

1 **A BIOGRAPHY AND OBITUARY OF ALFRED TRAVERSE (1925–2015)**

2

3 **1. Introduction**

4 Professor Alfred ('Al') Traverse passed away following a long illness at 90 years of
5 age on September 15th 2015 at Juniper Village, State College, Pennsylvania, USA.

6 With his death, the twin sciences of palaeobotany and palynology have lost one of
7 their most influential and productive of practitioners and teachers. He had a stellar
8 student career, was a coal petrologist, an industrial palynologist and held parallel
9 positions in the Episcopal (Anglican) church. However he is principally defined by
10 his 30-year tenure as a professor at The Pennsylvania State University (Penn State)
11 from 1966 to his full retirement in 1996. Al was an incredibly diverse scientist; the
12 topics of his numerous research papers are highly eclectic. He demonstrated a truly
13 polymathic approach to palaeobotany and palynology. Most notably, he published two
14 editions of the only single-author textbook ever published in English on pre-
15 Quaternary palynology. This short article seeks to celebrate and document Al's
16 fascinating, fulfilling, long and productive life, hence it is designated as both a
17 biography and an obituary. The authors have drawn on their collective memories, Al's
18 publications, online information and other obituaries such as Anonymous (2015) and
19 Rich & Strother (2015).

20

21 **2. Childhood and schooling (1925–1943)**

22 Alfred Traverse was born on the 7th of September (Labor Day) 1925 at St. James
23 Anglican rectory in Port Hill, Prince Edward Island, Canada. He was always known
24 as Al to everyone, and was the son of the Reverend A. Freeman Traverse, a priest in
25 the Episcopal church. His mother was Pearle Akerley Traverse, who was a dietician
26 and schoolteacher. In 1926 the Traverse family moved to Lucknow in southern
27 Ontario, and then to Allegan, Michigan, USA in 1928. Al never moved back to
28 Canada, and he became a naturalised United States citizen in 1934. He went to
29 primary and secondary public schools in St. Joseph, Michigan, graduating from high
30 school in 1943 as the valedictorian (highest-ranking student) of his class. Al was
31 clearly an outstanding student; he was editor of the school newspaper, president of the
32 local chapter of the National Honor Society and he won the Bausch and Lomb
33 Science Award.

34

35 **3. Al Traverse the university student (1943–1951)**

36 Al's stellar school record was rewarded with a freshman scholarship at Harvard
37 University, commencing in June 1943. He majored in biology, and graduated with a
38 bachelor's degree *magna cum laude* (with great honour) in 1946. Al was elected to
39 Phi Beta Kappa (the oldest academic society in the USA). His bachelor's honours
40 thesis, directed by Professor Paul C. Mangelsdorf, concerned a problem in corn
41 genetics. It was clear at the outset that Al exhibited a definite penchant for botany. Al
42 was as active at university as he had been at school; he sat on several student council
43 committees and was a member of the Speakers Club.

44 Upon graduation, Al won a Lady Julia Henry Fellowship to undertake
45 scientific research in England. These awards are given by Harvard and Yale
46 universities to unmarried US citizens in order to allow them to undertake one year of
47 study at either Cambridge or Oxford universities in the UK. Al spent the academic
48 year 1946–1947 working on palaeobotany under the legendary figures of Sir Harry
49 Godwin and Hugh Hamshaw Thomas at the School of Botany of the University of
50 Cambridge. He was affiliated to King's College Cambridge, and was awarded a
51 Certificate in Botany in 1947.

52 Al returned to Harvard in August 1947 to become a graduate student, and held
53 an Anna C. Ames scholarship. He continued his work on palaeobotany, and also
54 began his work in palynology. Al was awarded a Master's degree by Harvard in 1948,
55 and elected to Sigma Xi, at the age of 23. Somewhat inevitably, Al elected to
56 undertake research towards a PhD. Additionally, he was a dormitory proctor,
57 freshman advisor and teaching fellow at Harvard. His supervisor, Elso S. Barghoorn,
58 advised Al to undertake research on the palynology of the Early Miocene Brandon
59 Lignite of Brandon, Vermont. Al was Elso Barghoorn's second PhD student.
60 Barghoorn's first graduate student, William ('Bill') Spackman, was researching the
61 fossil wood from the Brandon Lignite at around the same time (Barghoorn &
62 Spackman 1949; 1950). Later, during the 1970s, Bruce Tiffney worked on the fruits
63 and seeds from the Brandon Lignite (e.g. Tiffney & Barghoorn 1976; Tiffney 1994).

64 The field locality in Vermont was relatively remote, and Al always contended
65 that the only travel funds he ever received from Elso Barghoorn was a \$10 bus ticket
66 to Vermont (Rich & Strother 2015). Fieldwork at the small field site was challenging;
67 the immediate area was profoundly waterlogged, and an old gas-fired pump was
68 needed to prevent the locality from flooding. Al was awarded his PhD by Harvard in

69 June 1951 at the age of 26 for a dissertation entitled *The pollen and spores of the*
70 *Brandon Lignite: a coal in Vermont of lower Tertiary age*. This thesis was the first
71 ever in North America on pre-Quaternary palynology. Al published a seminal paper
72 on his PhD research four years later (Traverse 1955). During June 1951, he married
73 Elizabeth Jane ('Betty') Insley, who was also trained in botany, graduating from
74 Wellesley College, Massachusetts, in June 1951. Betty and Al first met in the biology
75 laboratories at Harvard University in 1949.

76

77 **4. Government service and the oil industry (1951–1962)**

78 The year of 1951 was truly a landmark one for Al, who was hired as a coal
79 technologist by the United States Bureau of Mines (USBM) Lignite Research
80 Laboratory at Grand Forks, North Dakota. His mission was to work on the palynology
81 and petrography of the Paleocene lignites of that state. Al went on to be appointed
82 head of the Fuels Microscopy Laboratory. While at Grand Forks, Al was also
83 Assistant Research Professor of Geology at the University of North Dakota. Paul and
84 Martha, the eldest two of Al and Betty's children, were born in North Dakota. During
85 his sojourn at Grand Forks, Al travelled to Ann Arbor, Michigan, in the autumn of
86 1953, to meet Chester A. Arnold, who was one of the leading palaeobotanists of that
87 time. One of the authors (WGC) was working with Arnold on Pennsylvanian
88 megaspores at that time, and the three took a collecting trip to a very productive
89 Pennsylvanian quarry near Ann Arbor. That meeting started a friendship between Al
90 and WGC that lasted some sixty years.

91 In early 1956, the USBM transferred Al to their office at the Federal Center in
92 Denver, Colorado, to become the head of the coal microscopy laboratory. However
93 only several months after arriving in Denver, he accepted an offer from the Shell
94 Development Company to establish a palynology laboratory at their Bellaire Research
95 Facility in Houston, Texas, during September 1956. One of the several reasons for
96 this change in career path was that the USBM had indicated that they would like Al to
97 undertake sample collecting in underground mines. He was rather claustrophobic and
98 this clearly was a significant factor in Al joining Shell. The Shell job was Al's first
99 primary position as a palynologist, at a time when stratigraphical palynology was
100 expanding almost exponentially in the US oil industry and elsewhere (Hoffmeister et
101 al. 1955; Woods 1955). This new job led to Al travelling to the international
102 headquarters of Shell in The Hague, The Netherlands, where he spent four months

103 undertaking corporate orientation and studying their in-house palynological
104 techniques. Upon his return, the Traverse family settled in Houston where Al worked
105 for Shell until 1962. His research at Shell was not biostratigraphical, but comprised
106 studying the sedimentation and transport of pollen and spores in seawater and modern
107 sediments off the Bahamas and in the Trinity River system, Texas. The Trinity River
108 was chosen by Al because, at that time, it was not dammed upstream so the waters
109 should represent all the hinterland flora. Al was given a free hand to conduct this
110 basic research as he saw fit because it was clearly deemed to be of strategic value to
111 the company. Another major project for Al was the compilation of a modern pollen
112 reference collection. The far-sighted approach of Shell was also adopted by the Carter
113 Oil Company in Tulsa, Oklahoma, under William S. ('Bill') Hoffmeister at this time
114 (Riding & Lucas-Clark 2016). Later, Al was able to publish some of this research
115 (e.g. Traverse & Ginsburg 1966; 1967; Traverse 1990; 1992; 1994a). He successfully
116 applied this type of taphonomic work on pollen and spores to the study of pre-
117 Quaternary kerogen macerals and palynomorphs, and this work culminated in
118 Traverse (1994b). John and Celia, the two youngest children of the Traverse family,
119 were born in Houston.

120

121 **5. A man of the cloth for 30 years (1951–1981)**

122 Much to the considerable surprise of contemporary palynologists, Al resigned from
123 full time work with Shell in 1962 and enrolled in the Episcopal Theological Seminary
124 of the Southwest in Austin, Texas. He had been brought up as a churchgoer, and his
125 father was an Episcopal priest. However, he also continued with Shell as a consultant
126 between 1962 and 1965. Al graduated with a Master of Divinity degree in June 1965
127 as the top ranked student. He was soon ordained deacon in the Episcopal church, and
128 became an assistant clergyman at a local branch. Al combined his ecclesiastical duties
129 of a curate at St. Matthew's Episcopal Church, Austin, with being an Assistant
130 Professor of Geology at the University of Texas for the academic year 1965–66. It
131 was at the University of Texas where Al first presented his introduction to palynology
132 course.

133 During Al's tenure at Penn State (section 6), he held positions as priest and
134 vicar in several Episcopal churches in Pennsylvania. One of these was being assistant
135 rector at St. Paul's Episcopal Church in Philipsburg until May 1975. He later moved

136 to St. John's Episcopal Church in Huntingdon, from November 1975 to July 1980
137 where he worked as a part-time priest-in-charge.

138 While in Zürich in 1980–1981 (section 9), Al became an assistant priest at the
139 *Christuskirche* (the Old Catholic Church), which had a close affiliation with the
140 Anglican/Episcopal Church. Al's affiliation with the *Christuskirche* was his last
141 formal connection with organised religion. Following a great deal of, no doubt,
142 agonising self-deliberation upon his return to Penn State in 1981, Al realised that he
143 was better categorised as a secular humanist. He felt that the Episcopal Church was
144 too ecclesiastically liberal for his liking. For example Al deplored the fact that some
145 bishops had been through multiple divorces; he was also against the ordination of
146 women. Clearly his secular humanist stance made more sense to him of his present
147 life, and he referred to himself being a 'religion of one'. Following this watershed, he
148 remained very positive about his religious past and did not reject it. Al made no public
149 disavowal of his long formal association with the church. Despite this major life
150 decision, Al continued to occasionally serve in a religious role at minor local
151 functions.

152

153 **6. The defining professional appointment: The Pennsylvania State University** 154 **(1966–1996)**

155 In June 1966, the month after being ordained as a priest, Al returned to full-time
156 palynology, accepting the position of Associate Professor of Geology and Biology at
157 Penn State in State College, Pennsylvania at the age of 40. Interestingly Al's great
158 friend Bill Chaloner was the first choice for this job, but he decided to pursue his
159 primarily palaeobotanical interests in the UK instead. Al was promoted to full
160 Professor of Geology and Botany (later Palynology) in May 1970, and held this
161 position for the rest of his career. Al was among the first ever Professors of
162 Palynology in the world. At Penn State, Al established a modern palynology
163 processing laboratory and taught palynology to both undergraduate and graduate
164 students. Al was an extremely talented teacher, and his *magnum opus*
165 *Paleopalynology* (Traverse 1988a; 2007) is largely based on the content of his
166 courses.

167 Al's most long-running and successful course was the famous
168 Geosciences/Biology 423 module. This course in basic palynology was run at Penn
169 State from 1966 until 1996. He also taught several other courses including evolution,

170 historical geology, advanced palynology, palaeobotany, philosophy and religion.
171 Incidentally, Al appeared for his lectures on evolution, philosophy and religion in full
172 clerical garb including the priest's collar! Geosciences/Biology 423 was always well-
173 enrolled, and it was this enduring popularity which ensured its remarkable longevity.
174 It was not simply the famous Traverse charisma which made Geosciences/Biology
175 423 so popular. This was not just another survey (textbook-based) course because Al
176 adopted an inquiry-led approach which was significantly ahead of its time. After a
177 suitable interval of classroom teaching and practicals, each student was provided with
178 an unknown (to them) rock or sediment sample. Their task was to process, analyse
179 and interpret the geological age to stage level. At the time at Penn State, no other
180 undergraduate course offered the opportunity to acquire hands-on experience of what
181 real practitioners do. Unsurprisingly, this innovative method of teaching enthused
182 many of Al's students, and some of these went on to become professional
183 palynologists of significant stature. When the Traverse children had grown up, Betty
184 became Al's volunteer research assistant and sample processor, as well as
185 demonstrating in the laboratory on the Geosciences/Biology 423 course.

186 Al supervised many graduate students at Penn State. His 12 PhD students
187 were: John W. Bebout (1977); Dale C. Beeson (1992); Lynn Brant (1980); Bruce
188 Cornet (1977); Duck Kuen Choi (1983); Robert E. Dunay (1972); Volkan Ş. Eidiger
189 (1986); Martin B. Farley (1987); Ronald J. Litwin (1986); Douglas J. Nichols (1970);
190 Eleanora I. Robbins (1982); and David J. Rue (1986). His eight Masters students
191 were: Said Al-Hajri (1991); Deborah Delfel (1979); Norma G. Johnson (1984);
192 Ronald J. Litwin (1983); Frederick K. May (1972); Andrew Schuyler (1987); Jamison
193 B. Warg (1972); and Harvey S. Zeiss (1976). He also, of course, advised many
194 individuals who were graduate students of other professors. Amongst these PhD
195 students were: Arthur D. Cohen (1968); Thomas D. Davies (1980); Sarah J. Fowell
196 (1994); Carmen Moy (1982); Fredrick J. Rich (1979) and Francis T. Ting (1967).
197 Furthermore, Al advised many future palynologists in their undergraduate days at
198 Penn State; these include Nan Crystal Arens, Paul K. Strother, Debra A. Willard and
199 Pierre A. Zippi. He could be rather formal with students, and would ask them to
200 address him as Dr or Professor Traverse, or perhaps Alfred (certainly not Al).

201

202 **7. Publications**

203 In all, Al published 120 scientific contributions between 1950 and 2015, and these are
204 listed chronologically in the [online supplementary information](#). The diversity of his
205 science has already been alluded to. Al's research papers range from Lower
206 Palaeozoic acritarchs to modern pollen and spores, together with contributions on a
207 wide variety of topics such as archaeology, coal petrography, evolution, fungal
208 spores, nomenclature/taxonomy/systematics, palaeobotany, palaeoecology and
209 palynological techniques. Without doubt, his most important publication was his great
210 textbook, *Paleopalynology*, of which the second edition was published nine years ago
211 (Traverse 1988a; 2007). Al had diverse research interests, but he developed several
212 major research themes which he explored over many years. These include the
213 palynological study of red beds (e.g. Dunay & Traverse 1971; Litwin et al. 1991).
214 Reddened, oxidised strata are normally very low in organic content. But Al proved
215 that, with persistence, one can frequently find beds of non-oxidised sedimentary rock
216 in what appears to be unpromising brown-red coloured successions. Al undertook
217 analyses of the Franciscan Complex of California, a metamorphic unit, on the
218 recommendation of his erstwhile colleague from his Shell days, Ken J. Hsü. The
219 Franciscan Complex palynomorphs are very poorly-preserved so Al termed this work
220 'marginal palynology' (Traverse 1972). Other examples from the early part of his
221 career include the palynology and petrography of coals, and the taphonomy of modern
222 pollen grains in water bodies (e.g. Traverse 1954; Traverse & Ginsburg 1966; 1967).
223 Al maintained a keen interest in all aspects of the nomenclature, systematics and
224 taxonomy of pollen and spores throughout his life; his first publication on this topic
225 was Traverse (1956). Similarly, he was profoundly interested in all aspects of
226 techniques in palynology (e.g. Traverse 1965; Litwin & Traverse 1989).

227 Al was one of the authors of the well-known 'Catalog of Fossil Spores and
228 Pollen' (CFSP) which was initiated in 1957. The CFSP is a comprehensive systematic
229 compendium of the original descriptions and illustrations of pre-Quaternary pollen
230 and spore taxa. This major series was instigated in 1956 by Gerhard O.W. Kremp
231 (1913–1994), while he was at Penn State working with Bill Spackman on the
232 palynology of the coals of South Dakota. The first editors were Herbert Tate Ames,
233 Hilda Grebe, Gerhard Kremp and Bill Spackman (Traverse et al. 1970). Al joined this
234 team, was a member of the Editorial Board between 1957 and 1966 and served as
235 editor-in-chief in 1966–1967. He co-authored volumes 26 to 40 between 1967 and

236 1976 (see the [supplementary online information](#)). The series was discontinued in the
237 1980s; the final volume, number 44, was published in 1985 (Traverse 2007, p. 35).

238 Unlike many other palynologists Al was a relatively late convert to
239 biostratigraphy. His first biostratigraphical paper was Dunay & Traverse (1971),
240 which was published when Al was in his mid-40s. Very many other contributions on
241 palynostratigraphy followed, over a wide range of ages from Ordovician to Neogene
242 (e.g. Pazzaglia et al. 1997; Strother et al. 2015). Later he turned his attention to topics
243 such as archaeology, fungal spores, and global floral dynamics and evolution (e.g.
244 Traverse 1982; 1988b; Traverse & Ash 1994; Dunning et al. 1998).

245 Without any doubt, the pinnacle of Al's publication record is his textbook
246 *Paleopalynology*. This is the only single-author textbook in English on pre-
247 Quaternary palynology, and it ran to two editions (Traverse 1988a; 2007). Tschudy &
248 Scott (1969) is a relatively old text, overwhelmingly focussed on terrestrially-derived
249 palynomorphs, comprising 18 chapters written by different specialists. Evitt (1985) is
250 entirely on dinoflagellate cysts, and Jansonius & McGregor (1996) is a three-volume
251 set with 32 chapters written by many different authors including Al (Traverse 1996).
252 *Paleopalynology* formed the core of Al's popular undergraduate course
253 Geosciences/Biology 423 that he ran at Penn State, and undoubtedly played a similar
254 role in the hands of many other teachers of pre-Quaternary palynology the world over.
255 Al said about *Paleopalynology* that "it offered most of the information necessary to
256 teach a good course in palynology, and as a handy, one-volume reference to
257 palynological subjects." Its utility is significantly enhanced by a comprehensive
258 bibliography, glossary and index.

259 *Paleopalynology* is a remarkable book; it is superbly-written, and phrased in
260 an extremely personable style such that it is almost like reading a novel. The first
261 edition, which was 600 pages, has 18 chapters which are very logically set out. Pre-
262 Quaternary palynology was defined, and its limitations were discussed in the first two
263 chapters. The biology and morphology chapters (4 and 5 respectively) were all on
264 pollen and spores; marine palynomorphs were only discussed as appropriate in the
265 chapters on stratigraphical palynology (6–16). The stratigraphical chapters are
266 comprehensive, consummately-researched and well-illustrated with very many quite
267 small photomicrographs. It would be a very useful book to take if one was dispatched
268 on a remote biostratigraphy mission and had limited luggage space. One of the joys of
269 the book is that Al discussed and illustrated important figures in both historical and

270 contemporary palynology. Giving photographs of eminent palynologists such as
271 Charles Downie, Robert Potonié, and David Wall really brought the book to life
272 (Traverse 1988a, p. 13, 123, 244).

273 In the intervening two decades Al revised the book, and the second edition was
274 issued nineteen years later (Traverse 2007). It had the same basic structure, but was
275 significantly larger at 813 pages and the front cover proudly sports a fabulous
276 montage of palynomorphs compiled by Rodolfo Dino together with four notable
277 palynomorphs selected by Al. He did a superb job in updating this work and consulted
278 widely. All the present authors, and many others, helped Al; for example he illustrated
279 some of the Australian Jurassic dinoflagellate cysts formalised by JBR in 2001
280 (Traverse 2007, p. 382–383). More photographs of prominent palynologists were
281 included this time, including David J. Batten, William G. Chaloner, Alfred Eisenack,
282 William C. Elsik, Sir Harry Godwin, Jan Jansonius and Sofiya N. Naumova (Traverse
283 2007, p. 197, 218, 231, 331, 408, 475, 561). Betty Traverse significantly helped Al
284 with information technology and secretarial support for both issues of the book, and
285 each edition was reviewed by Hughes (1989) and Gajewski (2008) respectively. The
286 first edition of *Paleopalynology* was followed by another major text edited by Al,
287 entitled *Sedimentation of organic particles* (Traverse 1994b). This is a book
288 comprising 23 chapters, totalling 544 pages, arranged into four sections based on
289 geological age and authored by 35 experts on kerogen macerals ('palynodebris') and
290 palynomorph taphonomy, two of Al's major research interests. Many of the authors
291 presented papers on this topic at the International Palynological Congress in Brisbane,
292 Australia in 1988 at a symposium organised by Al. Some of the presentations in
293 Brisbane were published in volume 64 of *Review of Palaeobotany and Palynology* in
294 1990. However Traverse (1994b) was inspired by the Brisbane symposium, but is a
295 far broader treatment of the subject than what was presented in Australia. The
296 emphasis throughout is on the qualitative and quantitative aspects of the
297 sedimentation of all types of organic particles, and the text explores their relevance in
298 palaeoecology and sequence stratigraphy. Traverse (1994b) is one of the major works
299 on palynofacies, and the chapters describe studies on a wide variety of geological ages
300 and localities. Again Betty helped Al out greatly with all aspects of this book, which
301 was reviewed by Hooghiemstra (1995).

302

303 **8. Al Traverse and committees**

304 Al's contribution to palynology extended significantly beyond his research and
305 teaching. He was an active and enthusiastic member of several international and
306 national organisations associated with geology and palaeontology. In particular, he
307 was one of the 32 founder members of the American Association of Stratigraphic
308 Palynologists (AASP), now AASP – the Palynological Society in 1967. Al was also
309 one of the members of the inaugural board of directors, serving as the first Secretary-
310 Treasurer of AASP, between 1967 and 1970. He was subsequently President/Past-
311 President in 1970–1972, and was the archivist of the association from 1984 onwards.
312 The society honoured Al with their Medal for Excellence in Education in 2001, and
313 made him an Honorary Life Member in 2005 (Demchuk & Riding 2008). Al
314 published two contributions on the early history of AASP (Traverse & Sullivan 1983;
315 Traverse 2008). In 1967, when the founder members of AASP were deciding on a
316 name for the association, Al suggested 'The Society of North American Palynologists
317 (SNAP)'. Many years later in 2007, he proposed a change from AASP to The
318 Palynological Society, which was accepted by the membership as AASP – the
319 Palynological Society (McCarthy 2007; Demchuk & Riding 2008; Traverse 2008).
320 When the board of AASP were searching for a base for their Center of Excellence in
321 Palynology (CENEX) during the late 1980s, Al offered up Penn State. The eventual
322 decision on the location of CENEX was that it was to be established at Louisiana
323 State University (LSU) in Baton Rouge. Al was understandably very dismayed by this
324 and unfortunately the decision had a significantly adverse effect on Al's relationship
325 with the association for many years.

326 Al was also the first President of the International Commission for Palynology
327 (ICP) between 1977 and 1980; he was in this post for the 5th International
328 Palynological Conference in Cambridge, UK during the summer of 1980. The ICP
329 became the International Federation of Palynological Societies (IFPS) in 1984
330 (Canright, 1984). Al also served IFPS as a Councillor, and was the archivist for many
331 years.

332 Al was a botanist just as much as he was a palynologist, and he exhibited the
333 classic botanical penchant for nomenclature and taxonomy. He was Secretary of the
334 International Association for Plant Taxonomy (IAPT) Committee for Fossil Plants
335 from 1969 to 1994, and continued to serve as a committee member. During 1950, Al
336 joined the Botanical Society of America. He became active in the Palaeobotanical
337 Section, serving twice as Chairman (1958 and 1960–1961) and Secretary-Treasurer

338 (1957–1960). Al was an accomplished editor, and served on the editorial board of
 339 *Palaeontographica Abteilung B* from 1992 onwards. From 1950, he was also a Fellow
 340 of the American Association for the Advancement of Science (AAAS) and the
 341 Geological Society of America (GSA). Al was also a member of many other scientific
 342 organisations such as the American Quaternary Association and the International
 343 Organisation of Palaeobotany.

344

345 **9. Scientific highlights in Al's career**

346 One of the high points in Al's career was being invited to be an on-board scientist
 347 (palynologist) on Leg 42B, a cruise of the Glomar Challenger in the Black Sea during
 348 May and June 1975, with the then Deep Sea Drilling Project (now the International
 349 Ocean Discovery Program). Later in his life, he always enjoyed conjuring up some of
 350 the results of that expedition to support his argument in whatever controversy he was
 351 engaged in. As a direct result of this position, Al was appointed as a Visiting
 352 Professor at the Geology Department of the Swiss Federal Institute of Technology
 353 (ETH) in Zürich, Switzerland between 1980 and 1981 during a sabbatical. Betty
 354 accompanied Al, and he presented a course on Cenozoic palynology while at ETH.
 355 His sponsor in Zürich was Professor Ken J. Hsü, who had been the chief scientist on
 356 the DSDP Black Sea cruise, and who had previously worked with Al at Shell.

357 Al was appointed Adjunct Professor of Geobiology by Juniata College,
 358 Huntingdon, Pennsylvania, between 1977 and 1982, where he presented occasional
 359 lectures. Some years later, in April 1989, Al was an invited speaker at the
 360 International Union of Geological Sciences (IUGS) Symposium on Global Change
 361 held at Interlaken in Switzerland (Ricklefs et al. 1990). Following this, he was
 362 frequently asked to present keynote talks, an example being an address to the
 363 *Asociación de Palinólogos de Lengua Española* (APLE) at their 10th Symposium in
 364 Valencia, Spain during September 1994.

365 In 1991–1992, Al and Betty returned to Europe, when Al took up a Fulbright
 366 Professorship at the Senckenberg Research Institute and Natural History Museum in
 367 Frankfurt am Main, Germany at the invitation of the director, Willi Ziegler. Al
 368 worked in the Palaeobotanical Section which was lead at the time by Friedemann
 369 Schaarschmidt. At this time, he finalised editing Traverse (1994b). As a result of this
 370 working visit, Al was elected a Corresponding Member of the *Senckenbergische*
 371 *Naturforschende Gesellschaft* (Senckenberg Nature Research Society) in 1992. This is

372 a scholarly society for the natural sciences founded by Johann Wolfgang von Goethe
 373 in 1817, and named for the pioneer German academic Johann Christian Senckenberg
 374 (1707–1772). Al joined a very select group as there are only around 30 members
 375 worldwide.

376 During his time in Frankfurt am Main, Al visited the Birbal Sahni Institute of
 377 Palaeobotany (BSIP) in Lucknow, Uttar Pradesh, India in November 1991. This visit
 378 coincided with the Birbal Sahni Centennial celebrations and he was awarded the
 379 Biennial International Medal for 1991–1992 by the Palaeobotanical Society of India
 380 for ‘outstanding contributions to palynology.’ Like most overseas visitors to the BSIP,
 381 Al worked for a short time at BSIP and presented several invited lectures to the staff
 382 there.

383

384 **10. Nomenclature and taxonomy (WGC)**

385 Al was always very open about changing his mind – a process he was driven to
 386 several times in his life-long involvement with fossil plant nomenclature and
 387 taxonomy. As a member of the IAPT Fossil Plant Committee for many years, Al
 388 always enjoyed debating the often extremely convoluted issues associated with fossil
 389 plant nomenclature – both verbally at congresses, and in a number of publications.

390 One of the several areas of nomenclatural controversy to which Al made a
 391 significant contribution was the use of modern generic names for
 392 Palaeogene/Neogene angiosperm pollen. This arose at an early stage in his career
 393 from his attributing several of the pollen types in the Brandon Lignite, to extant
 394 genera such as *Nyssa* (Traverse 1955). But as he wrote many years later: “For years I
 395 felt that, where the generic reference is absolutely clear, there is no reason at all to
 396 avoid the extant generic name. However, after decades of thinking about the matter, I
 397 have now changed my mind and now feel that pre-Pleistocene sporomorphs should be
 398 referred to morphotaxa (morphogenera, morphospecies) such as *Nyssapollenites*, not
 399 *Nyssa*, even though, for example, association with other organs makes it clear that
 400 *Nyssa* pollen in the Brandon Lignite described by me (Traverse, 1955) was produced
 401 by plants that probably were congeneric with the extant genus *Nyssa*” (Traverse 2007,
 402 p. 413). So although he withdrew from his original stance, he characteristically clearly
 403 communicated that he felt that the basis for it had been perfectly valid!

404 Another related debate that Al enjoyed involved the term ‘morphotaxon’. That
 405 designation, applicable to fossil taxa in the Vienna Code, was taken out of the

406 International Code of Nomenclature for algae, fungi and plants (previously the
 407 International Code of Botanical Nomenclature, or ICBN), following the Melbourne
 408 International Botanical Congress of July 2011. Writing as a member of the Fossil
 409 Plant Committee, commenting on the proposal that led to its removal he wrote: “The
 410 elimination of morphotaxonseems to me questionable. At least, the subject needs
 411 more thinking about various ramifications. Let’s take paleopalynology as an example.
 412 *Aquilapollenites* is a generic name for a kind of (mostly) Cretaceous angiosperm
 413 pollen grains. In no way could such a generic name (and there are several thousand of
 414 them) be applied to anything other than dispersed pollen grains. If they are found in
 415 the anthers of a megafossil flower, called say *Stupidoflora*, they would be the “pollen
 416 of *Stupidoflora*” with a note that the pollen, if found dispersed, would be
 417 *Aquilapollenites*. The latter is a morphotaxon name by definition of the ICBN and
 418 could not become the name of a flower or of a plant” (personal communication to
 419 WGC, 2010). But, despite Al’s plea, the term morphotaxon has vanished from the
 420 present Code.

421

422 **11. Various anecdotes**

423 Some of Al’s contemporaries have suggested that he took life rather too seriously, and
 424 was lacking in a well-tuned sense of humour. The present authors never felt this, but
 425 rather that we were tuned to the same wavelength. Once while Al and WGC were
 426 driving to a Silurian palynological collecting site in Pennsylvania, Al needed some
 427 guidance on finding the location. He cheerfully reached for a road map in the back of
 428 the car in those happy, pre-satellite navigation days. He placed it across his lap below
 429 the steering wheel and began to peruse the map while driving, occasionally glancing
 430 up at the traffic. After some minutes of this, and several near misses, WGC snatched
 431 the map from Al’s lap and said “I’ll read the map, you drive!” Al took this in good
 432 humour and roared with laughter, explaining that he often did this. He went on to say
 433 that while “on open interstates with little traffic I also peel bananas and oranges while
 434 simultaneously studying language cards”. Al added that Betty’s reaction to his map-
 435 reading had been similar to WGC’s, but she had never actually snatched the map
 436 away.

437 A more recent illustration of his cheery acceptance of the results of surviving
 438 into one’s late eighties was his aside in the course of an email to WGC in 2012. It
 439 reads: “I am now ‘four score and seven years’ as in the Gettysburg address. That

440 made me think of the fact that from Lincoln’s assassination in April 1865 to the birth
 441 of our son, Paul, was exactly 87 years – man that is a LONG time and I must be
 442 OLD.” He went on to remark that “since 70 years ago I have been a skilled touch
 443 typist – no more. I hit 30% wrong keys. I am doing this with one finger”.

444 Al cheerfully embraced new ideas and technology. One example of this is his
 445 delight in using the relatively new online encyclopaedias. JBR recalls being told that,
 446 in the severe Pennsylvanian winters, he and Betty would enthusiastically use pages
 447 torn from their complete and venerable set of the *Encyclopaedia Britannica* to light
 448 their log-burning stoves!

449 There is one final anecdote which Al never knew about. Early in the career of
 450 JBR, a colleague (Ronald Woollam) asked if Jim was going to the morning coffee
 451 break. JBR was deep in microscope work at that instant and replied that he would
 452 indeed attend, but only when he had “finished his current Alfred”. Woollam
 453 questioned this, and was told that an Alfred is rhyming slang for a traverse (of the
 454 microscope slide). Non-UK-based readers should refer to Ayto (2002).

455

456 **12. Retirement (1995–2015)**

457 During 1995, Al formally retired from Penn State, becoming Professor Emeritus in
 458 perpetuity, although he presented his beloved Geosciences/Biology 423 course for the
 459 final time in 1996. After Al’s retirement, he and Betty could enjoy their country estate
 460 close to Penn State to the full. This was appropriately named Alphabet Arboretum,
 461 because it was largely wooded land with a relatively high arboreal diversity. For
 462 example, Al was delighted to find that some mature, flowering American chestnut
 463 trees (*Castanea dentata* (Marsh) Borkh.) were growing on his land, despite the
 464 ravages of the introduced chestnut blight which was brought to North America early
 465 in the twentieth century (Rich & Strother 2015). Clearly, the name Alphabet
 466 Arboretum appealed to him because it combined his and Betty’s names – a point Al
 467 always liked to make. Because Al was always at heart a botanist, and one who
 468 enjoyed rural life, he greatly enjoyed country activities such as felling timber and
 469 cutting logs for fuel.

470 Despite being retired, Al just could not keep away from science and he affirmed a
 471 tangible commitment to botany by becoming the Adjunct Curator of the Penn State
 472 Herbarium from 2007 until 2015. This had great historical significance for Penn State.
 473 The herbarium was initiated by its first President, the agricultural chemist Dr Evan

474 Pugh (1828–1864), who acquired much of the original botanical material in Germany,
475 from around Göttingen where he lived at the time and elsewhere
476 (<https://www.libraries.psu.edu/psul/digital/pshistory/presidents/pugh.html>).
477 Significantly, Evan Pugh believed that the herbarium was an important base for
478 research and teaching in what had been the ‘Farmers High School’ and renamed by
479 him, the ‘Pennsylvania College of Agriculture’. When he retired, Al added the ~5000
480 specimens from his personal herbarium to the Penn State Herbarium. Al was
481 honoured to continue Evan Pugh’s legacy, who correctly believed that a herbarium
482 was essential for an institution which researched and taught agriculture. During his
483 retirement years, Al rearranged and updated the herbarium, and incorporated much
484 more material. Consequently, the number of specimens rose from 95,000 to 107,000
485 under Al’s tenure; a truly phenomenal retirement project!

486

487 **13. Conclusions**

488 Al Traverse was a hugely important figure in palaeobotany and palynology. He was a
489 consummate advisor/mentor, teacher and researcher, and he achieved some significant
490 ‘firsts’. Al wrote the first pre-Quaternary PhD dissertation in North America, and was
491 one of the first ever professors of palynology. During his early years he excelled at
492 school to postgraduate level. He decided upon his botanical/palaeobotanical vocation
493 very early, as an undergraduate in fact. Al spent 15 years variously in government
494 service, in the oil industry and as a priest before settling down at Penn State. Here he
495 taught the massively popular and far-sighted undergraduate course
496 Geosciences/Biology 423 for 30 years. Al single-handedly trained a prodigious
497 number of palynologists. He published widely on a very diverse range of topics, and
498 his highlights were two major textbooks and co-authorship of the ‘Catalog of Fossil
499 Spores and Pollen’ between 1967 and 1976. Al worked hard for a number of scientific
500 societies, notably AASP – the Palynological Society. Al loved to travel, and
501 undertook significant research visits to Germany, India and Switzerland. Typically he
502 would study the language of a country he was visiting or was about to visit. After
503 retiring from Penn State in 1996, Al became Adjunct Curator of the Penn State
504 Herbarium between 2007 and 2015. He was also a very cultured individual. He
505 creatively used a palaeobotanically-relevant extract from *The Lost World* by Michael
506 Crichton to introduce the second edition of *Paleopalynology* (Traverse 2007, p. vii).

507 There is no doubt that Al could be both charming and pleasant but he also had a
508 somewhat steely side, particularly in the professional arena.

509 Al Traverse is survived by his wife Betty, their four children, John Insley,
510 Celia Elizabeth, Paul Whitney and Martha Jane, seven grandchildren, two step-
511 grandchildren, one great-grandchild, and two step-great-grandchildren. Both his
512 family, and the world of palaeobotany and palynology, will miss him greatly.

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