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The Works of John Ruskin

VOLUME 26: DEUCALION, AND OTHER
STUDIES IN ROCKS AND STONES

JOHN RUSKIN
EDITED BY EDWARD TYAS COOK
AND ALEXANDER WEDDERBURN



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J. Ruskin

AUSTRALIAN OPAL

LIBRARY EDITION

THE WORKS OF
JOHN RUSKIN

EDITED BY

E. T. COOK

AND

ALEXANDER WEDDERBURN



LONDON

GEORGE ALLEN, 156, CHARING CROSS ROAD

NEW YORK: LONGMANS, GREEN, AND CO.

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VOLUME XXVI

DEUCALION

AND OTHER STUDIES

IN

ROCKS AND STONES

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CONTENTS OF VOLUME XXVI

	PAGE
LIST OF ILLUSTRATIONS	xiii
INTRODUCTION TO THIS VOLUME	xvii
I. ON THE FORMS OF THE STRATIFIED ALPS OF SAVOY (1863):—	
BIBLIOGRAPHICAL NOTE	2
ABSTRACT OF THE LECTURE BY THE AUTHOR	3
REPORT OF THE LECTURE	12
II. NOTES ON THE SHAPE AND STRUCTURE OF SOME PARTS OF THE ALPS, WITH REFERENCE TO DENUDATION (1865):—	
BIBLIOGRAPHICAL NOTE	20
TEXT	21
III. ON BANDED AND BRECCIATED CONCRETIONS (1867–1870):—	
BIBLIOGRAPHICAL NOTE	36
TEXT	37
IV. DEUCALION: COLLECTED STUDIES OF THE LAPSE OF WAVES AND LIFE OF STONES (1875–1883):—	
BIBLIOGRAPHICAL NOTE	89
CONTENTS	93
TEXT	95
NOTES FOR THE INTENDED CONTINUATION OF DEUCALION:—	
1. BRUMA INERS	363
2. THE ENIGMA OF DENUDATION	365
3. THE FORMATION OF MALHAM COVE	368
4. MOUNTAIN FORM IN THE ALPS	369
V. ON THE DISTINCTIONS OF FORM IN SILICA (1884):—	
BIBLIOGRAPHICAL NOTE	372
TEXT	373
POSTSCRIPT	386

CONTENTS

VI. CATALOGUES OF MINERALS:¹—

	PAGE
1. CATALOGUE OF A SERIES OF SPECIMENS IN THE BRITISH MUSEUM (NATURAL HISTORY) ILLUSTRATIVE OF THE MORE COMMON FORMS OF NATIVE SILICA (1884):—	
BIBLIOGRAPHICAL NOTE	396
PREFACE	397
TEXT	399
2. CATALOGUE OF MINERALS IN ST. GEORGE'S MUSEUM, SHEFFIELD (1877–1886):—	
BIBLIOGRAPHICAL NOTE	416
PREFACE	418
TEXT	419
3. CATALOGUE OF FAMILIAR MINERALS IN THE MUSEUM OF KIRKCUDBRIGHT (1884):—	
BIBLIOGRAPHICAL NOTE	457
TEXT	458
4. CATALOGUE OF THE COLLECTION OF SILICEOUS MINERALS GIVEN TO AND ARRANGED FOR ST. DAVID'S SCHOOL, REIGATE, BY JOHN RUSKIN (1883):—	
BIBLIOGRAPHICAL NOTE	488
TEXT	491
5. CATALOGUE OF MINERALS PRESENTED TO THE CONISTON INSTITUTE (1884)	516
6. CATALOGUE OF MINERALS SHOWN AT EDINBURGH (1884):—	
BIBLIOGRAPHICAL NOTE	519
TEXT	520
7. NOTES ON MINOR COLLECTIONS:—	
AT WHITELANDS COLLEGE (1883)	528
AT THE CORK HIGH SCHOOL FOR GIRLS (1889)	530

VII. THE GRAMMAR OF SILICA (*not hitherto published*):—

BIBLIOGRAPHICAL NOTE	532
TEXT	533

¹ These are not arranged chronologically, but in accordance with the order given by Ruskin on p. 387.

CONTENTS xi

APPENDIX

LETTERS, ADDRESSES, AND NOTES

	PAGE
I. NOTICE RESPECTING SOME ARTIFICIAL SECTIONS ILLUSTRATING THE GEOLOGY OF CHAMOUNI (1858)	545
II. LETTERS TO THE "READER" ON THE CONFORMATION OF THE ALPS (1864):—	
(i.) THE CONFORMATION OF THE ALPS (NOVEMBER 10)	548
(ii.) CONCERNING GLACIERS (NOVEMBER 24)	550
(iii.) ENGLISH <i>versus</i> ALPINE GEOLOGY (DECEMBER 3)	553
(iv.) CONCERNING HYDROSTATICS (DECEMBER 10)	557
III. JAMES DAVID FORBES (1874)	559
IV. A LECTURE ON STONES (1876)	563
V. THE ALPINE CLUB AND THE GLACIERS (1878)	566
VI. INTRODUCTION TO W. G. COLLINGWOOD'S "LIMESTONE ALPS OF SAVOY" (1884)	568
VII. THE GARNET (1885)	575
VIII. A GEOLOGICAL RAMBLE IN SWITZERLAND	577

INDEX

I. OF SUBJECTS, MAINLY IN "DEUCALION"	583
II. LIST OF MINERALS MENTIONED IN THIS VOLUME	591

THE FOLLOWING MINOR RUSKINIANA ARE ALSO INCLUDED IN THIS
VOLUME:—

EXTRACTS FROM RUSKIN'S DIARY:—

AN EVENING WITH JAMES FORBES (SIMPLON, JULY 16, 1846)	xxi
THE FALL OF THE ARVERON (CHAMOUNI, JUNE 17, 1849)	xxiii
LETTER FROM J. J. RUSKIN ON HIS SON'S GEOLOGY (FEBRUARY 19, 1858)	xxvi
LECTURES ON MINERALOGY AT HARROW (1866, 1867)	xlix
LETTER TO HIS FATHER (BELLINZONA, JUNE 18, 1858)	545 n.

MINOR RUSKINIANA: *Continued* :—

	PAGE
LETTER FROM CARLYLE TO RUSKIN ON GEOLOGY (FEBRUARY 22, 1865)	xxx
THE "BRECCIAS OF MORNEX" (A FRAGMENT)	xxxii
LETTERS TO MR. GEORGE ALLEN ON FORBES'S GLACIER THEORY (ASSISI, JUNE 8, 20, 1874)	xl
LETTERS ON "DEUCALION" :—	
TO MR. HENRY WILLET (OCTOBER 14, 1875)	xxxiii <i>n.</i>
TO MR. ALFRED TYLOR (1875)	xxv
LETTER TO ALFRED TYLOR, F.G.S., ON MALHAM COVE (SETTLE, SEPTEMBER 11, 1875)	368
LETTERS TO MR. W. G. COLLINGWOOD :—	
THE LECTURE ON "THE IRIS OF THE EARTH" (FEBRUARY 1876)	xliii
GLACIER THEORIES (JULY 25, 1879)	xlv
RUSKIN AS A LECTURER (1880): A NOTE BY MR. F. WEDMORE	xlii
LETTERS TO MR. L. FLETCHER, F.R.S., KEEPER OF THE MINERALS IN THE BRITISH MUSEUM :—	
IN PRAISE OF CHALCEDONIES (LONDON, 1882)	i
THE GEOLOGY OF LAON (AUGUST 14, 1882)	li
A CATALOGUE OF CHALCEDONIES (RHEIMS, AUGUST 14, 1882)	li
"HEMI-MORPHITE" (JULY 18, 1884)	lii
CORRECTIONS IN RUSKIN'S CATALOGUE (JULY 24, 1884)	liii
THE POSTSCRIPT TO THE CATALOGUE (AUGUST 3, 1884)	liii
ITS SALE IN THE MUSEUM (OCTOBER 23, 1884)	liii
"MINERALOGY BY MY LAKE SHORE" (OCTOBER 13, 1885)	lxiii
THE COLENZO DIAMOND (SANDGATE, DECEMBER 14, 1887)	liv
DR. GÜNTHER (SANDGATE, DECEMBER 26, 1887)	liv
THE COUTTET ROSE-FLUORS (SANDGATE, JANUARY 8, 1888)	lv <i>n.</i>
INSCRIPTIONS BY RUSKIN AT THE BRITISH MUSEUM :—	
ON THE COLENZO DIAMOND	lv
ON THE EDWARDES RUBY	lv
ON THE COUTTET ROSE-FLUORS	lv
"INSTITUTES OF MINERALOGY" (A FRAGMENT)	lx
RUSKIN AND TYNDALL: NOTES OF A CONVERSATION WITH M. H. SPIELMANN (1884)	xxxix <i>n.</i>
LETTERS TO DR. HARLEY, F.R.S., ON MINERALS (BRANTWOOD, JUNE 15, 16, 1887)	lxii, lxiii

LIST OF ILLUSTRATIONS

(From Drawings by the Author¹)

AUSTRALIAN OPAL (*Reproduced by three-colour process*) . . . *Frontispiece*

PLATES

PLATE		
A.	THE MER DE GLACE, 1849 (<i>Photogravure</i>) . . .	<i>To face page xxii</i>
B.	THE RANGE OF MONT BLANC FROM THE COL DE LA SEIGNE, 1849 (<i>Photogravure</i>) . . .	„ „ xxiv
I.	IDEAL SECTION OF THE SALÈVE (<i>Reduced by S. J. Mackie, from a diagram by the author</i>) . . .	„ „ 7
II.	SALÈVE CLIFF, LOOKING NORTH (<i>Woodcut by H. S. Uhlich</i>)	„ „ 8
III.	SECTION OF THE BREZON (<i>Reduced by S. J. Mackie, from a diagram by the author</i>)	„ „ 14
IV.	THE VALLEY OF MAGLANS AND AIGUILLE DE VARENS (<i>Process block from Steel Engraving by G. Allen</i>)	„ „ 33
V.	BANDED AND BRECCIATED CONCRETIONS (<i>Steel En- graving by G. Allen</i>)	„ „ 40
VI.	ROCK-VEINS UNDER CONTRACTION AT TWO PERIODS (<i>Steel Engraving by G. Allen</i>)	„ „ 44
VII.	AMETHYST QUARTZ WITH WARPED FAULTS IN CON- CRETION (<i>Steel Engraving by G. Allen</i>)	„ „ 55
VIII.	SECTION AND MAP OF A CONCRETE AGATE—(1) SECTION (<i>Steel Engraving by J. C. Armytage</i>); (b) MAP (<i>Drawn and engraved by G. Allen</i>)	„ „ 57

¹ Except where otherwise stated.

xiv LIST OF ILLUSTRATIONS

PLATE

IX. FOLDED AGATES AND MURAL AGATES (<i>Steel Engraving by G. Allen</i>)	To face page	68
X. MURAL AGATES (<i>Drawn and engraved by G. Allen</i>)	„ „	76
XI. TRANSITION FROM MURAL TO INVOLUTE AGATE (<i>Chromo-lithograph from drawing and engraving by G. Allen</i>).	„ „	84
IN “DEUCALION”		
XII. FIRST CONDITIONS OF ACCUMULATION AND DIFFUSION IN MOTIONLESS SNOW (<i>Steel Engraving by G. Allen</i>).	„ „	128
XIIA. THE VALLEY OF CLUSE (<i>Photogravure</i>)	„ „	150
XIII. THE PROGRESS OF MODERN SCIENCE IN GLACIER SURVEY (<i>Facsimiles of Illustrations by Forbes and Tyndall</i>)	„ „	160
XIV. STRUCTURE OF LAKE AGATE (<i>Drawn by J. Clifton Ward; engraved by J. Rapkin</i>)	„ „	241
XV. LATERAL COMPRESSION OF STRATA (<i>Drawn by L. Hilliard; engraved by G. Allen</i>)	„ „	257
XVI. THE STRATA OF SWITZERLAND AND CUMBERLAND (<i>Drawn by Studer and Phillips; engraved by G. Allen</i>)	„ „	278
XVII. SAW-BILL DUCK AND TWO CROCODILES (<i>Photogravure</i>)	„ „	310
XVIII. STUDIES OF CERASTES CORNUTUS (<i>Photogravure</i>)	„ „	323
XIX. STUDIES OF VIPERA ELEGANS (<i>Photogravure</i>)	„ „	324
XX. MODES OF CRYSTALLINE INCREMENT (<i>Steel Engraving by G. Allen</i>)	„ „	356
XXI. THE OLYMPIAN LIGHTNING (<i>Drawn and engraved by Hugh Allen</i>)	„ „	359

LIST OF ILLUSTRATIONS

xv

ILLUSTRATIONS PRINTED IN THE TEXT

FIG.	PAGE
1. NORTHERN PORTION OF THE RIDGE OF MONT SALÈVE	25
2. SECTION OF MONT SALÈVE AT <i>a</i> , IN FIG. 1 (<i>Ruskin</i>)	26
3. THE SAME SECTION (<i>Studer</i>)	26
4. DIAGRAM OF UPHEAVED BEDS	27
5. EXAMPLES OF UNDULATORY CLEAVAGE	32
6. DIP OF THE BEDS IN THE RANGE OF THE AIGUILLE DE VARENS	33
7. CLEAVAGE IN THE SAME	34
8. SPHERICAL CONCRETIONS IN HELIOTROPE	46
9. CONCRETIONS IN HYALITE	48
10. CONCRETIONS IN JASPER	51
11, 12. CONCRETIONS IN AGATE	53
13. JASPER AND SUPERIMPOSED CHALCEDONY	54
14. AGATESCENT MASS RENT AND FILLED WITH PURE CHALCEDONY .	54
15. DIAGRAM IN EXPLANATION OF PLATE VII., FIG. 2	55
16. TYPICAL STRUCTURE OF COMMON AGATE	65
17. TYPICAL STRUCTURE OF FOLDED AGATE	65
18. TYPE OF A PERFECT FOLDED AGATE	66
19. CONCRETE JASPERINE AGATE	68
20. INVOLUTE AGATES :—	
(<i>a</i>) BANDS OF CONSISTENT STRUCTURE BROKEN UP	69
(<i>b</i>) DISPOSED IN SHELL-LIKE CURVES	69
(<i>c</i>) VERMICULAR CONCRETIONS	69
21. CORNISH HORNSTONE	72
22. CRYSTALLISATION OF THE QUARTZ IN THE SAME	73
23. DECEPTIVE RESEMBLANCE OF FAULTS IN CRYSTALLISATION . . .	73
24. STONE SHOWING THE FORCES OF AGATESCENCE AND STRAIGHT CRYSTALLISATION	77
25. STONE SHOWING APPARENTLY PENDENT STALACTITE	78
26, 27. STALACTITE AGATES	78
28. QUARTZOSE BAND AT A JUNCTION OF FLUOR WITH SILICEOUS SANDSTONE	80
29. CENTRAL BAND WITH CORRESPONDING OPPOSITE SERIES ON ITS SIDES	81
30. DETACHED CRYSTALLINE FORMATION	82

xvi LIST OF ILLUSTRATIONS

FIG.	PAGE
31. OBLIQUE FORCE IN CRYSTALLISATION	83
32. TRANSVERSE SECTION OF NO. 31	84
33. TYPICAL SECTION OF ROCKS IN NORTH SWITZERLAND	105
34. (A.) STUDER'S SECTION OF THE HIGH SENTIS OF APPENZELL; (B.) SHEETS OF PAPER CRUSHED TOGETHER	109
35. DIAGRAM ILLUSTRATING PHENOMENA OF FLUID MOTION	140
36. THE SHIELD OF NINE COLOURS	181
37. EFFECT OF SUNSHINE ON A GLACIER (A. AS DRAWN BY TYNDALL; B. AS DRAWN BY RUSKIN)	231
38. THE CONSTELLATION DRACO	299
39. THE HYDRA OF LERNA	300
40. COLOUR PATTERN OF A VIPER, WITH GREEK ORNAMENT FOR COMPARISON	315
41. SKULL OF THE RATTLESNAKE	331
42. HEXAGONAL PRISMS	357
43. OUTLINE OF INCIPIENT SURFACE ICE	358
44. SECTION UNDER THE AIGUILLE DE BOCHARD	546
45. SECTION OPPOSITE THE PRIEURÉ, CHAMOUNI	546
46. SECTION AT LES OUCHES	547

FACSIMILES

A PAGE OF THE MS. OF THE PAPERS "ON BANDED AND BRECCIATED CONCRETIONS" (§ 29)	<i>Between pp. 66, 67</i>
A PAGE OF THE MS. OF "DEUCALION," VOL. II. (ch. iii. § 1 n.)	,, 346, 347

Note.—Of the drawings reproduced in this volume, the *frontispiece* was No. 163 in the Ruskin Exhibition at Coniston, 1900; No. 391 in the Ruskin Exhibition at the Royal Society of Painters in Water-Colours, 1901; and No. 416 in the Ruskin Exhibition at Manchester, 1904.

The drawing reproduced on Plate A was No. 337 at Manchester, and that on Plate B was No. 110 at Manchester.

No. II. was No. 157 at the Royal Society of Painters in Water-Colours; and No. XIIA. was No. 60 at Coniston, No. 312 at the Water-Colour Society, and No. 220 at Manchester.

One of the drawings of agates, engraved in the *Geological Magazine*, was No. 162 at Coniston, and was sold for the benefit of the Institute.

INTRODUCTION TO VOL. XXVI

THIS volume collects Ruskin's writings on Geology and Mineralogy. *Deucalion*—the principal work here included—was itself intended by Ruskin to collect “the notices of phenomena relating to geology which were scattered through my former works”;¹ but the scheme of that book was altered as it advanced, and it came to consist almost entirely of additional studies. Many of “the notices” to which he refers are contained in other volumes; more especially the fourth volume of *Modern Painters*, in the case of geology, and *The Ethics of the Dust*, in that of mineralogy. These are, of course, not here repeated, though references to them are often supplied in editorial notes. With these exceptions, the present volume brings together all the author's papers, letters, lectures, books, and catalogues on the subjects in question.

The arrangement is, as usually in this edition, chronological, and the contents are: I. A paper of 1863, to which the author attached considerable importance, *On the Forms of the Stratified Alps of Savoy*. II. Two papers of 1865, *On the Shape and Structure of some parts of the Alps, with reference to Denudation*. III. Seven papers (1867–1870), *On Banded and Brecciated Concretions*. IV. *Deucalion*, published at intervals between 1875 and 1883. V. A paper of 1884, *On the Distinctions of Form in Silica*. These are in large print.

They are followed, in smaller print, by VI., a series of Catalogues of Minerals (1883–1886), and VII., a *Grammar of Silica* (hitherto unpublished). The *Catalogues* and the *Grammar* are parts of a general scheme, as explained below (p. lx.).

In an Appendix various minor writings are collected. These also are arranged chronologically, namely, I. A *Notice respecting some Artificial Sections illustrating the Geology of Chamouni* (1858). II. A series of letters (1864) on the Conformation of the Alps, with especial reference to glacial action. III. An appreciation (1874) of James David Forbes and his work on glaciers. IV. A report of a lecture on Stones (1876). V. Some letters on the Alpine Club (1878). VI. An

¹ See *Deucalion*, vol. ii. ch. ii. § 1 (below, p. 333).

Introduction to Mr. W. G. Collingwood's *Limestone Alps of Savoy* (1884), a work printed by Ruskin as a "Supplement to *Deucalion*."

Lastly, the Appendix includes some fragments (hitherto unpublished) which are here printed from Ruskin's MSS., namely, VII., the beginning of a chapter on "The Garnet," intended for a continuation of *In Montibus Sanctis*, and VIII., "A Geological Ramble in Switzerland"; this is mentioned below, p. xxviii.

Ruskin complained with some emphasis that his contributions to geology and mineralogy attracted little attention, as compared with his writings on art, "though precisely the same faculties of eye and mind are concerned in the analysis of natural and of pictorial forms."¹ For this neglect several explanations may be found. The world is in the habit of applying the formula, "One man, one subject." To Ruskin it looked for criticisms of art and life, and descriptive writing, and did not care to consider him seriously as a geologist. Again, Ruskin in his writings on geology was in the habit, as he says, of "teaching by question, rather than by assertion";² his chapters had "sometimes become little more than notes of interrogation";³ he did not from the first assume the tone of authority which he permitted himself in other subjects. His method of entering upon the territory of the men of science was, it must be admitted, not ingratiating. He did not profess to have studied their subjects very far; but he required them to confess that they were mostly wrong, and that they must begin afresh with new systems of nomenclature and classification of his devising. But the neglect of his geological writings may also be attributed to another cause. They were not considered, because they were little known. They were buried in back numbers, scattered in miscellaneous periodicals, or distributed among scarce pamphlets. It is hoped that the present volume, which for the first time collects Ruskin's studies, will serve to call more attention to a branch of his work, in which he was profoundly interested, which is rich in suggestion, and upon which he spent much labour, both in research and in literary embellishment.

The contents of this volume do not for the most part carry us beyond the date in Ruskin's life which we have already reached;⁴ though, in order to bring all his studies of stones together in the same volume, it will be necessary to touch incidentally on later times. In this Introduction we shall go back over past years, tracing Ruskin's

¹ See *On Distinctions of Form in Silica*, §§ 3, 29 (below, pp. 373, 386).

² *Ibid.*, § 29, p. 386.

³ *Deucalion*, ii. ch. ii. § 18, p. 342.

⁴ His illness of 1878: see Vol. XXV. p. xxvi.

INTRODUCTION

xix

geological life, so to say, and noting the circumstances in which the various pieces included in the volume were written. He remarks in one of the letters of 1864, printed in this volume, that he had spent “eleven summers and two winters in researches among the Alps,¹ directed solely to the questions of their external form and its mechanical causes” (p. 548). By “solely” he means that his geological researches were thus directed. It was not in Ruskin’s nature to devote himself at any time solely to any one subject; but the following pages will show how often, and how long, he had studied the questions discussed in this volume.

Geology and mineralogy, and not painting or literature, were Ruskin’s earliest love. No acquisition of later years—not his most radiant Turner or choicest manuscript—gave him pleasure so keen as he felt in the possession of his first box of minerals,² and no subsequent possession, he says, had so much influence on his life.³ The ambition of his boyhood was to connect with his name, not a system of art criticism, but a system of mineralogy.⁴ The dream of his early manhood was that he should become, not a master of English, but President of the Geological Society.⁵ As a boy he spent many a day at the British Museum, comparing the minerals there with the descriptions of them in Jameson’s *Mineralogy*;⁶ and for a present on his fifteenth birthday he chose Saussure’s *Voyages dans les Alpes*—a book which to the end of his working life was almost always kept at hand and frequently quoted and referred to. Saussure was his master in geology,⁷ for this reason among others, that he “had gone to the Alps, as I desired to go myself, only to *look* at them, and describe them as they were, loving them heartily—loving them, the positive Alps, more than himself, or than science, or than any theories of science.”⁸ The first of his prose⁹ writings, which appeared in print, were notices on the Colour of the Rhine and the Twisted Strata of Mont Blanc.¹⁰ His interest was excited, as he says in *Deucalion*, “very early in life by

¹ Presumably he omits his earlier tours of 1833 and 1835, and counts 1844, 1846, 1849, 1851, 1854, 1856, 1859, 1860, 1861 (winter also), and 1862 (winter also).

² *Fors Clavigera*, Letter 4, § 3.

³ See below, p. 294 *n.*

⁴ See below, pp. 97, 553.

⁵ *Ibid.*, p. 97.

⁶ *Manual of Mineralogy*, by Robert Jameson, F.R.S.E., Edinburgh, 1821. See *Præterita*, i. § 139.

⁷ *Modern Painters*, vol. iv. (Vol. VI. p. 214 *n.*), and vol. v. (Vol. VII. p. 164).

⁸ *Ibid.*, vol. iv. (Vol. VI. p. 476). Compare below, p. 560.

⁹ A slight piece of verse was actually first: see Vol. II. p. xviii. *n.*

¹⁰ Vol. I. pp. 191–196.

the forms and fractures in the mountain groups of Savoy.”¹ The paper of 1834, “On the Strata of Mont Blanc,” was the result of observations made during his first continental tour (1833). His second tour was in 1835 (his geological studies on that occasion have already been referred to²), and in his versified account of the tour “the dreams of the geologist” find place.³

At Oxford Ruskin received further impetus towards the study of geology from the attention paid to him by Dr. Buckland, the Reader in Geology. He mentions how great a favour he held it to be allowed to prepare diagrams for Buckland’s lectures;⁴ and he records how at a later time Buckland enjoined upon him to read Forbes’s *Travels in the Alps* for the decisive word on the theory of glaciers (p. 134).⁵ He spent the winter and the spring of 1840–1841 on the Continent, and sent to Dr. Buckland from Naples a notice of “A Landslip near Giagnano,” which was duly communicated to the Ashmolean Society (Vol. I. p. 211). He had become a Fellow of the Geological Society in 1840; he also joined the Mineralogical Society, and contributed to the Meteorological Society’s *Transactions* (Vol. I. p. 206). He was a frequent attendant at the meetings of these Societies, and had once heard Darwin read a paper at the Geological. Shortly afterwards, at a dinner-party at Dr. Buckland’s, he had met Darwin. “He and I got together,” he wrote to his father, “and talked all the evening.”⁶

In 1842 Ruskin had again spent several months among the Alps—engrossed, as he said in letters to friends, with “snow and granite.”⁷ To what purpose his studies in this sort were directed, appeared, when the first volume of *Modern Painters* was published (1843), in the sections “Of Truth in Skies” and “Of Truth of Earth.” His observations of the phenomena of snow and ice had not, however, as yet been entirely exact; and he notes in *Deucalion* “a grave error,” with regard to the accumulation of snow, “which, strangely enough, remained undetected, or at least unaccused, in spite of all the animosity provoked by my earlier writings” (p. 129). Similarly, in the fifth volume of *Modern Painters* (1860) he corrects an account of cloud-phenomena among the high mountains which, in the first volume, he had accepted from Saussure without independent consideration.⁸

¹ *Deucalion*, i. ch. xiv. § 5 (below, p. 275 and n.).

² Vol. I. p. xxx.

³ Vol. II. p. 407 (29).

⁴ *Præterita*, i. § 225.

⁵ Compare *Fors Clavigera*, Letter 34, § 13.

⁶ From a letter of April 22, 1837, given in full in a later volume of this edition.

⁷ Vol. II. pp. 222–223.

⁸ See on this subject *The Storm-Cloud of the Nineteenth Century*, § 52.

INTRODUCTION

xxi

Ruskin's study of all such phenomena became closer and more detailed in subsequent years. The first volume of *Modern Painters* being disposed of, he returned in 1844 to the Alps. His tour of that year was memorable among other things for his meeting with Principal Forbes. The occasion remained firmly fixed in Ruskin's memory, and is several times referred to in autobiographical passages—in *Deucalion* (p. 219), in the Preface to *The Limestone Alps of Savoy* (p. 569), and in *Præterita* (ii. § 97). The following is his note of it made at the time:—

“July 16.—I have just had a most uncomfortable chat with Professor Forbes—uncomfortable because my father forced me to show my sketches when they didn't want to see them, and because when I had found him out, which I did not for a long time, I knew nothing of what he had asserted.”

The diary then proceeds to describe a mountain excursion:—

“When I got up this morning I was quite exhausted, limbs aching, and a little feverish feeling altogether. It will be a good warning to me never to walk too quickly up hill again. No walk on the journey knocked me up so completely. After breakfast Mr. Stone and Mr. Anderson came in—a pleasant surprise—but which kept us from going out till ten—all the better, I believe, for me. At ten we started, got leisurely up the hill against strong wind, began to recover a little after an hour's walk, but still felt weak. Worked on—crossing the valley of the Col—up hills on other side, reached the summit on the left of the Col about two; view noble, but Bernese Alps just topped by cloud. Professor Forbes tells me the summit so conspicuous from Martigny is the Bietschhorn—the one with the jagged ridge above Brieg the Aletschhorn—the little glacier coming from it the Ober Aletsch Glacier. The peak seen from the Valais, Simplon way, is the Matterhorn. The broad expanse above the Kaltwasser Glacier, which rose to-day as I climbed to a noble elevation, is the Breithorn, the side of it to the north, remarkable for a perfect line of snow at an angle of 45°, is the Monte Leone. Descended from this point of view by a little lake, and climbed a higher peak, which at length fully rewarded me; it commanded the Valais far down, the Bernese Alps in their whole extent unbroken, and two mountains beyond the Valley of Saas, which I took for the Monte Rosa and Cervin, but Professor Forbes tells me they are no such thing. I think not myself now. The wind was violent, and the slaty ridge, shattered and broken into deep crevices, afforded small footing, so that I stayed not long, but it was a glorious panorama. Descended among steep loose sliding stones to the edge of the

loveliest snow lake I ever saw—crystal water, lightly rippled, edge of snow, which appeared to have melted below and then broken off, giving a sharp edge. The pieces which fell into the water extended much farther under it than above, and being perfectly pure, exhibited its fine green. A vast field extended above it. Altogether a day to be most grateful for, and to remember long.”

Other extracts from Ruskin’s diary of 1844 have been given in Vol. III. (pp. xxv.–xxvii.), and some were included by him in *Præterita* (ii. §§ 97 *seq.*). His mind was during this tour mainly fixed on the clouds and rocks and snows. After the meeting with Forbes he went up to the Bell Alp.¹ The panorama of the Alps as seen from that place, which he drew at this time and afterwards slightly coloured, is in the Ruskin Museum at Sheffield; he refers to it in this volume as giving trustworthy record of the then state of the snows (p. 222).

The next impulse which Ruskin received was, however, in the direction of pictures, his Italian tour of 1845 being followed by the second volume of *Modern Painters*. The next year found him again for a short time among the Alps, but he went on to Italy and his preoccupations were now with painting and architecture.² On the way home, however, in 1845, he halted at the Pass of the St. Gothard in connexion with Turner’s drawings. Stones and rocks here again occupied his attention.³ But his thoughts were principally tending at this time in the direction which was to lead him to write *The Seven Lamps of Architecture* and *The Stones of Venice*. His interest in geology, though for a while overlaid by other studies, was still keen. Thus in 1847 we find him acting as one of the secretaries of the Geological Section at the Oxford meeting of the British Association;⁴ and in his diary for 1846–1847 there are some pages in which he classifies, with reference to various drawings of his own, the different forces which seem to have governed mountain forms. He lays particular stress, here as always, on “the muscular or inherent structure” and “the undulatory power.”

When *The Seven Lamps* was out of his way, Ruskin set out in the spring of 1849 for Chamouni once more, and it was on his work there and afterwards at Zermatt that, as he says in this volume (*Limestone* Preface), the mountain studies in the fourth volume of *Modern*

¹ So Ruskin always wrote this place-name, regarding “Bel Alp” as “a modern vulgarism.”

² See Vol. VIII. p. xx.

³ See Vol. V. p. xvi.

⁴ See Vol. VIII. p. xxv. and *n.*

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Frontmatter

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J. Ruskin

THE MER DE GLACE FROM THE MONTANVERT
(1849)

INTRODUCTION

xxiii

Painters were principally based. The extracts from his diaries of 1849, already given (Vol. V. pp. xvii. *seq.*), show how careful those studies were. The diary of this tour contains many lists of minerals, geological sections, and observations. A passage describing the ruin of the Cascade des Pèlerins is in the fourth volume of *Modern Painters*.¹ Another passage of the kind may here be given, in connexion with what he says (p. 552) about his watching of the Alpine watercourses:—

“CHAMOUNI, *Sunday, June 17th.*—Half-past five. Pouring still; and fresh snow just down to the level of the pines, all along, from the top of Montanvert bending in above the chalets of Blaitière Dessous; out again and well on to the top of Tapia; then taken up by the lower ridge of La Côte, and the correspondent ridge of Taconay, which I always thought till this moment was much lower. But that notch in both their flanks at the same level is significative; I must examine it. I got out, however, before dinner to-day; during a fair blink which lasted just long enough to let me, by almost running and leaping all the streams, reach the end of the pinewood next the Source of the Arveron, in order to see the waterfall. I had then to turn to the left to the wooden bridge over the Arveron, when, behold, a sight new to me—an avalanche had evidently taken place from the glacier into the very bed of the great cataract, and the consequence was that the stream was as nearly choked as could be with *balls and ellipsoids* of ice, from the size of its common stones to that of a portmanteau, which were rolling down with it wildly, generally swinging out and in of the water as it waved, but when they came to the shallow parts tumbled and tossed over one another, and then plunging back into the deep water like so many stranded porpoises, spinning as they went down, and showing their dark backs with wilder swings after their plunge—white as they emerged—black, owing to their clearness as seen in the water, the stream itself of a pale clay colour, opaque, larger by one-half than ever I saw it, and running, as I suppose, not less than ten miles an hour, the whole mass—water and ice—looking like some thick paste full of plums or ill-made pineapple ice with quantities of fruit in it; and the whole, looking like a solid body (for the nodules of ice hardly changed their relative position during the quarter of a minute they were severally in sight), going down in a mass, thundering and rumbling against the bottom and the shore, and the piles of the bridge, it made one giddy to look at it; and this the more, because on raising the eye there was the great cataract itself—every time it was seen

¹ See Vol. VI. pp. 342–344 *n.*

startling one as if it had just begun, or were increasing every instant, like a large avalanche bounding and hurling itself hither and thither, as if it was striving to dash itself to pieces, not falling because it could not help it—and behind, there was a fearful storm coming up by the Breven, its grisly clouds warping up as it seemed against the river and cataract, and pillars of hail behind.”

Two more of his drawings of the time are here introduced—one (Plate A) of the Mer de Glace at Chamouni, the other of the chain of Mont Blanc, as seen from the Col de la Seigne, looking towards Courmayeur (Plate B). For the time, however, Ruskin laid by his observations and drawings of the mountains, for he was now to devote the greater part of three years to *The Stones of Venice*.¹ In the early summer of 1854 that long task was over, and he set out again for Switzerland and Chamouni. On this tour the observations of 1849 were supplemented, and Ruskin felt himself equipped for the continuation of *Modern Painters*.

The fourth volume of *Modern Painters*, with its close analysis and description of mountain structure, formed in the author's opinion, as stated in this volume (p. 568), “the most valuable and least faultful part of the book.” He began to republish these chapters in 1884 in a series of reprints entitled *In Montibus Sanctis*.² Geologists also account them the most important of his contributions, or aids, to their science. “We must not forget his services to our science,” said the President of the Geological Society in an obituary notice of Ruskin, “in directing the attention of artists and others to the effect of geological structure, and of the characters of rocks, on scenery”; and the speaker added that the chapters in *Modern Painters* “might be read with advantage by many geologists.”³ Ruskin himself made a more modest claim for them; they “should be read,” he said, “to young people by their tutors as an introduction to geological study.”⁴

Certainly those chapters are typical of Ruskin's point of view in approaching geology. He was little interested in unknown ages and immeasurable forces. And so, in *Deucalion*, Ruskin defines “our own work” as beginning where all theory ceases, and as being the study of forms which have “actually stood since man was man” (p. 113).

¹ See the summary of these years in Vol. V. p. xxxi.

² The notes which he appended in that year to the chapters will be found in Vol. VI. at pp. 116, 121, 122, 124, 126, 128, 131, 132, 133, 135, 136, 138; Post-scripts at pp. 127, 145; the Preface to the reprints, in Vol. III. p. 678.

³ Annual address by the President, William Whitaker, F.R.S., May 1900: see the *Quarterly Journal of the Geological Society*, vol. 56, pp. lx., lxi.

⁴ *Modern Painters*, vol. iv. (note of 1885), Vol. VI. p. 128.



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FROM THE COL DE LA SEIGNE. LOOKING TO COURMAYEUR
(1849)

J. Ruskin

INTRODUCTION

xxv

Similarly in a letter to his friend, Mr. A. Tylor, who had sent him a paper from the *Geological Magazine*,¹ he wrote (1875):—

“I am grateful to you for sending me the binomial curve and the Glaciers on Mount Sinai—but it’s all much too grand and far away back for me. I don’t care three farthings what happened when Mount Sinai was under ice.

“I want to know how long the Staubbach has been falling where it is in the Valley of Lauterbrunnen, and why it hasn’t cut itself further back?

“There’s a mere nutshell of a question for you geologists. You ought to crack it for me as easily as a squirrel does a beech-nut, and give me my question out of the shell. But I can’t get anybody ever to answer about what I want to know.”

The bent of Ruskin’s mind, in all such studies, was severely practical (p. 166). He turned away from theory, conjecture, speculation, to what could certainly be known, seen, drawn, and measured. In *Deucalion*, and elsewhere, he often speaks with seeming contempt of “science” and “men of science”; but, as one of the acutest of his critics has pointed out, this was a piece of literary *finesse*. “It was on the point of science that issue was joined; and if he did not reproach his adversary in that this adversary was too little, and not too much, a man of science, he reproached him to no purpose.”² And, in fact, what Ruskin claimed for his own writings on mountain form is that they are of observation, experiment, and verification all compact. What he wrote was founded not on what he had read in books, but on his own “watchings of the Alps”; he “closed all geological books,” and set himself “to see the Alps in a simple, thoughtless, and untheorising manner, but to see them, if it might be, thoroughly.”³ Hence, he asserted that the work of *Proserpina*, which was tentative, was “quite different from that of *Deucalion*, which is authoritative as far as it reaches, and will stand out like a quartz dyke, as the sandy speculations of modern gossiping geologists get washed away.”⁴

Ruskin, then, in *Modern Painters* limited himself to what could be securely seen in mountain form. But incidentally he touched upon

¹ For this paper see p. 290 *n.*, and compare p. 368. For other references to Mr. Tylor, see p. 316 *n.*, Vol. IV. p. 107, Vol. XV. p. 369, and Vol. XXIII. p. liii.

² *John Ruskin*, by Mrs. Meynell, p. 245. Mrs. Meynell calls attention, as an example of Ruskin’s “exquisite and characteristic wit,” to his criticism of Tyndall’s phrase “contact with facts,” as expressive merely of “occasional collision with them.” See below, p. 285.

³ *Modern Painters*, vol. iv. (Vol. VI. pp. 214 *n.*, 475).

⁴ *Proserpina*, ii. ch. i. § 42 (Vol. XXV. p. 413). Compare, below, p. 197.