

J. GORDON BLOWER – ANAMORPHOSES AND ANAGRAMS

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This paper is intended to commemorate Gordon Blower's contribution to progress, endeavour and projects in myriapodological research over the last decades. It is mainly based on my personal experience and recollection.

When re-reading Gordon's papers and his letters, I realised more than before that he had led an exemplary life, with his dedication to science, his affection for his family, his friends and colleagues, with its highlights and its tragedies. Everything was more pronounced than in an ordinary life. When he thought about a problem, when he weighed his words, when he made suggestions, and even when he applied dots to his meticulous drawings, he was more careful than anyone else whom I have ever met.

Therefore, I decided not to separate the scientific and the personal aspects, but to try to cast a glance on part of Gordon's life from the viewpoint of a foreigner who was happy enough to come into contact with his world and his circle from time to time. Most of Gordon's qualities and contributions are so well-known to many of the myriapodologists and have been stressed in several obituaries that I will not extend too much on these, but will concentrate on some traits which are probably not familiar to everybody and have partly passed unrecognised. The paper may also give evidence as to the influence which Gordon Blower exerted outside Britain.

I met Gordon for the first time in Paris in 1968 on the occasion of the 1st International Congress of Myriapodology. During the welcome party in the large Hall of the Musée national d'Histoire naturelle, someone looked closely at my name-tag and said: "O, *Glomeris*-Dohle" and gave me a dig in the ribs. This was Gordon Blower. My thesis on the embryology of *Glomeris* and other millipedes had been unwisely published in German, but Gordon had studied it. Some will not be aware of this, but Gordon could read and even write German though some of his German letters are rather peculiar. Despite this proficiency, he sometimes asked me to translate some paragraphs of Verhoeff. However, Verhoeff had not only made several impossible countings of segment numbers and leg pairs, but had also constructed impossible sentences, so I was no great help. Gordon also understood some French, and Jean-Jacques Geoffroy mentions that he wrote letters to his French colleagues in a sort of French "very close to surrealism".

To come back to Paris, this Congress was a very important event, for Gordon, for the British group, for myriapodology in general. It was held in conjunction with the Congress of Arachnology. Indeed, it was the first step of emancipation and consolidation of the myriapodologists. Up to that time, people doing research in myriapods had mostly worked separately, now the threads and the persons came together, ideas and reprints were exchanged.

In Paris, Gordon gave a summary of the investigations on the life-histories of some British Julida which had been elaborated in Manchester by him and his working group (Blower 1969/70). Gordon had left behind him his first commitment to cuticular structure, epidermal glands and histology (Blower 1950, 1951, 1952). I never saw him handle a microtome. Nevertheless, he was continuously interested in everything concerning morphology and histology, and he appreciated the facts and details as only someone can do who has experienced the difficulties and imponderabilities of histological work.

Gordon had also crowned his previous faunistic and taxonomic work by the first synopsis on millipedes in Britain (Blower 1958). The ecological and life-cycle project had arisen out of these early studies. It had already been launched some 15 years before the Congress. At first, ideas and methods had been developed independently from other researchers. Stages had been separated mainly on the ground of measurements of length and width and by plotting this data on probability paper. The method proved reliable for early stadia

but was not sensitive enough for the latest stadia. In 1964, when Gordon published his paper on the millipedes of a Devon oak wood together with Peter Gabbutt (Blower & Gabbutt 1964), the papers of Vachon (1947), Saudray (1952, 1961) and Sahli (1955, 1958) on the characterisation of stadia by the number of rows of ocelli were unknown to him. As soon as Gordon became aware of this method, he and Colin Fairhurst reworked their whole material to see whether the results of the two methods agreed (Blower & Fairhurst 1968). Gordon later informed me that Charles Brookes (Brookes 1963) had elaborated the defence gland method independently of Ritva Halkka (Halkka 1958) though Charles began his work one year after the publication of Halkka's paper.

In Paris, a new frame had been set for the mutual information and communication, and all participants made use of it. But as I said, this was only the first step.

Everybody knows that at normal Congresses there is always a lot of competition, of intrigues, of vanity, of hierarchies. The Myriapodological Congresses are quite different. Everybody is accepted, is listened to, is encouraged and supported. Well, there are critical discussions, but they are never derogatory. When did the myriapodologists become such a great and supportive family? This was clearly during the second Congress which was held in Manchester in 1972.

In Paris, it had been decided to organise the next Congress in Brno, Czechoslovakia. But soon afterwards, when the Prague spring was crushed by tanks this option was no longer tenable. Gordon offered to host the Congress instead.

After 1968, I had switched to investigations into crustacean embryology and had no intention of doing further work on millipedes. But Gordon asked me to give a lecture on segmentation and chair a general discussion on phylogenetic relations. He brought all sorts of people together. He must have written letters day and night. He persuaded Sidnie Manton to give a talk on the segmentation of Symphyla, Chilopoda and Pauropoda in relation to phylogeny. He induced the almost 85-year-old Reverend Canon Brade-Birks to preside over the Congress and open it in three languages. He urged Charles Brookes to present the results of his Thesis for the first time.

Gordon and his staff really took care of everything. The Gabbutts, The Brookes's, the Fairhursts, the Millers and the Rounds were engaged, made us feel at home. One of the highlights was, of course, an excursion to the Lake District.

But what was most amazing besides all the organisational work was the presentation of their own contributions. The Manchester group gave several lectures on life-cycles, growth and production, sympatry and competition of millipede species. They introduced their efforts in establishing a distribution map. Gordon gave a talk on the positive correlation between the distribution of millipedes and homesteads of collectors. Most of this work has been fully appreciated and has been extended later. But I think there was one contribution by Gordon (Blower 1974b) which was more outstanding than the others and has never been surpassed. Gordon had reared *Ophiulus pilosus* on non-nutritional agar from egg to maturity! He had measured consumption quantitatively throughout the whole lifespan. He had checked weight increase and production on a fortnightly basis over 2 years. This was and still is a big step forward in evaluating the role of millipedes in the food-web. Nobody has had the patience and the nerve to repeat that work in other species in the same way.

That Congress was a great success and it established a standard for further meetings. Everybody can still sense the atmosphere and the flavour by reading the Congress proceedings (Blower 1974a). In his modest way, Gordon wrote in his foreword: "To some extent this collection of contributions indicates the present state of knowledge". I have never experienced such careful editing. Even the discussions had been taped, transcribed, when necessary translated. This was not repeated in later Congresses.

One year later, in 1973, Gordon spent several months in Sierra Leone. One of the results of this venture was a paper on a jumping millipede, written with Glyn Evans and published in "Nature" (Evans & Blower 1973).

When he got back, I travelled to Scotland and made a stopover. And during that visit Gordon proposed that I should spend some time at the Zoological Department to work upon some pressing questions which had been discussed during the Congress: How is the segmentation of the millipede body? Are the anterior segments simple or are they cryptic or reduced double segments? Is the gnathochilarium composed of 1 or 2 pairs of maxillae? These questions had been addressed in *Glomeris*. But was the answer valid for ring-forming millipedes as well? Gordon paved the way for me. He made reservations in Hulme Hall and organised a lab in the attic of the Zoology Building. I mention this, as my case is not exceptional. Many others enjoyed his hospitality, Francois Sahli, Erwin Meyer, Maija Rantala. Gordon had a secret manner of stimulating ideas and provoking investigations which is a rare gift.

I must confess that scientifically speaking, my stay was no great success. We did not proceed further than we had been before. In retrospect, I would say that we lacked the methods which were developed later: fluorescent dyes, antibody staining, in situ hybridization. Even Scanning Electron Microscopy was not yet available for everybody. So we did not really solve the problems. It is just nowadays that these questions are being addressed in an adequate way, in the labs of Tom Kaufman in Bloomington and of Diethard Tautz in Cologne. I am sure Gordon would be delighted to see the latest results, on expression patterns of the segmentation genes *engrailed*, *wingless* and *cubitus interruptus* in the millipede germ band, on the role of Notch and Delta during the invagination of nerve cells in the ganglia (Dove & Stollewerk 2003).

During my entire stay in Manchester, Gordon was engaged in teaching. At noon, he had tea together with his colleagues, Glyn Evans, Dick Askew, Derek Yalden, John Dalingwater and others talking about the present practical courses and recapitulating on the 3rd year's students from courses several years before. I have never met a staff which cared so much about the students and their progress.

I am going to skip over the next years and Congresses, 1975 in Hamburg, 1978 in Italy and move on to 1979, when I visited Gordon in January. We took a long walk through six foot drifts of snow between Tegs Nose and Chapel Forest. During that walk, we first talked about a joint project, a review summarising and evaluating all available information about anamorphosis in millipedes.

In 1980, I passed through Manchester on a journey to Scotland. Gordon helped me to hire a car, and my wife and I went off. North of Perth, we had a head-on collision. As soon as Gordon heard about that he came up to visit me in hospital, to cheer me up and to arrange things for me. I never expected that, and I was very moved. There are many other occasions which testify how much Gordon cared about people who were close to him.

I must mention 1981, as in that year his book "Estimating the size of animal populations" was published which was written together with his colleagues Lawrence Cook and James Bishop and which summarises their efforts and experiences in quantitative population biology, with a stress on mark, release and recapture (MRR) methods. I have often recommended that book to my students as it is not only theoretically sound, but is based on profound practical experience. Also in 1981, the Myriapodological Congress took place in Radford/Virginia. Gordon, now 57, went there together with his last but one research student, Henk Littlewood. Gordon had the honour of acting as President of that meeting.

I am going to jump forward two other essential years, 1984 and 1985. In 1984, the Myriapodological Congress took place in Amsterdam. Gordon came and enjoyed himself. It was the first time that he made no contribution, at least not officially. However, at the end, when the farewell dinner came nearer, he and Colin Fairhurst and I sat together, I think whisky played a certain role, and we thought about something not too serious. I proposed taking a German nursery song about the bird's wedding. All of us contributed some verses, but some of the best stanzas (and also the most vicious one) came from Gordon. I admit that was a rare occasion. Most people knew Gordon as being very serious, very thoughtful, never making a cutting remark. But he could be cheerful, he could be funny, he could even be sarcastic. The ditty was reproduced in the Liste des Travaux parus et sous presse en 1984. Colin and I took over the responsibility.

The following year was crammed with activities. Gordon suggested to commemorate Charles Hilary Brookes by a memorial lecture and he asked me to give a talk about "Myriapods and the ancestry of

insects". This shows that he was still deeply interested in evolution and phylogenetics. I made a blueprint and went to Prestbury to discuss it with him. I came just in time to see the proofs of the "Synopsis of the British fauna: Millipedes" and had the privilege of having a look at them. This book (Blower 1985a) which only on the surface is the second edition of the 1958 synopsis is a real milestone in several respects. It presents concise and condensed information about all aspects of the British species: Morphology, life history, habitat preference, distribution. Nearly all the drawings are original, not simply redrawn from literature but from material which was mostly collected by himself. Hopefully, the original drawings will be well preserved.

1985 was also the year of Gordon's formal retirement. During a field course in Woodchester Park, he was presented with a volume on "Case studies in population biology" dedicated to him by his former colleagues and students. He wrote: "I was quite overwhelmed by the compliment and have only partly recovered". The same year saw the edition of Volume 2 of the Bulletin of the British Myriapod Group with an important paper on the British Chordeumatidae (Blower 1985b). And we always had the anamorphosis paper in our minds though there was not much progress. Letters went to and fro. We exchanged information, asked questions, invented riddles (Figure 1) and ended up in writing anagrams (Figure 2). Looking back, that time was rather happy-go-lucky.

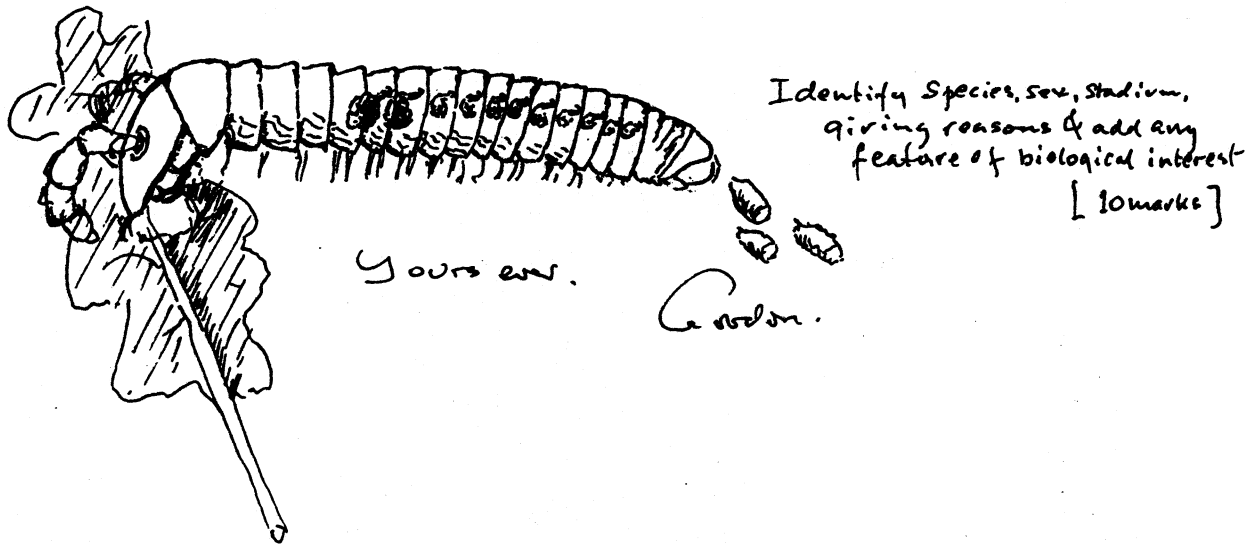


Figure 1. Part of a letter from Gordon Blower, 4th August 1985. The figure represents a juvenile *Boreoiulus tenuis* stadium IV. Reason: 2 primary defence glands which is unique in Julidae. Source of information: PhD thesis of C.H. Brookes.

My only question this time is one which my granddaughters gave to me — and I, English speaking (?) found difficult.

Q. What is an ANAGRAM of MONDAY?
(It's a common English word and it's the same in German)

thwi tseb hewiss,

Crylsein,

Gordon.

Figure 2. Part of a letter from Gordon Blower. 5th December 1985.

Four years later, in 1989, Gordon's wife Mary died. He had already had several personal blows. In 1983, Charles Brookes, his first research student who had completed his Ph.D. Thesis twenty years previously and who was his close friend, died in a rail accident. In 1987, the wife of his eldest son John died. The death of Mary with whom he had a most affectionate relationship was very serious indeed and we feared that he would not get over it.

I think it was partly his love of nature and of science which helped him. He bought a house in the Lake District. He went to the Dordogne and collected *Lithobius*. He attended the Congress in Innsbruck in Austria. And he came back to the idea of writing a review of the anamorphosis of millipedes. In 1990 he wrote: "...I feel in the swim again – there's a danger of letting things slip until I become involved again". He was now actively engaged in summarising all the life history data on the Juliformia.

As Henrik Enghoff had agreed to co-author the paper and had taken upon himself the task of driving the project and collecting and typing the bits and pieces, we finally met in Copenhagen in 1991 for nearly one week to discuss the manuscript sentence by sentence. In the Museum, we were confined to a room without windows and we said jokingly after that week that now the grey smoke has emerged. The paper was published in the Zoological Journal of the Linnaean Society and comprised 131 pages (Enghoff, Dohle & Blower 1993). Of course, it was not only an accumulation of old and some new data but we tried to discuss the variations and the peculiarities in a developmental and a phylogenetic frame.

We invented new names: euanamorphosis, teloanamorphosis, terms which must be an offence to a linguist's ears. We radically transformed previous countings, stadia, rings and segments where necessary. We discussed at length the so-called "law of anamorphosis" and especially its non-existence in several orders which must have upset several colleagues. We tried to find formulations to which all three of us could consent.

There were some parts where opinions were at first divided. The old question of elongation and contraction which had preoccupied Gordon since the sixties (Blower & Fairhurst 1968, Blower 1969/70) was discussed using cladistic methods. Gordon had been very much influenced by the views of Sidnie Manton who favoured a more intuitive approach on the ground of functional requirements. This influence was quite comprehensible. Sidnie Manton had not only profited from Gordon's myriapodological expertise, she had made an excursion to Sicily with him collecting specimens for her monumental work on sceleotomuscular design of millipedes. Gordon often told about their joy having found the overlength *Dolistenus savii*.

Manton had several times given her precious cats into Gordon's care, and she had dedicated her authoritative book on "*The Arthropoda – Habits, functional morphology and evolution*" (Manton 1977) "to J. Gordon Blower". Manton had come to the conclusion that most arthropod groups must have a polyphyletic origin. In the seventies, this was nearly unanimous conviction especially in the English-speaking countries. Only much later the wind turned once more, and most researchers have come back to the belief that Arthropoda are monophyletic. I had many discussions with Gordon about the impact of the principles of phylogenetic systematics regarding this question. He listened attentively and patiently, but was never really convinced. Now, at the end of our discussions on the anamorphosis paper he said: "My colleagues will be surprised that I have now jumped on the phylogenetic bandwagon".

The anamorphosis paper was the last of his publications. The bolt was shot. In 1992, during a visit to Levens we took a long walk, and he told me more about the marrows in his allotment and his activities in the village than about millipedes. I remember that we had a look over a plain speckled with small limestone mounds, and I said that it would be worthwhile to have a closer look at these ecological islands whether all of them have the same or probably different populations. He found the idea interesting but never got into this or another project.

In 1993, he did not attend the Congress in Paris, 25 years after the first one. In 1996, there were two different occasions, and I hoped very much to draw him out of his corner. By then, he was not frail, he was, as far as he wrote, "in good health". The first occasion was a Symposium in London under the heading "Arthropod relationships". Many people working on arthropods made contributions. From

Manchester, Jason Dunlop and Paul Selden read a paper and - to take the millipede men - Bill Shear, Otto Kraus and myself gave a talk. Geoffrey Fryer from the University of Lancaster, one of Gordon's old friends presented "A defence of arthropod polyphyly". The symposium and the proceedings were dedicated "To the memory of Sidnie Manton, 20 years on from the publication of *The Arthropoda*" (Forty & Thomas 1997). I informed Gordon long before and sent him a provisional and later the final programme. But he wrote: "In a way I would have very much liked to attend, to see you and others – but I cannot due to commitments here in Levens + with my family".

One month after that symposium, I made another attempt and asked him to come to Copenhagen and attend the Myriapodological Congress that same year, Copenhagen where we had spent many hours in the Museum and after work in a pub called Lumskebuksen. But there was no chance.

There remained a large gap in our correspondence. After a longer stay in Tasmania, I wrote in January 2001, but by then many bad blows had hit him: An aortic aneurism had whisked him to hospital, he had partly lost his voice, he had to take sheltered accommodation in Kendal, Nicholas House was being sold "which is sad" as he commented. His reply ends: "I shall look forward eagerly to your talking on your scientific aims". So I wrote another rather long letter but never got a reply.

The gap which Gordon Blower leaves is big. It is not only his personal contribution to the knowledge of life-cycles, of faunistics and distribution which we will miss. It is even more his ability to open the eyes for a wider scope and especially his gift to get people involved. He created an atmosphere of interest and encouragement which was invaluable. I am an extant witness of this. Without Gordon, I would not have much cared about millipedes during the last 35 years. I am very glad to have met Gordon, to have experienced his friendship and to have shared his knowledge and his ideas.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to the British Myriapod and Isopod Group and especially to Helen Read for inviting me to give a talk at the occasion of a special meeting in Manchester on Friday, 25th April 2003.

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