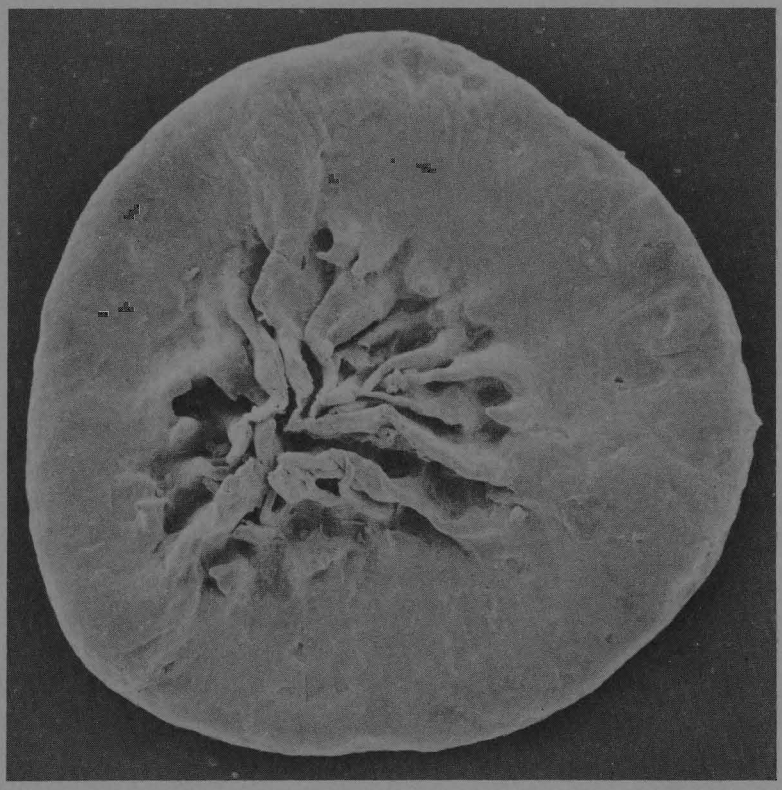
SPECIAL PAPERS IN PALAEONTOLOGY · 35

Studies in Palaeobotany and Palynology

IN HONOUR OF

N. F. Hughes



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N. F. HUGHES

drawn by P. Hughes

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STUDIES IN PALAEOBOTANY AND PALYNOLOGY IN HONOUR OF N. F. HUGHES

EDITED BY

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N. F. HUGHES

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N. F. HUGHES—BIOGRAPHY AND BIBLIOGRAPHY

THE articles that make up this Special Paper have been collected together to mark the occasion of Norman Hughes's official retirement at the end of September 1985 from many years on the staff of the Department of Earth Sciences (formerly Geology) in the Sedgwick Museum, Cambridge. They have been written by present and former students and associates in recognition of his guidance while they were engaged in research at the University and subsequently.

Norman was born in Buckinghamshire on 4 August 1918. He was educated at King's College School, Wimbledon and Cambridge where he graduated with first class honours in natural sciences. His studies at the university were, however, interrupted by war service to the extent that he completed the Natural Sciences Tripos Part I in 1939, but was unable to finish Part II until 1946/1947.

During the war, Norman served in Field and Survey Regiments of the Royal Artillery in the UK, North Africa, and Italy, rising to Captain. During 1945 he was an instructor in biology at the Army Formation College in Perugia (Italy). He maintained military connections after the war by serving from 1948 until 1970 in the Royal Engineers Specialist Pool of Geologists of the Territorial Army (later, the Territorial Army and Volunteer Reserve), rising to the rank of Colonel. During this period he was involved in terrain evaluation, soil mechanics, and exploration for materials in Germany, the Canadian Arctic, Malaya, and north-east Thailand as well as in the UK. He received both Territorial and Emergency Reserve Decorations in recognition of this long period of service.

In 1947, while in Cambridge, Norman and his contemporary L. V. Illing shared a Harkness Scholarship. The same year he was appointed a Lecturer in Geology at Bedford College, London, where he stayed until 1953. In 1948 he began research on plant cuticles and megaspores from the English Wealden. This led to his first publication (Hughes 1955) in which the artistic talent of his wife Pamela is also evident in the attractive and scientifically accurate illustrations of the megaspores described. It is again manifested here in the form of Norman's portrait. This shows not the man who, as is well known, laughs easily, but the more serious person he is most of the time!

Norman's interests in evolutionary palaeobotany were kindled when he was a student in Cambridge and encouraged by H. Hamshaw Thomas. This led subsequently to his taking over, from W. T. Gordon, London intercollegiate teaching in that subject. Work on a London University research degree was aborted, however, when he returned to Cambridge in 1953 as a University Lecturer in Geology and inherited palaeobotanical instruction. He was appointed a Fellow of Queens' College in 1962. Among his college commitments have been his service as a Steward (1963–1972), Acting Junior Bursar (1974–1976), Keeper of the Records (1977–), and Wine Secretary (1963–). He was awarded an Sc.D. by the University in 1977.

Norman has been an active member of several geological societies and other organizations, both national and international. He played a major role in helping to establish the Palaeontological Association during 1955–1957 and in the initiation of publication of the journal *Palaeontology*. He was subsequently on Council and Vice-President (two terms: 1957–1959 and 1972–1974), Editor (1960–1961) and Senior Editor (1962–1972), and has organized two meetings for the society in Cambridge (1950 and 1971). A Fellow of the Geological Society of London since 1946, he was a council member from 1956–1959 and served on the Stratigraphic Committee of the society from 1965–1976, being its Secretary from 1969–1972 and Chairman from 1972–1976. He has also been involved with the running of other British societies from time to time, particularly as a member of the councils of the Palaeontographical Society (three terms), the Systematics Association and the British Micropalaeontological Society (one term each). Currently he is an editor of the Earth Sciences Series published by Cambridge University Press.

On the international scene, Norman has presented papers at many scientific gatherings. He is well known in the palynological world as a former President of the International Commission for

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Palynology (ICP, 1971–1977; now International Federation of Palynological Societies), its Chairman for the 4th conference in Lucknow (1976/77), and the organizer of the 5th which was held in Cambridge in 1980. He has also been involved with several other international bodies including the International Organization for Palaeobotany (IOP), the International Palaeontological Association (IPA), the Stratigraphy Commission of the International Union of Geological Sciences (IUGS), the Stratigraphic Correlations Panel of the Deep Sea Drilling Project (DSDP), and the International Geological Correlation Project (IGCP); with respect to the last of these, he was a member of Projects 1 and 148 and convenor of 175 ('Stratigraphic Precision') from 1981–1983.

Norman's research interest in Mesozoic miospores (small spores and pollen grains) was aroused shortly after he was appointed to Cambridge and was further stimulated the following year (1954) when his first research student, the late Ashley Couper, joined him. As the list of publications that follows this introduction indicates, he has expended much effort since then on two main themes, both of which have been supported by a succession of grants from the Natural Environment Research Council (NERC), particularly for the provision of research assistants. The first concerns the means by which fossils in general, but miospores in particular, can be used to provide a basis for precise stratigraphical correlation. In a series of papers dating from the 1960s he has developed ideas on how palaeontological data should, in his view, be handled. His approach to the identification of selected English Wealden (Lower Cretaceous) miospores, and an analysis of their stratigraphic distribution, form the basis of several of these contributions within which he has introduced to the palynological vocabulary such now-familiar terms as 'biorecord' and 'genusbox'. His methods are applicable to other fields of palaeontology, as he has been at pains to point out. They have served as a catalyst to stimulate discussion on the future of palaeontological systematics, but they have also been seen as an attack on well-tried conventional methods of dealing with fossils and have not achieved the widespread acceptance for which he must have hoped.

His second main line of research, which is on the palaeobiology of angiosperm origins, led to the publication of a book of that title in 1976. Since then there has been an increased effort on his part, as well as by other palaeobotanists and palynologists, to find further evidence of early flowering plants and their precursors. Norman decided to use routinely the scanning electron microscope (SEM) to search palynomorph assemblages for the small and rare pollen grains that are thought to have angiospermous characters. Recently this approach to palynological analysis has become standard in Cambridge for other plant microfossil studies, light microscopy playing a lesser role or being dispensed with altogether.

Two-thirds of Norman's former and present students and associates who are still actively engaged in palaeobotanical and palynological pursuits have provided articles for this Special Paper. Only Elizabeth Truswell's co-author (N. G. Marchant) was not at some point under his supervision, though he too was a research student in Cambridge (Botany School).

Apart from the fact that all of the papers are in the fields of palaeobotany and/or palynology there is no single unifying theme. The taxonomic procedures adopted by several of the authors to deal with their palynomorphs differ considerably and highlight some of the problems that have occupied Norman's time. One of the more controversial aspects of his own recent research and that of some of his students is evident in the three contributions in which the only photographic illustrations of the pollen and dinoflagellate cysts considered are scanning electron micrographs. Whether this approach is beneficial to the discipline of palynological taxonomy is debatable. Jenny Chapman's paper in particular demonstrates some of the problems that can arise when reliance is placed solely on observations made under the SEM. Specific reference to Norman's methods is made in the majority of papers, and a longer appraisal is provided by David Smith. I hope that both these and the other contributions will serve to stimulate discussion and further research, aims that Norman has always sought to encourage.

BIBLIOGRAPHY

HUGHES, N. F. 1955. Wealden plant microfossils. *Geol. Mag.* **92,** 201–217.

—— 1958. Palaeontological evidence for the age of the English Wealden. Ibid. **95,** 41–49.

—— and COUPER, R. A. 1958. Palynology of the Brora Coal of the Scottish Middle Jurassic. *Nature*, **181,** 1482–1483.

FORBES, C. L., HARLAND, W. B. and HUGHES, N. F. 1958. Palaeontological evidence for the age of the Carboniferous and Permian rocks of Central Vestspitsbergen. *Geol. Mag.* **95,** 465–490.

HUGHES, N. F. 1961. Fossil evidence and angiosperm ancestry. *Sci. Progr.* **49,** 84–102.

—— 1961. Further interpretation of *Eucommiidites* Erdtman 1948. *Palaeontology*, **4,** 292–299.

—— and PLAYFORD, G. 1961. Palynological reconnaissance of the Lower Carboniferous of Spitsbergen. *Micropaleontology*, **7,** 27–44.

—— DETTMANN, M. E. and PLAYFORD, G. 1962. Sections of some Carboniferous dispersed spores. *Palaeontology*, **5,** 247–252.

—— 1963. The assignment of species of fossils to genera. *Taxon*, **12,** 336–337.

COUPER, R. A. and HUGHES, N. F. 1963. Jurassic and Lower Cretaceous palynology of the Netherlands and adjacent areas. *Verh. K. geol.-mijnb. Genoot. Ned. Geol. Ser.* **21–2,** 105–108.

DELCOURT, A. F., DETTMANN, M. E. and HUGHES, N. F. 1963. Revision of some Lower Cretaceous microspores from Belgium. *Palaeontology*, **6,** 282–292.

HUGHES, N. F. 1964. Einige Vorschläge zur angabe der daten und der Klassifikation in der Sporologie. *Fortschr. Geol. Rheinl. Westf.* **12,** 39–44.

—— 1964. Cretaceous floras and the assessment of past climates. *In* NAIRN, A. E. M. (ed.). *Problems in Palaeoclimatology*, 44–47, Interscience.

—— DE JEKHOWSKY, B. and SMITH, A. H. V. 1964. Extraction of spores and other organic microfossils from Paleozoic clastic sediments and coals. *C.r. 5 Cong. Int. Strat. Geol. Carbon.*, Paris, 1095–1109.

ANDERSON, F. W. and HUGHES, N. F. 1964. The 'Wealden' of north-west Germany and its English equivalents. *Nature*, **201,** 907–908.

COOKSON, I. C. and HUGHES, N. F. 1964. Microplankton from the Cambridge Greensand (mid-Cretaceous). *Palaeontology*, **7,** 37–59.

HUGHES, N. F. and MOODY-STUART, J. C. 1966. Descriptions of schizaeaceous spores taken from early Cretaceous macrofossils. Ibid. **9,** 274–289.

—— —— 1967. Palynological facies and correlation in the English Wealden. *Rev. Palaeobot. Palynol.* **1,** 259–268.

—— —— 1967. Proposed method of recording pre-Quaternary palynological data. Ibid. **3,** 347–358.

—— WILLIAMS, D. B., CUTBILL, J. L. and HARLAND, W. B. 1967. A use of reference-points in stratigraphy. *Geol. Mag.* **104,** 634–635.

HARLAND, W. B., HOLLAND C. H., HOUSE, M. R., HUGHES, N. F., REYNOLDS, A. B., RUDWICK, M. J. S., SATTERTHWAITE, G. E., TARLO, L. B. H. and WILLEY, E. C. (eds.). 1967. *The fossil record*, xii + 828 pp. Geological Society, London.

HUGHES, N. F. and SMART, J. 1967. Plant–insect relationships in Palaeozoic and later time. *In* HARLAND, W. B. *et al.* (eds.). Ibid. 107–117.

ALVIN, K. L., BARNARD, P. D. W., HARRIS, T. M., HUGHES, N. F., WAGNER, R. H. and WESLEY, A. 1967. Gymnospermophyta. Ibid. 247–268.

BANKS, H. P., CHESTERS, K. I. M., HUGHES, N. F., JOHNSON, G. A. L., JOHNSON, H. M. and MOORE, L. R. 1967. Thallophyta 1. Ibid. 163–180.

—— COLLETT, M. G., GNAUCK, F. R. and HUGHES, N. F. 1967. Pteridophyta 2. Ibid. 233–245.

CHESTERS, K. I. M., GNAUCK, F. R. and HUGHES, N. F. 1967. Angiospermae. Ibid. 269–288.

HUGHES, N. F., WILLIAMS, D. B., CUTBILL, J. L. and HARLAND, W. B. 1968. Hierarchy in stratigraphical nomenclature. *Geol. Mag.* **105,** 78–80.

—— 1969. Jurassic and early Cretaceous pollen and spores. *In* TSCHUDY, R. H. and SCOTT, R. A. (eds.). *Aspects of palynology*, 311–329. Wiley, New York.

—— 1969. Suggestions for better handling of the genus in palaeo-palynology. *Grana Palynologica*, **9,** 137–146.

—— and MOODY-STUART, J. C. 1969. A method of stratigraphic correlation using early Cretaceous spores. *Palaeontology*, **12,** 84–111.

—— 1970. The need for agreed standards of recording in palaeopalynology and palaeobotany. *Paläont. Abh.* **3B,** 357–364.

—— 1971. Remedy for the general data handling failure of palaeontology. *In* CUTBILL, J. L. (ed.). *Data processing in biology and geology*. Systematics Association Spec. Vol. **3,** 321–330. Academic Press, London.

HUGHES, N. F. and PACLTOVA, B. 1972. Fresh-water to marine time-correlation potential of Cretaceous and Tertiary palynomorphs. *24th Int. Geol. Congr.* Montreal, **7,** 397–401.

HARLAND, W. B., AGER, D. V., BALL, H. W., BISHOP, W. W., BLOW, W. H., CURRY, D., DEER, W. A., GEORGE, T. N., HOLLAND, C. H., HOLMES, S. C. A., HUGHES, N. F., KENT, P. E., PITCHER, W. S., RAMSBOTTOM, W. H. C., STUBBLEFIELD, C. J., WALLACE, P. and WOODLAND, A. W. 1972. A concise guide to stratigraphical procedure. *J. geol. Soc. Lond.* **128,** 295–305.

LAFFITTE, R., HARLAND, W. B., ERBEN, H. K., BLOW, W. H., HAAS, W., HUGHES, N. F., RAMSBOTTOM, W. H. C., RAT, P., TINTANT, H. and ZIEGLER, W. 1972. Some international agreement on essentials in stratigraphy. *Geol. Mag.* **109,** 1–15.

HUGHES, N. F. (ed.). 1973. Organisms and continents through time: a symposium. *Spec. Pap. Palaeont.* **12,** vi + 334 pp.

—— 1973. Mesozoic and Tertiary distributions and problems of land-plant evolution. *In* HUGHES, N. F. (ed.). Organisms and continents through time. Ibid. 188–198.

—— 1973. Towards effective data-handling in palaeopalynology. *In* BOLKHOVITINA, N. A. (ed.). Morphology and systematics of fossil pollen and spores. *Proc. 3rd Int. Palyn. Conf.* Novosibirsk, 1971, 9–14.

—— 1973. Environment of angiosperm origins. *In* CHLONOVA, A. F. (ed.). Palynology of Mesophyte. Ibid. 135–137.

—— and CROXTON, C. A. 1973. Palynologic correlation of the Dorset 'Wealden'. *Palaeontology*, **16,** 567–601.

SMART, J. and HUGHES, N. F. 1973. The insect and the plant; progressive palaeoecological integration. *In* VAN EMDEN, H. F., (ed.). Insect/plant relationships. *Sympos. roy. Entom. Soc. Lond.* **6,** 143–155.

HUGHES, N. F. 1974. Palynological time-correlation of English Wealden with boreal marine successions. *In* CASEY, R. and RAWSON, P. F. (eds.). The Boreal Lower Cretaceous. *Geol. J. Spec. Issue*, **5,** 185–192. Seel House Press, Liverpool.

—— 1974. Angiosperm evolution and the superfluous upland origin hypothesis. *Birbal Sahni Inst. Palaeobot. Lucknow, Spec. Publ.* **1,** 25–29.

—— 1974. Beneficial regulation of procedure in editing stratigraphy. *Lethaia*, **7,** 283–286.

—— 1975. The challenge of abundance in palynomorphs. *Geoscience and Man*, **11,** 141–144.

—— 1975. The challenge of abundance in palynomorphs: reply. Ibid. **11,** 149.

—— 1975. Jurassic–Cretaceous boundary requirement from a palynologic viewpoint. *Mem. Bur. Res. Geol. Min.* **86,** 204–206.

SMITH, D. G., HARLAND, W. B. and HUGHES, N. F. 1975. Geology of Hopen, Svalbard. *Geol. Mag.* **112,** 1–23.

CASEY, R., ALLEN, P., DÖRHÖFER, G., GRAMANN, F., HUGHES, N. F., KEMPER, E., RAWSON P. F. and SURLYK, F. 1975. Stratigraphical subdivision of the Jurassic–Cretaceous boundary beds in northwest Germany. *Newsl. Stratigr.* **4,** 4–5.

HUGHES, N. F. 1976. *Palaeobiology of angiosperm origins*, vii + 240 pp. Cambridge University Press.

—— 1976. Cretaceous palaeobotanic problems. In BECK, C. B. (ed.). *Origin and early evolution of angiosperms*, 11–22. Columbia University Press.

—— 1976. Plant succession in the English Wealden strata. *Proc. Geol. Ass.* **86,** 439–455.

SMITH, D. G., HARLAND, W. B. and HUGHES, N. F. 1976. The geology of Kong Karls Land, Svalbard. *Geol. Mag.* **113,** 193–232.

HUGHES, N. F., HARLAND, W. B. and SMITH, D. G. 1976. Preservation and abundance of palynomorphs in Svalbard. Ibid. 233–240.

CARVER, R. O. H. *et al.* including HUGHES, N. F. 1976. *Applied Geology for Engineers*, xxxv + 378 pp. HMSO, London.

HUGHES, N. F. 1977. Palaeo-succession of earliest angiosperm evolution. *Bot. Rev.* **43,** 105–127.

—— 1977. *Mid-Cretaceous seed plants.* 6th Birbal Sahni Memorial Lecture, 11 pp. Birbal Sahni Inst., Lucknow.

—— and DREWRY, G. E. 1978. Cretaceous Barremian tectate pollen from Southern England. *Cour. Forsch.-Inst. Senckenberg*, **30,** 62–69.

—— 1979. Proposal for a new palaeobotanical appendix for the International Code of Botanical Nomenclature. *Taxon*, **27,** 497–504.

—— DREWRY, G. E. and LAING, J. F. 1979. Cretaceous Barremian earliest angiosperm pollen. *Palaeontology*, **22,** 513–535.

PICKTON, C. A. G., HARLAND, W. B., HUGHES, N. F. and SMITH, D. G. 1979. Mesozoic stratigraphy of eastern Svalbard: a reply. *Geol. Mag.* **116,** 55–61.

HUGHES, N. F. 1980. Reply to commentary on code proposals for palaeobotany. *Taxon*, **28,** 386–387.

—— 1980. Palynologic correlation of early Cretaceous fresh-water to marine strata. *Proc. 4th Int. Palyn. Conf.* Lucknow, **2,** 497–499.

—— 1981. Jurassic–Cretaceous boundary palynology in Europe. *Palaeobotanist*, **28–29,** 316–323.
—— 1981. Mid-Cretaceous plant megafossils from England. *Cretaceous Research*, **2,** 339–341.
—— 1981. 'cf'.—symbol of an outdated data-handling system. *Newsl. Int. Org. Palaeobot.* **14,** 5–6.
—— 1982. Dispersed pollen and the search for angiosperm ancestors among Mesozoic seed plants. *In* NAUTIYAL, D. D. (ed.). Studies on living and fossil plants. *Phyta. Spec. Issue; Pant Commem. Vol.* 115–120.
—— 1984. Cretaceous plant taxonomy and angiosperm ancestors: sources of difficulty. *Bot. J. Linn. Soc. Lond.* **85,** 55–61.
—— 1984. Mesosperm palynologic evidence and ancestors of angiosperms. *Ann. Missouri Bot. Gard.* **71,** 593–598.
—— and HARDING, I. C. 1985. Wealden occurrence of an isolated Barremian dinocyst facies. *Palaeontology*, **28,** 555–565.

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