in cave bears, the topic of her Master's thesis, subsequently published as Viranta (1994). With Björn gone, it took a while to find the right topic but eventually Suvi defended a nice monograph Ph.D. thesis on bear dogs (Viranta 1996). To our delight, Suvi has remained an active Kurtén grandchild and carnivore specialist to this day, as the present volume nicely shows.

At this time, Björn's family formally gifted Björn's large professional library to Mikael, on the condition that it be kept available for research. The library still exists, despite several scary twists along the way, and has been almost a *sine qua non* for the continuation of mammal palaeontology at Helsinki. It is currently stored in the Department of Geosciences but owned and curated by the Palaeontological Society of Finland. After Björn's death, Lars returned for a while to Helsinki, officially employed for two months to help sorting through Björn's materials for archiving at Svenska Litteratursällskapet i Finland. It has since been joined there by the archives of Ann Forstén and Mikael Fortelius.

Björn Kurtén's death left the local palaeontology community small and vulnerable. A natural thing to do in this situation, it seemed to us, was to produce a memorial volume celebrating Björn Kurtén. Together with Ann Forstén, we accordingly wrote to many of Björn's colleagues and invited contributions. We also convened a meeting in Helsinki to discuss plans for a book in the same spirit as Kurtén's classics on the mammals of the Ice Age (Kurtén 1968). This meeting took place in the autumn of 1989 and coincided with the demolition of the Berlin wall. Our Polish colleague Kazimierz Kowalski considered this event decisive: "Too late now to get the tooth paste back into the tube," he said. I'm not sure many of us believed him but history soon proved him right. A major shift in the state of the world was happening around us, globally as well as locally.

The book that had been planned never actually materialised, but it was the seed of something far better. This change occurred because one of our Helsinki friends, Henrik Kock, had at that time recently secured a job with The European Science Foundation (ESF). Talking to Henrik we realised that a database was much more in line with current thinking than a book, and also learned that the ESF was keen on creating Europe-wide networks of scientists to promote better coordinated research. The first ESF-funded Network we were involved with ran in the early 1990s and was essentially designed to create a database of Quaternary Mammals of Europe. It was to be the first of several such efforts and in many ways determined the direction that mammal palaeontology was to take in the community left behind by Björn, and also the way in which palaeontology was eventually to be re-established at Helsinki. But that, as we can

hear Björn saying, is another story. Part of it is recorded in Donner (2014).

Looking back

After our formative years with Björn, we peacefully divided up the world, such that Lars took the carnivores and Africa (and North America) while Mikael took the ungulates and Eurasia. From these separate realms we remained in friendly contact, with databasing fossil mammals as one of the main strands of collaboration (Fortelius et al. 2023). And, perhaps unavoidably, we eventually did overlap again in the Turkana Basin, in the service of the Leakey family and their network of collaborators. Unlike so many others, who come to Turkana because of the fossil hominins, we were both there for the large collection of non-hominin fossils that the long-running field work had also produced. Lars was there primarily for the carnivores while Mikael ended up helping Meave Leakey and others to organise the scattered collection data for analysis of the entire mammal fauna. Which is not to say that we weren't also attracted by the famous hominins and their equally famous discoverers, still as fascinating as when we read about them in our school days.

Looking back after all these years, Björn remains our first and greatest inspiration in palaeontology. So far at least, it seems that neither of us was cut out to become a writer of books or perhaps growing up so close to Björn just put the bar too high. But we did learn about writing and remain convinced that scientific writing is, in the end, also a special kind of storytelling, though one that comes with rather strict rules. Björn himself was completely clear about this, as his explanatory commentaries to the novels Dance of the Tiger (Kurtén 1980) and Singletusk (Kurtén 1986) show. Novels aren't science. But equally, the strictest computations aren't science either, unless successfully communicated to other scientists.

Björn was a master communicator. Somebody might ask whether he was more a writer than a scientist but to us the question is almost meaningless. He was a communicator and he used all channels at his disposal. He often referred to communication as the duty of a scientist, "That's what we're paid for," and he took it further than anyone else we've ever met. He received many letters from people who had read his books and had become fascinated by them. It seems he also answered most of them, perhaps all. He certainly answered many letters from children, and kept the correspondence with his young readers organised in the Dossier system along with the rest of his scientific letters. He was annoyed and frustrated by the pseudoscience in the daily papers and while he never to our knowledge confronted it directly in the form of letters to the editor, he often addressed false claims and misunderstandings in his popular essays.

Another thing that remains with us since the days with Björn is a sceptical attitude to authority. Björn was no admirer of received wisdom and often ready to tentatively embrace new ideas in science even when others felt there wasn't yet enough information for a decision; cladism, hot-blooded dinosaurs and punctuated equilibria are examples. He liked to see himself as an *enfant terrible* and he clearly enjoyed shocking conservative colleagues with his liberal ways. Mikael remembers Björn complimenting him, after an international seminar in France in 1979, on contradicting his supervisor in public. "A picture of how we cooperate in Finland," he said (Fortelius 2024).

Björn stuck to his decision to do nothing useful and often mentioned it in discussions and interviews. He would sometimes add that he wanted to study fossils because they were beautiful. Björn was by no means a pompous person and it seems unlikely that he would ever have used words like truth and beauty to describe his own work, yet those are words that spring naturally to mind. He had a commitment to quality that's obvious in his work — and what is quality, if not our best approximation of truth? His work was true and beautiful in his time and, for this very reason, much of it remains true and beautiful to this day.

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