

Contents

<i>Foreword by Mott Greene</i>	<i>page</i> x
<i>Acknowledgments</i>	xiii
<i>List of abbreviations</i>	xv
<i>Introduction</i>	xvii
1 How the mobilism debate was structured	1
1.1 The three phases of the continental drift controversy	1
1.2 Solutions, theories, hypotheses, and ideas or concepts	4
1.3 Problems and difficulties	5
1.4 First and second stage problems	5
1.5 Four examples of first stage problems	6
1.6 Four examples of second stage problems	7
1.7 Difficulties	8
1.8 Unreliability difficulties	8
1.9 Anomaly difficulties	10
1.10 Missing-data difficulties	11
1.11 Theoretical difficulties	12
1.12 Difficulty-free solutions	13
1.13 The three research strategies and how they gave structure to the debate	18
1.14 Specialization and regionalism in the Earth sciences	23
1.15 Why regionalism and specialization affected theory preference during the mobilist debate	28
2 Wegener and Taylor develop their theories of continental drift	38
2.1 Introduction	38
2.2 Geological theorizing at the turn of the twentieth century	39
2.3 The contractionism of Suess	39
2.4 The reception of Suess' contractionism and the difficulties it encountered	42
2.5 Wegener the man	45

vi	<i>Contents</i>	
2.6	Wegener's 1912 theory of partition and horizontal displacement of continents, from idea to working hypothesis	50
2.7	Wegener presents and defends his drift theory in 1912: his six major arguments	52
2.8	Wegener's further arguments in 1912	58
2.9	Taylor and his career	61
2.10	The emergence of Taylor's theory of creep and horizontal displacement	62
2.11	Taylor's cosmogony and his notion of continental drift, 1898	63
2.12	Taylor's 1910 presentation and defense of his creep and drift theory	64
2.13	Wegener and Taylor: the independence of their inspiration	69
2.14	Wegener and Taylor compared	71
2.15	Evolution of Wegener's theory, 1912–1922	75
3	Sub-controversies in the drift debate: 1920s–1950s	81
3.1	Introduction	81
3.2	Wegener's theory as presented in 1922	82
3.3	Biotic disjuncts and Wegener's 1922 explanation of them	87
3.4	Landbridgers revise and rebut	92
3.5	Mobilists rally increasing support for continental drift	98
3.6	The resurgence of American permanentism: isthmian links	107
3.7	Du Toit, Simpson, and Longwell debate	112
3.8	Support for permanentism continues through the mid-1950s	114
3.9	Questioning reliability and completeness of the biogeographical record	122
3.10	Permo-Carboniferous glaciation: Wegener's 1922 solution; key support for Wegener	127
3.11	Permo-Carboniferous glaciation: fixists attack Wegener's solution and refurbish their own	129
3.12	Permo-Carboniferous glaciation: mobilists counterattack	132
3.13	The geodetic sub-controversy over the westward drift of Greenland	139
3.14	Use of research strategies in the three sub-controversies	144
3.15	Köppen and Wegener determine ancient latitudes	148
4	The mechanism sub-controversy: 1921–1951	159
4.1	Introduction	159
4.2	Wegener's 1922 mechanism	159
4.3	Wegener's mechanism attacked: 1921 through 1926	162
4.4	Van der Gracht modifies Wegener's mechanism	170
4.5	Daly's early attitude toward mobilism	171
4.6	Daly's mobilist theory presented in <i>Our Mobile Earth</i>	172

Contents

vii

4.7	Daly's defense of continental drift and his down-sliding hypothesis	174
4.8	The reception of Daly's down-sliding hypothesis	179
4.9	Joly's thermal cycles and his ambivalence about mobilism	183
4.10	The Joly–van der Gracht mechanism	190
4.11	Fixists reject the Joly–van der Gracht mechanism	191
4.12	Mobilists show little sympathy for the Joly–van der Gracht mechanism	196
5	Arthur Holmes and his Theory of Substratum Convection: 1915–1955	203
5.1	Introduction	203
5.2	Holmes' scientific career	204
5.3	Holmes before becoming a mobilist	205
5.4	Holmes develops his mobilistic theory, 1928–1931	210
5.5	Reception of Holmes' hypothesis of substratum convection	223
5.6	Work on convection currents during the 1930s	231
5.7	Reception of Holmes' substratum convection by mobilists Daly and du Toit	238
5.8	Holmes reconsiders his substratum convection hypothesis, 1944	240
5.9	Reception of Holmes' 1944 presentation of his convection hypothesis	244
5.10	Geophysicists' attitude toward convection around 1950	249
5.11	Holmes' attitude toward mobilism in the early 1950s	251
5.12	Significance of Holmes' convection hypothesis	253
5.13	Appeal to historical precedent: another manifestation of standard research strategy one	255
5.14	Difficulty-free solutions, theory choice, and the classical stage of the mobilist debate	257
6	Regionalism and the reception of mobilism: South Africa, India, and South America from the 1920s through the early 1950s	264
6.1	Introduction	264
6.2	Ken Caster and his attitude toward continental drift	266
6.3	Edna Plumstead and her support for continental drift	271
6.4	Alex du Toit: his life and accomplishments	284
6.5	Du Toit's early defense of continental drift	287
6.6	Du Toit compares geology of South America and Africa	292
6.7	Du Toit's <i>Our Wandering Continents</i>	297
6.8	The reception of <i>Our Wandering Continents</i>	306
6.9	Du Toit's later contributions to mobilism	310
6.10	Lester King	314
6.11	Other South African mobilists	321
6.12	South African fixists	324

viii	<i>Contents</i>	
6.13	Favorable reception of mobilism among Indian geologists	326
6.14	L. L. Fermor supports mobilism	335
6.15	The differing views of D. N. Wadia and M. S. Krishnan	338
6.16	Favorable reception of mobilism in South America	345
6.17	Summary	346
7	Regional reception of mobilism in North America:	
	1920s through the 1950s	349
7.1	Introduction	349
7.2	Previous studies on the reception of mobilism in North America	350
7.3	Permanence of ocean basins, continental accretion, geosynclines: the North American experience, Marshall Kay and others	354
7.4	Antarctica breaks the chains of North American regionalism: the experience of William Long	363
7.5	Long returns from Antarctica and becomes a mobilist	366
7.6	Antarctica again breaks the chains of North American regionalism: the experience of Warren Hamilton	374
7.7	Hamilton finds new evidence of continental drift in Antarctica	378
7.8	Hamilton explains the origin of the Gulf of California in terms of mobilism	384
7.9	Regionalism and Warren Hamilton	385
7.10	North American regionalism: a summary	388
8	Reception and development of mobilism in Europe: 1920s through the 1950s	392
8.1	Introduction	392
8.2	Continental Europe: preliminary comments	393
8.3	Fixists from continental Europe: Stille and Cloos	394
8.4	The 1939 pro-fixist Frankfurt symposium	403
8.5	Some other fixist Europeans	409
8.6	Mobilists from continental Europe	411
8.7	Argand and his synthesis	412
8.8	Reception of Argand's synthesis internationally	419
8.9	Reception of Argand's synthesis among tectonicists of Western Alps	425
8.10	The peri-Atlantic Caledonides: Wegmann	434
8.11	The peri-Atlantic Caledonides: mainly Høltedahl	439
8.12	Hercynides/Variscides and Caledonides: F. E. Suess	447
8.13	Mixed reception in Britain and Ireland	453
8.14	The Dutch East Indies: the changing attitude of the Dutch	474
8.15	Regionalists and globalists	488
9	Fixism's popularity in Australia: 1920s to middle 1960s	496
9.1	Introduction	496
9.2	Geologists working on Australia's geology favorable to mobilism	497

Cambridge University Press

978-0-521-87504-2 - The Continental Drift Controversy: Volume I: Wegener and the Early Debate

Henry R. Frankel

Table of Contents

[More information](#)

	<i>Contents</i>	ix
9.3	Geologists against mobilism	503
9.4	Paleontologists working in Australia reject mobilism	511
9.5	Biologists working in Australia disagree about mobilism	522
9.6	Regionalism in Australia	544
9.7	Regionalism, rationality, and wisdom: an interim summary	545
	<i>References</i>	554
	<i>Index</i>	587