

At the age of 65. from a Photo-mezzotint by A. F. Fradelle.



Believe me
 ever your affectionate
 C. R. G. Allen



AS-028391 SL

MEMOIR

RARE OF

GENERAL



SIR WILLIAM ERSKINE BAKER, K.C.B.

ROYAL ENGINEERS (BENGAL).

COMPILED BY

TWO OLD FRIENDS, BROTHER OFFICERS,
AND PUPILS.

....."a worthy man
That fro the tyme that he firste began
To riden out, he loved chevalrie,
Trouthe and honour, freedom & curtesie.

And though that he was worthy he was wise,
And of his port as meke as is a mayde.
He never yet no vilanie ne sayde
In alle his lif, unto no manere wight.
He was a veray parfit gentil knight."

CHAUCER.

LONDON.

PRINTED FOR PRIVATE CIRCULATION.

1882.



CSL

028391

-42

B
Bar ~~ms 2 M~~
~~B 15 V~~

Quaecumque sunt vera ;

Quaecumque pudica ;

Quaecumque justa ;

Quaecumque sancta ;

Quaecumque amabilia ;

Quaecumque bonae famae ;

Si qua virtus ;

Si qua laus disciplinae ;

Haec cogitate.

Epist. ad Philipp. iv, 8.

21665



CSL

PREFATORY NOTE

It may almost be said that this compilation was sanctioned by Sir William Baker; for, some two years and a half ago, on receiving from one of the present writers a little memoir of a valued friend (W. W. H. G.), he wrote that it had occurred to him, in reading the pamphlet, that one day, perhaps, the same hand might perform a like friendly office for himself, and that the thought was not displeasing.

Originally, the intention had been to prepare a concise biographical sketch for insertion in the *R. E. Journal*; but the material soon grew much beyond the limits admissible in such a notice, and the compilers were unwilling to cut down to meagre outline the record of services so varied and weighty, of a friend so honoured and beloved.

The friends whose names are here subscribed then associated themselves to print the memoir in its present form, and to present it to Lady Baker, as a small token of affection for her husband's memory, as well as of their strong regard and respect for herself.

R. J. H. VIVIAN.

J. T. BOILEAU.

FREDERICK ABBOTT.

T. T. PEARS.

W. J. EASTWICK.

NAPIER OF MAGDALA.

H. C. RAWLINSON.

J. R. OLDFIELD.

S. A. ABBOTT.

E. W. S. SCOTT.

ED^{MD}. DRUMMOND.

R. STRACHEY.

T. C. BLAGRAVE.

J. R. BECHER.

C. H. DICKENS.

H. YULE.

R. MACLAGAN.

D. C. VANRENEN.

J. P. BEADLE.

R. H. SANKEY.

W. A. CROMMELIN.

G. HUTCHINSON.

E. C. S. WILLIAMS.

GEORGE CHESNEY.

E. A. DURAND.

FLORENCE FRASER.

FLOR. E. BAIRD SMITH.

MARIA GOODWYN.

ALICE GREATHED.

AMY FRANCES YULE.



CSL

TO THE READER.

Lord Napier of Magdàla kindly sent a paper regarding his old friend, containing memoranda, which have been either embodied in the Memoir or quoted expressly. Another memorandum, contributed by Sir Bartle Frere, will be found in the Appendix. General R. Strachey has added, in looking through the sheets, some welcome notes or anecdotes.

Let no old friends be offended at the spelling of proper names. Except in quotations, we have thought it best to ascertain and adopt that of the *Imperial Gazetteer of India*.

May 1882.

H. Y.

R. M.



CONTENTS.

Birth and parentage of William Baker ; his father's sea services, 2-4 ; loss of the *Tartar* frigate, 4.

Death of Captain Joseph Baker, 5 ; the family left behind him ; Admiral James Vashon.

Baker at Ludlow School ; Addiscombe ; under Jonathan Cape, 6 ; classical tastes. Chatham, 7 ; departure for India ; parting letter from his mother.

Appointment to Delhi canals ; history of those works, and of the Doab Canal, 7-9 ; Colonels Robert and Edward Smith, 9.

Colonel John Colvin ; his character, 10 ; Lieutenants Napier and Durand.

Life of canal officers in Upper India, and its interests, 11 ; Hansi, and Colonel James Skinner ; George Thomas, 12.

Anecdote of a rural siege, 13 ; expedition across the desert to Bhāwalpur.

The canal head-quarters at Dādūpur, 13 ; occupations of the rainy season, 14 ; Studies of Italian, and of palæontology.

Sahāranpur ; Dr. Hugh Falconer and Captain Proby Cautley ; the fossils of the Siwālik Hills ; Firishta's notice of such discoveries, 15 ; Falconer's first fossils ; Cautley's ; Baker and Durand find a field west of the Jumna, 16 ; the Nāhan molar ; friendly emulation in fossil research ; zeal in osteology under difficulties, 17.

Vast mass and importance of the discoveries ; some detail of the species ; the *Sivatherium*, 18 ; the disposal of collections ; the great tusks ; papers on fossils by Baker and Durand, 19 ; illustrations under difficulties ; discovery of fossil quadrumana, 20 ; last of Baker's palæontological papers.

Succession to chief charge of Delhi canals, 21 ; marriage ; line of levels from Jumna to Sutlej, and Report on Navigation Canal Project ; extract from it, 22 ; line of comparative depths to water in wells, 23 ; minor canal projects ; project of Great Irrigation Canal from Sutlej (since carried out), 24 ; traces of old Mahomedan attempt, probably that of Firoz Shah, 26-27.

The Army of Reserve (December 1842), 27 ; the Gates of Somnath, 28 ; the Sikh Army, 29.

Episode of the expedition to Kaithal, 29.

Captain Baker ordered to Sind, 30 ; nature of the Canals there, 31 ; and of the Forests, also in his charge, 32 ; occupations in Sind ; fossils not neglected, 33 ; his influence on his assistants.

Sir Charles Napier, 33-34 ; the Allah Bund, and a hot-weather survey, 35-36 ; Baker's return to Upper India, 36 ; his year's work in Sind, 37.

Structure of the Indus bed ; the Alor Bund, and Eastern Narra, 38 ; Captain Baker is made Director of Ganges Canal.

Called to the Sutlej campaign (December 1845), 39 ; the attack of Sobraon, and Baker's distinguished part in it, 39-40.



- His direction of the Ganges Canal, 40; hesitations of Government on the project, 41; Committee on the health question, and their report, 41-42; the Thomason College at Rurki, 42-43; Colonel Cautley returns, and Major Baker goes home on furlough (1848), 44.
- His occupations in England, 44; return to India (1851); Public Works Commission, 46; Mr. Thomason; Baker's appointment as consulting engineer for railways, 46; his admirable service in that capacity, 47; appointment as first Secretary to the Government of India, Public Works Department; opening of the East India Railway; Lord Dalhousie's departure (March 1856), 48; letters to Baker; failure of Baker's health; the Mutiny; eventual departure from India (November 1857), 49; Lord Canning's opinion of him; bust of Colonel Baker.
- Appointment as Military Secretary to the India Office (December 1858), 49; the amalgamation measures, 50.
- Election to the Council of India; his work there; on the Army Sanitary Commission, 51; Miss Nightingale's testimony; made K.C.B.; failure of health and symptoms of longing for retirement; tour in northern Europe (August 1874).
- His successive residences near London, 52; retirement from India Office (Sept. 1875); removes to Banwell, in Somersetshire; country pursuits.
- Visits to London, 53; a party on one of these occasions commemorated.
- A last visit to him at Banwell; his sudden illness and death; burial at Bournemouth (21st December, 1881).
- Character and remarkable public services, 53-55; extracts from letters of Sir S. Northcote and Lord Salisbury, 55; Sir H. Rawlinson's testimony, 55; Baker as a friend, 55-56.

APPENDICES.

	PAGE
I. Extracts of a letter to WILLIAM BAKER from his MOTHER on his leaving England	57
II. Extract from GAUDRY, <i>Animaux Fossiles</i> , etc., regarding discovery of Fossil Ape	58
III. Note on BAKER's work in Sind, and his character, by SIR BARTLE FRERE	59
IV. Letter from Captain BAKER to Mrs. Baker, describing the battle of Sobraon	60
V. Extract of letter from the VICAR OF MORDEN on the departure of Sir W. Baker from his parish	66
VI. Extract of sermon preached in Banwell Church on Christmas Day, 1881, shortly after the death of Sir W. Baker	ib.
VII. Resolution of the Board of Guardians at Axbidge on his death	67
VIII. Dates of SIR W. BAKER's Commissions, etc.	ib.



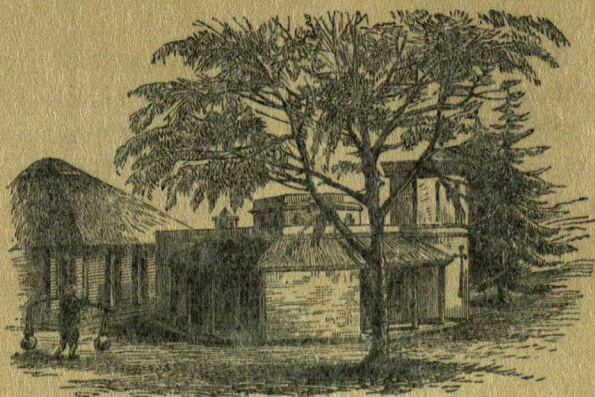
LIST OF ILLUSTRATIONS.

PAGE

Frontispiece. Portrait of SIR W. BAKER at the age of 65; Woodbury-type, from a Photo-Mezzotint by Mr. Fradelle, 246, Regent Street; the mounting, etc., by Mr. W. Griggs, Elm House, Peckham.

WOODCUTS, ENGRAVED BY G. PEARSON.

1. COLONEL COLVIN'S house at DADUPUR; from a sketch by H. Yule	1
2. Captain JOSEPH BAKER'S house at PRESTEIGN; from a sketch by W. E. Baker	4
3. The JAHAZ, and old Pathán Bridge on Firoz Shah's canal; sketch by W. E. Baker	8
4. ANUPGARH, on the Desert Route; sketch by H. M. Durand	13
5. Skull of SIVATHERIUM; drawing by W. E. Baker	16
6. SIVATHERIUM Skull, restored; from <i>Fauna Antiqua Sivalensis</i>	19
7. Portrait of Colonel JOHN COLVIN, C.B.; from a photograph	21
8. The JUMNA DAM at DADUPUR; Sketch by H. M. Durand	26
9. The Fort of KATHAL; sketch by H. Yule	29
10. Caricature Sketch of SIR C. NAPIER, as he appeared at a Durbar at Hyderabad in 1844 (author unknown)	34
11. Colonel Sir P. T. CAUTLEY; from a bust by Sir John Steell, R.S.A.	43
12. The GANGES CANAL WORKS, from the bridge at Rurki, 1849; sketch by H. Yule	45
13. Sir W. Baker's Last Residence, THE CASTLE, Banwell; sketch by the same	52
14. Fossil Tusks of the ELEPHAS GANESA; from the <i>Fauna Antiqua Sivalensis</i>	56



Colonel Colvin's House at Dádúpur.

MEMOIR OF THE CAREER
OF
GENERAL SIR WILLIAM ERSKINE BAKER,
R.E., K.C.B.

WILLIAM ERSKINE BAKER was born 29th November 1808, at Leith, in Scotland. Neither of his parents had any connection with that part of the United Kingdom, but his father, Captain Joseph Baker, R.N., was then attached to the Leith Station, and in command of the 32-gun frigate *Tartar*.

Captain Baker was the second son of Mr. James Baker, who had been in business at Bristol. In 1797 he married Miss Elizabeth Weyermann, a lady of Swiss family, but who had English relatives. Intercourse with the Swiss members of her family appears to have ceased with Mrs. Baker's death, or perhaps earlier; and a curious reminder of them came in 1860, when William Baker was Military Secretary at the India Office, in the form of an advertisement issued by the Swiss Consul in London, that by the will of Miss Martha Weyermann, a maiden lady of St. Gall, a legacy of a thousand florins had been left to the family of her sister, Mrs. Baker.¹

¹ The Swiss authorities or administrators must have been very earnest in tracing the legatees, for their mother was apparently described in the will

Captain Baker had been one of the lieutenants of Vancouver's ship on that navigator's voyage of discovery (1791-1795). He had been selected by Vancouver, as having served some years with him under Sir Alan Gardner, and being thus well known to him for character and capacity. The principal charts in the atlas of the account of the *Voyage of Discovery in the North Pacific Ocean*, bear to have been drawn, under Captain Vancouver's inspection, by Lieutenant Joseph Baker. Baker's name was commemorated by his Captain on two geographical features, viz., *Point Baker*, on the North-West Coast of America, in lat. $56^{\circ} 17'$, and *Mount Baker*, a little south of the Fraser River, in lat. $48^{\circ} 33'$. This name is still prominent in modern maps, standing just within the U. S. "Washington Territory".² Another of Vancouver's lieutenants was Peter Puget, whose name was given to two of Captain Baker's children.

Captain Baker, at one period, had charge of French prisoners of war; and he must have won their regard (no easy matter), for a little model of a ship, still in the drawing-room at Banwell, was made for him by the prisoners; the rigging being formed of Mrs. Baker's hair.

We were, in 1808-11, at war with both Russia and Denmark, and the *Tartar* seems during her commission to have been usually employed on the coast of Norway (then united to the Crown of Denmark), or in the Baltic. Captain George Bettesworth, who had commanded the frigate, was killed in an attack on North Bergen, in May 1808, after which the *Tartar* returned to Leith with his body; and it would seem that Captain Baker then succeeded to the command. Some papers of his that we have read show that one of his duties in the Baltic was (September 1809) to carry back to Russia Vice-Admiral Seniavin and a part of the officers and crew of the Russian

as the widow of "Captain Draker of the Royal Marines"! So, at least, it was rendered.

² There is a belief in the family that another feature on that coast was called Mount Elizabeth, or Point Elizabeth, after Miss Weyermann. The only such name that we can find in Vancouver's charts is Point Elizabeth, near the mouth of Prince William's Sound (otherwise Cook's River), in Alaska. But that name was given, some years before, by Captain Cook, after the Princess Elizabeth (see *Cook's Third Voyage*, London 1784, ii, 382).

fleet which had surrendered in the Tagus at the time of the Convention of Cintra.³ In these papers Admiral Seniavin (who, according to James's *Naval History*, had been trained in the British Navy) recognises warmly, and in excellent English, the good treatment that he and his people had met with from Captain Baker; and the Admiral commanding at Riga also writes that the crews, with all their baggage, had been landed in such perfect order, that it was incumbent on him to express his sincere acknowledgment for the assiduous care and attention shown by Captain Baker whilst they were under his charge.

James, in his *Naval History*, relates a notable escape in connection with the *Tartar*, while under Captain Baker's command. The frigate's boats having taken a Danish privateer on the coast of Courland:—

"The Danes, before they abandoned their vessel, had most dishonourably placed a lighted candle in a twelve-pounder cartridge in the magazine, where lay several hundred-weight of powder. Fortunately one of the *Tartar's* men discovered the light, and with wonderful presence of mind grasped the candle in his hand, just as it had burnt within half an inch of the powder. Another minute, and all on board, and alongside of the vessel, would have been blown to destruction."⁴

Another letter before us is from Vice-Admiral Sir James Saumarez (who commanded the Baltic Squadron till the peace with Russia), conveying his own and the Admiralty's approbation of Captain Baker's conduct in connection with the repulse (March 1811) of a Danish attack on the Island of Anholt in the Cattegat, which we held in those days as a depôt, and fulcrum for the violation of Napoleon's continental exclusion of British trade, as well as for the light on it, which aided the navigation. The particulars will be found in James's book, and more concisely in Brenton's *Naval History*.⁵

The Danish force consisted of nearly 1,600 men, embarked in 14 large gun-boats and 25 transport-boats. Their troops landed

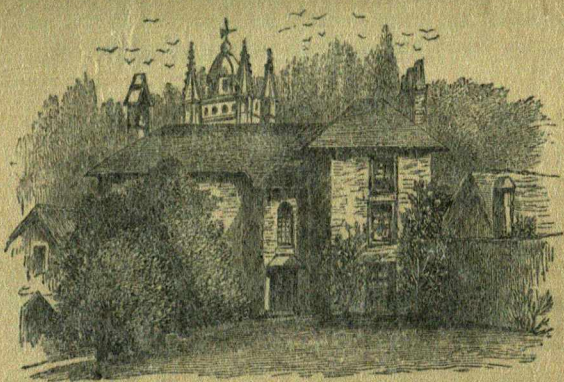
³ Admiral Seniavin, by a separate convention with the British Admiral, Sir C. Cotton (end of August 1808), placed his ship as a deposit in the hands of His Britannic Majesty, to be held till six months after the conclusion of peace between Russia and England, whilst the officers, seamen, and marines were to be conveyed without conditions, to Russia at British charges.

⁴ *Naval History*, ed. 1826, vol. v, p. 261.

⁵ *James*, vol. v, pp. 500-502, and *Brenton*, vol. iv, 502-505.

and attacked the British forts, but were completely beaten and had to surrender. Captain Baker with the *Tartar*, and the *Sheldrake* sloop of 16 guns, had arrived from England the day before, and they were anchored north of the island. On seeing signals of what was occurring, they endeavoured to work round the shoals and get into action, but it was a very tedious business. The smaller vessel, drawing less water, was the more fortunate in coming up with the Danish gun-boats and capturing two of them, whilst the *Tartar* caught two of the transport-boats that were carrying off the retreating Danes.

A few months later the *Tartar* was wrecked on a shoal in the Baltic (August 18th, 1811). Captain Baker was tried, as usual in such cases, but acquitted of blame. His little son Caspar, eight years of age, was on board with him when wrecked. The figure-head of the *Tartar*, representing a swarthy Saracen rather than a Tartar, adorns the hall of Sir William's last residence, at Banwell.⁶



Captain Joseph Baker's House at Presteign. (Sketch by W. E. B.)

Captain Baker, during the intervals of service, lived at Presteign, in Radnorshire, and he died there in 1817, leaving

⁶ We can find only the briefest notices of the wreck of the *Tartar* in the *Naval Chronicle* of the time. Thus :—"The *Tartar* frigate has been lost in the Baltic. She struck on a rock on the 18th August, and remained in that perilous state till the 23rd, when it was found impracticable to save her. Not one of the officers or crew was lost. They have all, we understand, been distributed among our ships on that station." Vol. xxvi, p. 255. Again—"Lately a Court Martial was holden on Captain Baker, the officers, and crew of His Majesty's late ship the *Tartar*, for the loss of that sloop (?) on a shoal in the Baltic, when the whole were honourably acquitted." Vol. xxvii, p. 251.

nine children. Of these, two entered the Navy, viz., the eldest, James Vashon, who died an Admiral in 1875, aged 77; and the fifth-son, Vashon, who died a Captain, aged 61, in 1878. Three of the sons passed away in early manhood, viz., the second, Caspar Weyermann Charles, who died 1826, aged 23, after taking his B.A. degree at Oxford (Balliol College); the third, Peter Puget, aged 20 (1827), who was a clerk in the Bank of England; and Henry Whittaker, the sixth son, just after passing all his examinations for the medical profession, aged 23 (1836). Josephine Puget, the eldest daughter, married Colonel John Colvin, C.B., in 1838, and died in 1878. Miss Elizabeth Baker, and the Rev. Joseph Baker, Rector of Neen Sollars, Salop, the youngest of the family, survive. William was the fourth son.

The widow and her family in 1821 removed to Ludlow, where lived her uncle, Admiral James Vashon. She had lost her own father when she was quite a child, and the Admiral had always been in the place of a father to her, as he was in those later years to her children.⁷

William was educated at King Edward VI's Grammar School at Ludlow, of which Mr. Hinde was master, and went from that to Addiscombe, where he entered in January 1825.

On account of an impediment in speech, he had to be absent for the whole of his second term, *i.e.*, from July 1825 to January 1826. He went to Edinburgh to put himself under an expert

⁷ Admiral Vashon's last command was on the Leith station, where he struck his flag in 1808, after fifty-three years of service, and almost constant employment afloat. He was born in 1742 at Ludlow, where his father, the Rev. James Volant Vashon, Vicar of Eye, held a lectureship. He saw an immense deal of war service, chiefly in the American seas, in the pre-revolution wars of the last century, including the sieges of Louisbourg, Guadaloupe, and the Havannah. In the great sea-fight of 12th April 1782, he did such excellent service that Rodney declared he would promote no man from *that* date but Vashon. We have verified this by the Navy-lists of the period, which show that though several other officers dated their post-rank from the 13th, 14th, and 15th April, Vashon was the only post-captain made from the actual date of the victory. After this he was Rodney's flag-captain in the *Formidable*. During the Great War, beginning in 1793, though still constantly employed, he never again saw a shot fired in anger. Admiral Vashon died October 20, 1827. There is an account of his services in *Ralfe's Naval Biography* (1828), vol. iii, 132, *seqq.* An old mezzotint engraving of him is sometimes seen in print-shops.



for the cure of this; and his younger sister remembers how resolutely, at home, he used to fight against the evil, and persevere in the disagreeable practice of the rules laid down by the professor.⁸ In after years he did not think these rules had been of much real value, but in any case the certificate of cure, which the expert gave, was of great value, for it secured re-entry at Addiscombe to Baker, and his services to his country. He fought this difficulty so bravely that practically he conquered it, and, in latter days, probably many of his acquaintances were unaware of its existence.

Notwithstanding the loss of one term of residence at Addiscombe, William Baker recovered his place, and passed out in the Engineers in December 1826, with those who had joined along with him in January 1825; thus practically passing out in three terms (four terms or half-years being the normal time). It was even then exceptional to pass out in three terms in the Engineers, though not so rare as in later days, when the number of cadets passed into that corps became greatly restricted, and the competition more strenuous. From Mr. Hinde's school he had brought with him an excellent classical foundation, but the mathematical acquirements that he also carried to college were due (as his sister still remembers) entirely to his own diligence and private study. His mathematical capacity drew from Jonathan Cape, Fellow of Trin. Coll. Cam., and chief instructor in that subject at Addiscombe, tokens of approbation, which were very rarely conceded to any of the young men by that austere professor,—austere in his relations to the cadets at least. Socially, we believe, he was a genial man, but he never considered cadets as subjects to be socially regarded.⁹

Addiscombe was then ruled by Sir R. Houstoun, a gallant old cavalry officer, whom Baker remembered as bringing in cavalry forms of command inappropriately on the parade of the cadet company.

Baker never entirely lost his classical likings. In his youth,

⁸ This was, we believe, Mr. Melville Bell, the father of the inventor of the telephone, and himself inventor of 'Visible Speech'.

⁹ Jonathan Cape was fourth wrangler in 1816, the year when Jacob and Whewell were first and second.

Lord Napier tells us, a pocket Horace was a favourite companion; and even when verging on old age he sometimes produced a couplet of no contemptible Latinity.¹

Leaving Addiscombe in the end of 1826, he went through a brief period of field instruction at Chatham, interrupted, for a time, by a serious illness which sent him home on sick leave. His health, which in youth seems to have been delicate, afterwards became remarkably good, and continued so until he was near three score and ten. Quitting Chatham, where he had earned a high character, he arrived in India early in 1828.

Among Sir William Baker's papers has been found, carefully treasured, a letter addressed to him by his mother at his departure. There is a certain quaintness of expression, which may have been due to her foreign birth, but it is full of an earnest desire for the formation of a religious character in her son, which was probably not without material influence on his after life.² She survived till 1841, but he never saw her again.

In the autumn of 1829 he was posted to the Canals in the Delhi Territory, then under Colonel John Colvin, C.B., the sagacious and benignant patriarch of irrigation in Upper India.

Soon after the British occupation of the Delhi Territory took place, in the early part of this century, the attention of Government was drawn to the remains of canals of irrigation which had been executed under the Moghul emperors and their predecessors.

The oldest of these was the canal of Fīroz Shāh of the Tughlak family, a king who reigned from 1351 to 1388. This was drawn from the Jumna, a few miles below the issue of that river from the sub-Himālayan hills, and was carried, chiefly by natural channels, which had been cleared out, and connected by links of artificial excavation, into the dry western region where King Fīroz had his favourite hunting ground, and had established a residence, at a place which he called *Hissār Fīrozah*, "the Victorious (or Fīrozian) Fortress". The place is still known as

¹ We have found the following, which he sent to one of the present writers about 1865, after a visit to the works of the Alpine Tunnel, above St. Michel:—

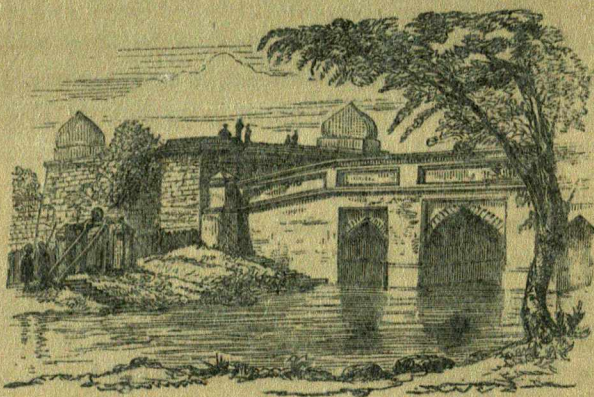
"Hannibal, ut narrant, montes liquefecit aceto;

At nobis nitrum mox aperibit iter."

² See extracts in Appendix (I).

Hissár, the chief station of a civil division, and the location of a great commissariat farm. Extensive ruins of dwellings and tombs are still scattered about, or, at least, were so some thirty or forty years ago.³ It is doubtful whether the canal of King Fíroz ever served any general purposes of irrigation, as no traces of distributary water courses existed; and it is probable that the stream ceased to flow with the life of the king who made it.

A more important work was the Delhi Canal. This was made by 'Alí Mardán Khán, a great Persian noble of the Court of Sháh Jahán, whose name is preserved by works of engineering art in Afghanistan, as well as in India (he died A.D. 1657). This channel was carried from a point on the canal of Fíroz, a few miles below the town of Karnál, and thence to the city of Delhi, after passing through which it entered the palace walls, sending through that enclosure a variety of open and covered conduits which terminated in the Jumna. This was a costly



The *Jaház*, and Old Pathan Bridge on Fíroz Shah's Canal. (Sketch by W. E. B.)

work, and one that exhibited some real engineering skill, though local tradition said that success had not been attained without some trials which ended in disaster, such as the drowning of certain villages. The water had ceased to flow about 1760, but the multitude of water-courses which intersected both banks

³ Among these was a building close to the canal called the *Jaház*, or "ship", which was traditionally said to have been erected by an Amír of the Court, who had made the Mecca Pilgrimage by sea, and who desired to give the King and his nobles some notion of that mysterious thing, a ship. And a very strange notion it must have given them!

from Karnál to Delhi (a distance of some seventy-five miles), bore witness that irrigation had been extensively practised during the century-and-a-half of the canal's existence under the Delhi Emperors.

Besides these works on the western side of the Jumna, there was in the Doáb, *i.e.*, on the eastern side of the river, a canal also ascribed to 'Alí Mardán Khán. This quitted the Jumna nearly opposite that of Fíroz, and re-entered it opposite Delhi. The natural difficulties besetting the head of this canal were extreme, as modern experience has shown, and they must have proved too great for the engineers of the Moghul. For though the channel was traceable in its whole extent, there was no vestige of distributaries, or of ancient bridges; and it may be concluded that the canal was abandoned⁴ almost immediately after its excavation. A project for the restoration of this canal was carried out under the charge, successively, of Captain Robert Smith of the Engineers,⁴ and Lieutenant (afterwards Sir Proby) Cautley of the Artillery, between 1824 and 1830, though the elaborate works, required to protect the upper course of the canal from the torrents that beset it, were not completely elaborated till many years later, partly under the late Colonel (then Lieutenant) R. Baird Smith.

The first officer employed in the reconstruction of the ancient canals west of the Jumna was Lieutenant Blane of the

⁴ This officer had been employed in 1826-27 to repair the famous Kutb Minár. The task was executed with great tact and skill as regards engineering, but a good deal of fault was found with the terminal with which he capped that magnificent tower. This was a Moghul kiosk of much more modern style, which Lord Hardinge, when Governor-General, ordered to be taken down, and which still may be seen near the foot of the tower. Colonel Robert Smith had left the service some years previously. It was reported that Lord Hardinge, on the late Colonel Edward Smith B.E. being presented, received him with the question: "Was it you, Sir, who put a Chinese umbrella on the top of the Kutb Minár?" "No", replied Smith, "I am not the culprit, but his brother!" Both brothers had much artistic talent, and Edward left behind him a vast number of clever sketches, which it is to be hoped are preserved. Robert had, in the highest degree, what the Italians call *la malattia della pietra*; and wherever he went he built, and built in a very peculiar style, rather suggestive of confectionery. Houses of his erection, and all closely alike in style, once adorned the banks of the Doáb Canal, and those of the Jumna within the walls of Delhi, a hill top at Mussooree, the coast of Devonshire near Torquay, the shores of the Mediterranean at Nice, and the Palatine Hill in Rome!



Engineers, who was nominated to that duty on the Delhi Canal in 1817, under the Government of Lord Hastings. Irrigation began in 1819, and in May 1820 the water entered the city, and passed through the palace to rejoin its native stream. Lieutenant Blane died prematurely in 1821, when Colvin, who had already been occupied on a project for re-opening Fīroz Sháh's canal, succeeded to the charge of the whole of the canals (or *canawls* as tradition says the good man always called them), and was for years employed in developing the irrigation, in expanding the apparatus of hydraulic structure, and in organising the whole system of waterworks and water-law in the Delhi Territory.

Active, indefatigable, and methodical, genial and friendly in his intercourse with the cultivators, yet firm in insisting on order, and watchful to prevent abuses, Colvin was singularly fitted for the task which had fallen to him, and which occupied the last sixteen or eighteen years of his service, with the exception of a summons to the field, on the occasion of the siege of Bhartpur, under Lord Combermere, in 1826, where he was slightly wounded in the assault.⁵ That upright statesman, Lord William Bentinck, held Colvin in especial esteem.

A comrade of Baker's under Major Colvin was, for a short time, Lieutenant Robert Napier, now so well known in the corps (and out of it) as Lord Napier of Magdála; as was also, for a much longer period, Lieutenant H. M. Durand, since Sir Henry, the termination of whose career (31st December 1870) by an extraordinary accident, soon after his accession to the Government of the Punjab, is still poignantly felt by many of us as a public and private calamity. Both these officers, as well as P. T. Cautley, remained Baker's attached friends through life. With their common chief he was afterwards united in even closer ties, for Colonel Colvin in 1838, soon after his return to Europe, married Baker's elder sister Josephine. But to return to earlier days:

⁵ All the canal officers were called to the siege. Cautley used to tell how, wearied out with many hours incessant duty, he fell asleep in his battery, but suddenly awoke. The place was taken, and the sudden *cessation* of the cannonade had aroused him!

During a great part of the year, the canal officers were in movement over the wide extent of the irrigation system, stretching from the heads southward to Delhi, a distance of 130 miles as the crow flies, and from the Jumna westward to Darba on the borders of the Bikaner Desert, nearly the same distance. All officers, we believe, who have served, like the present writers, on the canals of Upper India, look back on their peripatetic life there as a happy time. The morning's journey was accomplished, sometimes by boat, sometimes on horseback along the springy turf of the banks, or on foot with a gun. Pea-fowl abounded in the plantations, and the sight of a peacock carrying the ponderous splendour of his train across the canal never ceased to be a marvel; black-buck were common on the western plains; bustard, florican, and bittern were sometimes met with; occasionally on a winding part of the bank one intruded on the solitude of a huge nilgai; whilst every now and then one came on a clan of monkeys who, aided by the branches of some spreading *ficus* that overhung the stream, were crossing it by a great trapèze performance. And the alternation of engineering and administrative work gave an unusual variety and zest to the occupation of the busy hours.

The old-world days of India had then (1830) hardly passed out of sight, and links still existed which connected the time with the masterless Hindostan of 1800. The last lion of Hariána had been killed some years before⁶; but Hansi, a chief place on Firoz's canal, was then, and for many years afterwards, the permanent quarter of "Skinner's Horse",—a yellow-coated brigade which formed the prototype of all the irregular cavalry of the Bengal Army; and old Colonel James Skinner himself still survived, the famous partizan soldier whose portrait (would it were a better one!) hangs beside those of Stringer Lawrence, of Warren Hastings, Coote, and Cornwallis, in the India Council Chamber at Westminster. He had served with the Mahratta in his youth, though his prime and all his later years he had

⁶ Baker was told by Colonel Skinner a curious circumstance about this last of the lions. Riding on to his parade-ground one morning, there lay a lion's head—the head alone, and unaccounted for! The story recalls the solitary foot-mark in Robinson Crusoe.



passed in the British service, winning respect and honour.⁷ The young canal officers used to stay with Colonel Skinner at Hansi; and Baker has told us how he has been awakened at night by the voice of the dark-skinned old warrior, who was whiling away the sleepless hours by reading the Bible, as he knelt with the book on the ground before him, in the monotonous chaunt of a Mussulman reading the Korán.

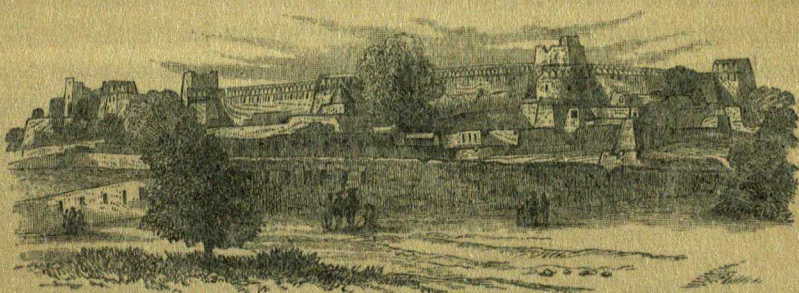
At Hansi too it was, as Skinner and many others then living well remembered, that *Jāj Sahib*, alias George Thomas, an English adventurer who had come to India before the mast, had ruled for a brief space as an independent prince. "Thus", writes this free-lance in 1802, "ended a campaign (1800) of seven months, in which I had been more successful than I could have expected, when I first took the field with a force consisting of 5,000 men and 36 pieces of cannon. I lost in killed, wounded, and disabled, nearly one-third of my force; but the enemy lost 5,000 persons of all descriptions. I realised nearly 200,000 rupees, exclusive of the pay of my army, and was to receive an additional 100,000 for the hostages which were delivered up. I explored the country, formed alliances, and in short was dictator in all the countries belonging to the Seiks, south of the river Setledge".⁸

Another story, related to us nearly forty years ago, rises to

⁷ Skinner was born in 1778, the son of a Scotch ensign and a Rájpútni girl. He served with the Mahrattas from 1796 to 1803. After the siege of Bhartpur in 1826, where he did excellent service, he received a King's commission as Lieutenant-Colonel, and was made C.B. There was a good deal of jealous and discreditable obstruction to this, but it was pressed through by the persistence of Lord Combermere and Sir John Malcolm. Lord Combermere, who was just leaving India when the grant arrived, insisted on presenting Skinner with his own cross of the Bath, that he might have the pleasure of seeing him invested before his departure. A very interesting memoir of Skinner, in large part autobiographical (from a Persian original), was published in 1851 by James Baillie Fraser, the traveller, whose brother, William Fraser, B.C.S. and Commissioner of Delhi, was by special permission Major and second in command of Skinner's corps. Skinner built, at large cost, the church at Delhi; it is said in fulfilment of a vow. He was confirmed himself, at the time of the consecration of his church, along with his three sons, by Bishop Daniel Wilson in 1836. He died in 1841, and was buried in the tomb of his old friend Fraser, murdered some years before by the Nawab of Ferozpur.

⁸ Captain William Franklin's *Military Memoirs of Mr. George Thomas*—Calcutta printed, London reprinted—1805, p. 291.

memory as we write. The troops of the Bikaner Raja were besieging a recusant village near the western extremity of the canal; Baker and Durand went to visit the trenches; whereupon, to their intense entertainment, one of the besieging force jumped upon the parapet of the battery, and waving his hand, called out to the hostile garrison: *Ho bhái! máriye nahín; Sahib-log á gayá!* ("Hullo, brothers! please don't fire; the gentlemen have come to see!") On one occasion the two young engineers extended their travels far beyond canal limits, and made an expedition on riding-camels across the western desert to Bháwalpur on the Sutlej. We have recovered the date of this outing from old sketch-books of theirs, in Lady Baker's possession, as March 1833. This was some years before the first Afghan war, and when the region in question had been rarely visited by English officers.



Anúpgarh, on the Desert Route. (Sketch by H. M. D.)

Colvin's secluded head-quarters were at Dádúpur, on a peninsular point between the canal-head and that branch of the Jumna from which the supply was drawn. Here, in a quaint *heptagonal*⁹ edifice,—the type followed in almost all the *chohies* or official staging-houses which he built—he and his two professional sons had their narrow quarters,¹ and here, chiefly, they passed the stationary and less busy portion of the year, *i.e.*, the rainy

⁹ Tradition says the heptagonal form of the central room, which shaped the whole, was founded on strict logic, *viz.*, one side to each of the three beds of the three officers, one to the fire-place, and three sides to three glass doors!

¹ In the sketch given at the head of this memoir there appears also part of a small bungalow which Baker built as an *annexe* when he married.

season. This leisure was, however, full of occupation. In one rainy season, Baker told us, he learned Italian, chiefly for the sake of the works on irrigation in that language. But later seasons were much taken up with a different study, to which circumstances led the whole trio, but especially the two younger men.

The nearest station to Dádúpur, though on the other side of the Jumna, was Saháranpur, distant some thirty miles, near which were the head-quarters of their friend Cautley, as the Chief of the Doáb (now called the Eastern Jumna) Canal. Here also, as Director of the Government garden there, lived Dr. Hugh Falconer,² a man whose rare genius as an investigator of nature, in the fields alike of botany and of geology, is widely known in Europe. Dr. Falconer, in 1831, soon after his arrival in the district, had been able to determine the tertiary age of the Siwálik or sub-Himálayan range of hills.³ The confirmatory evidence of fossils was as yet lacking,⁴ but he had come to the conclusion, to use his own words, "that the remains of mastodon and other large extinct mammalia would be found... and the notice in Ferishta's *Indian History* of the bones of giants being

² Victor Jacquemont says of the station of Saháranpur :—"Il existe à Saharanpour un air de soin et d'intelligence, rare dans l'Inde, et qu'on n'y rencontre jamais sans plaisir." *Voyage dans l'Inde*, ii, 3. At the time of his visit (1830) Falconer had not yet arrived; but the latter's predecessor, Dr. Royle, was a man, in his own line, also of much distinction; and the presence, for years, of two such men as Royle and Cautley, at a small station, might well have leavened it with the intelligence that attracted the brilliant young Frenchman.

³ The name *Siwálik* occurs in Mahomedan writers as far back as the thirteenth century, but, apparently, then applied to a region embracing Rájputána. Later, as in the history of Timur's invasion and in Baber, it is applied to the outer Himálayas. Falconer appears to have given it first the definite and convenient application to that tertiary range of no great altitude which runs parallel to the foot of the true Himálaya at various points, with a valley or *Dhún* between the two.

⁴ "Cautley was from an early date in possession of something which he suspected to be a fossil bone, but the scientific French traveller, Victor Jacquemont, had seen it and put it aside as a piece of lignite. Falconer, arriving with fresh knowledge from the lecture-rooms of Edinburgh, at once pronounced the supposed piece of lignite to be a real fossil bone" (*Notes by Lord Napier of Magdala*). The fossil in question is mentioned in Dr. Murchison's sketch of Falconer, quoted below.

found in the hills in which the Sutlej took its origin, made this opinion the more probable".⁵

The Persian passage here alluded to is sufficiently remarkable to be worth quoting from Briggs's translation of Firishta. The historian is describing the various public works of Fīroz Sháh, of which one was an attempt to bring water from the Sutlej, or from one of its tributaries, into the plain of Sirhind :

(A. H. 762, i.e., A. D. 1361.) "On his return in the month of Rujub to Delhy, the King heard that in the vicinity of Perwar was a hill, out of which ran a stream that emptied into the Sutlooj, which stream bore the name of Soorswutty ; that beyond the Soorswutty was a smaller stream called the Sulima. It was stated that if a large mound, which intervened between the streams, were cut through, the water of the Soorswuttee would fall into the small stream, from whence it would come to Soonam, passing through Sirhind and Munsoorpoor, and that the stream would flow all the year round. The King accordingly moved in that direction, and ordered that 50,000 labourers should be collected and employed in cutting through that mound, and forming the junction. *In this mound were found the bones of elephants and men.* The bones of the human forearm measured three guz (5 ft. 2 in.) ; some of the bones were petrified, and some retained the appearance of bone."⁶

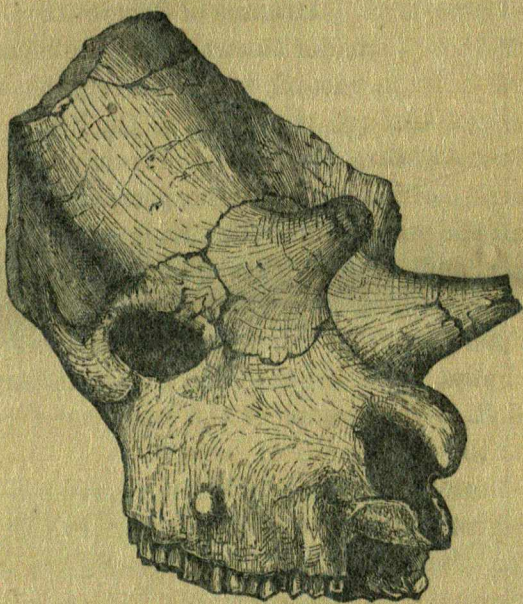
In the cold season of 1831-32 Falconer found a few fragments of fossil bones and shells of tortoises, in the Siwalik hills south-west of Dehra. Nothing more of consequence, however, seems to have been discovered till the spring of 1834, when he found the shell of a fossil tortoise in the Timli Pass, through the same hills. The search was pursued by Cautley with characteristic energy in another of the passes (Kálúwálá), and was rewarded by many important fossils. These finds were on the east of the Jumna,

⁵ Letter from Dr. Falconer to Professor Jameson, of Edinburgh, quoted in Dr. Murchison's biographical sketch of Falconer, prefixed to *Palaeontological Memoirs*, London, 1868, vol. i, xxvii.

⁶ *Briggs*, i, 453. The account of the intended canal is not very intelligible, but see p. 26, where the subject is noticed in connection with a project on which Baker was employed. Firishta was a compiler, writing about two hundred and fifty years after the events here spoken of ; and we have been unable to find in Elliot's "Mahomedan Historians" the original source of the statement.

i.e., between the Jumna and the Ganges, but Baker and Durand in the same year discovered extensive fossil deposits of still greater importance between the Jumna and Sutlej; and, especially near the valley of the Markanda. The original clue to this discovery was a fossil elephant's grinder, and a piece of a tusk, which were given to Lieutenant Baker by the Raja of Náhan (or Sirmur, a small hill-state north of Umballa) as the remains of giants, said to have been found near Pinjor.⁷

These western deposits now became the great field of search, and the pursuit was followed up by all four friends, Falconer



"Natura certo, quando lasciò l'arte
 Di sì fatti animali, assai fe bene. . ."

Skull of Sivatherium. (From drawing by W. E. B.)

and Cautley, Baker and Durand, with great zeal and emulation, each of them maintaining workmen on the search, whilst the reports and consignments from the excavations were looked for with the greatest eagerness and interest. In one of the early printed notices Cautley mentions with chagrin how one

⁷ The grinder had originally been placed as a votive offering in a temple at Náhan. Baker, recognising the importance of the discovery, obtained possession of it (*Lord Napier's Notes*).



of the people had absconded with a splendid skull of unknown character, and gone off to present it to the Raja as the head of a *Dea*, or god.⁸ Even the subordinate Europeans of the Canal Department caught the scientific contagion, and we remember one old warrant officer, Mr. Dawe, who had made a respectable collection on his own account.

It may be conceived that the banks of the Jumna afforded none of the apparatus by which men of science in Europe are enabled to compare and determine fossil species. Falconer, therefore, turned to the living forms around him to supply the want; skeletons of all sorts were prepared, and the extinct structures were compared with their nearest surviving analogues.⁹ In this process the genius of Falconer took the lead, but the others followed with intelligent zeal in the same path, so far as their duties permitted; and whilst Baker and Durand were waiting through the long months that passed before the *Cuvier* and other works that they had ordered could arrive from Europe round the Cape, the rural Golgothas, in which are heaped, outside every village, the bones of dead cattle, were ransacked with new eyes, and strange zeal, in search of osteological knowledge, and any animals that they chanced to shoot were buried and *skeletonized*. Osteological plates were carefully copied, as many drawings of Baker's still remain to testify.

The discoveries of Dr. Falconer and the Canal Officers are still recognised as having opened a new era in fossil Geology. The mass of discovery was enormous. "By the joint labours of Cautley, Falconer, Baker, and Durand," says Dr. Murchison, "a sub-tropical mammalian fossil fauna was brought to light, unexampled for richness and extent in any other region then known. It included the earliest discovered fossil *Quadrumania*, an extraordinary number of *Proboscidea* belonging to *Mastodon*, *Stegodon*, *Loxodon*, and *Euelephas*; several extinct species of *Rhinoceros*; *Chalicotherium*; two new sub-genera of *Hippopotamus*; several species of *Sus* and *Hippohyus*, and of *Equus* and *Hippotherium*; the colossal ruminant *Sivatherium*,¹ together with fossil

⁸ *Journ. As. Soc. Bengal*, iii, 593.

⁹ *Dr. C. Murchison*, as above, p. xxix.

¹ A species of a new genus, of remarkable type, a ruminant, but connecting the ruminants with the *pachydermata*, approaching the elephant in size, and provided

species of *Camel*, *Giraffe*, *Cervus*, *Antelope*, *Capra*, and new species of *Bovidae*; *Carnivora* belonging to the new genera *Hyenarctos* and *Enhydriodon*, and also to *Drepanodon*, *Felis*, *Hyaena*, *Canis*, *Gulo*, *Lutra*, etc.; among the *Aves*, species of *Ostrich*, *Cranes*, etc.; among the *Reptilia*, *Monitors*, *Crocodiles* of living and extinct species, the enormous Tortoise *Colossochelys Atlas*,² with numerous species of *Emys* and *Trionyx*; and among fossil fish *Cyprinidae* and *Siluridae*.³

The bulk of the valuable spoil may be judged from the fact that Cautley's collection alone, presented by him to the British Museum, filled 214 large chests averaging 4 cwt. each.⁴ Falconer's collection also eventually found its way to the British Museum. Other collections from the same source were presented to Edinburgh University by Colonel Colvin, and by Colvin and Baker to the Museum at Ludlow. For this last group, Baker in 1850 printed an instructive little handbook, which we hope may be still on sale there. A considerable part of Baker's collection is in the Museum at Calcutta, and a part was given by him to the British Museum. One great *trouvaille* of his is now conspicuous in the new Zoological Galleries in Cromwell Road, and forms perhaps the *spolia opima* of the whole Siwalik discovery—the elephant's head (*Elephas Ganesa*, Falc.) with its two vast tusks more than twelve feet in length.⁵ Though broken into many pieces, every part of this noble pair was found; but the

with a trunk analogous to the tapir's, having one pair of short solid-core horns between and over the orbits, and another pair of horns on the vertex; these last of an anomalous kind, *cavicorned* with cores, as in ox-horns, but flattened and branching into three (see p. 19). The wood-cut on p. 16 represents the cranium described by Falconer and Cautley. It is from a drawing of Baker's, under which stands in his hand-writing the apt quotation from Dante (*Inferno*, xxxi, 47) :—

(" Certes, when Nature put aside the art
Of fashioning such monsters, she did well.")

² Falconer estimated that this tortoise, from the tip of the head to the extremity of the tail, must have measured close on twenty feet, and stood seven feet in height.

³ *Dr. Murchison* as above, p. xxviii.

⁴ The cost of transmitting this collection to Europe—over £600—was defrayed by the Indian Government. The Court of Directors also, on Falconer's suggestion, presented coloured casts of the most remarkable fossils to the chief museums of Great Britain and of the Continent.

⁵ 12 ft. 9 in. including the part within the incisive sheath; 10 ft. 6 in. exposed; see cut at end.

point of one tusk was stolen on its way to Dádúpur, and is replaced by an imitation.

Papers by Lieutenants Baker and Durand, on the subject of these fossils, are published in the earlier volumes of the Journal of the Asiatic Society of Bengal, as follows:—

Vol. iii, p. 638.—*Description of the Fossil Elephant's Tooth from Sumrootee, near Nahun.* W. E. B.

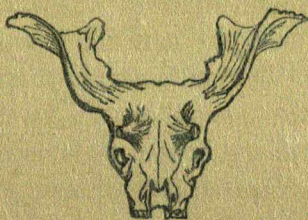
Vol. iv, p. 506.—*On the Fossil Elk of the Himálaya.* W. E. B.

Vol. iv, p. 565.—*Selected Specimens of the Sub-Himálayan Fossils in the Dádúpur Collection.* W. E. B.

Vol. iv, p. 694.—*Note on the Fossil Camel of the Sub-Himálayas.* W. E. B.

Vol. v, p. 291.—*Table of Sub-Himálayan Fossil Genera in the Dádúpur Collection.* W. E. B. and H. M. D.⁶

Vol. v, p. 486.—*Sub-Himálayan Fossils in the Dádúpur Collection (chiefly Rhinoceros).* W. E. B. and H. M. D.



Sivatherium Skull restored (front view).

Vol. v, p. 579.—*Smaller Carnivora from the same.* W. E. B. and H. M. D. 1 plate by Baker.

Vol. v, p. 661.—*Sub-Himálayan Fossils, etc.; Fossil Sus.* W. E. B. and H. M. D. 1 plate by Baker.

⁶ This paper contains five plates of carefully and clearly drawn fossil bones, four lithographed by Baker, and one etched on copper by Durand. The Editor, James Prinsep the Illustrious, says in a note :—"In despair of the difficulty and expense of executing so many plates in Calcutta, it occurred to us that the same pens and pencils which could produce such neat original drawings, could, if provided with the requisite materials, furnish engravings and lithographs ready executed for our journal. We accordingly despatched some yellow paper and a copperplate by dák to Dádúpur; and these are the first fruits. If not quite perfect it is to be remembered that the transfers had to travel 1000 miles in the height of the rains, ere they could be secured on the stone, and that the copperplate, with its waxed and etched surface, had to be bitten by the acid after its arrival in Calcutta."



Vol. v, p. 739.—*Sub-Himālayan Fossil Quadrumana*. W. E. B. and H. M. D. 1 plate by Baker.

This paper derives a special interest from the reference it makes to the then imperfectly described "theory of the progressive development of organic life", and to Sir Charles Lyell's view of the inconclusive character of the evidence in support of such development, and his notice of the absence of any remains of this class of animals in a fossil state. In later editions of the *Principles of Geology* Lyell particularly notices these discoveries of Baker and Durand; as does Owen in *British Fossil Mammalia*. They are also honourably recognised in Mr. W. T. Hamilton's Presidential Address to the Geological Society for 1865, in an obituary notice of Falconer (see also Appendix II).

The discovery of a fossil monkey by Baker and Durand was a very remarkable one, and following, as it did, close upon the discovery of the first Miocene monkeys in France and Greece, it drew a good deal of attention at the time. Falconer was apparently a little sore at the credit given his friends for *first discovery* in this case. It would seem that Cautley and he had made a similar discovery about the same time, but had communicated it to England, where it was published six months later than Baker and Durand's Calcutta paper.

After a lapse of many years, we find again in the same Journal (vol. xii, p. 769), *Note on a Fossil Antelope in the Dadoopoor Museum*, by Captain William Erskine Baker, with a plate from a drawing of his. The note ends with the following passage, which we may extract as a sample of his mature style:—

"The assemblage, in one deposit, of animals differing so widely in their forms and habits, and in their adaptation to particular localities, leads irresistibly to the conclusion that we have before us the delta of a great river, which, in one of the past configurations of our globe, must have collected in its course the various spoils of some extensive continent. No existing river, excepting perhaps the Nile, could unite in one vast cemetery the remains of every known order of terrestrial mammalia and aquatic reptiles; of the denizens of the forest, the lake, and the mud-bank; mingled with those of the wide prairie and the sandy desert."

Colvin went home in 1836, and Baker, who had become his right hand, succeeded him in the direction of the "Delhi Canals", as they were then called officially; a title changed in Lord Ellenborough's time to "Western Jumna Canals". In Baker's seven years' administration of these works the revenue from them was doubled.



Portrait of Colonel Colvin, from a photograph.

The year after his succession to this charge (1837) Baker married Frances Gertrude Duncan, third daughter of Major-General Alexander Duncan, of the Bengal Army, who then commanded the Karnál Division. Not long after this his headquarters were established at Karnál, then a great and popular cantonment, but which in 1843-44, after several unhealthy seasons, was entirely deserted. Baker's work during this period was not confined to the occupations of the canal administration, ample as these were. Thus, in February 1840, when a scheme had been suggested for connecting the Jumna and Sutlej rivers by a navigable canal, Baker, under the orders of the Governor-General (Lord Auckland) ran a line of levels between the former river near Karnál, and the latter near Ludhiána, a distance of about 100 miles.

His report and section were communicated by the Government of India to the Asiatic Society of Bengal, and published in their Journal for 1840 (vol. ix, part ii, p. 688). It is stated therein: "The information thus attained is necessarily incomplete, and though it has in my opinion proved the practicability of the contemplated measure, it has not furnished data for a detailed project, and still less for an estimate of the probable cost of the

undertaking; such as it is, however, I have judged it expedient to communicate it at once, both as a report of progress, and to enable Government to decide whether or not it be advisable to prosecute enquiry further."

On the question "whether the construction of such a work would be eventually as beneficial to the country as it is practicable as an engineering operation", he wrote :—

"At the present time it might facilitate the transport of military stores required for warlike operations westward of the Sutlej" (it was the time of the first Afghan war), "but this inducement will fail whenever magazines may be formed on the bank of the Indus, and their contents transported by water from Bombay. As regards the public interest, however, the case is different; attention being now so universally attracted towards the shorter communications with Europe, whether by the Mesopotamian route or that of the Red Sea, it cannot be supposed that the use of these means will long be restricted to the conveyance of mails; the more valuable descriptions of merchandise will soon follow, and shipments for Europe will be made from some port to be established near the mouth of the Indus. The North-Western Provinces of India will abandon the present circuitous route by Calcutta, and send their exports by the more direct one of the Indus; and the deserts bordering the east bank of that river, which will then be the only obstruction, may be turned by the contemplated canal."

The "port near the mouths of the Indus" was established not long after.

At various times since this canal was proposed, the relative advantages of land and water carriage in India have been thoroughly discussed, and the need of both recognised. The navigation of the Indus and its tributaries, though very imperfect, and much impeded by the shifting habits of the channels, is carried on still to a considerable extent, and for slow downward or export traffic (and for more than this with the aid of steam) is very serviceable. But railways, not then introduced into India, with which Baker came in later days to have an important connection, have taken up much of the duty which this scheme would have assigned to the rivers, whilst they have at the same time left much for the rivers to do. Besides a continuous line of railway alongside the Indus to Karáchi, two lines from Delhi to Bombay now connect those North-Western Provinces of India with the sea-board.

Whilst running this line, which was done with great rapidity, as it involved his absence from the daily canal duties, he



measured the level of the springs in 156 wells between the two rivers. The object of this was, first, to ascertain whether, as some had surmised, such measurements would give data for an approximate profile of the country; and, secondly, to obtain one element for calculating the amount of absorption in a standing canal, for which it would be necessary to provide a daily compensation. The experiment showed that no practical conclusion as to profile could be derived from such measurements. In regard to the second object, Baker observes:—

“It is satisfactory to find that the wells measured have generally so little depth, as the waste by absorption on the contemplated canal will be relatively much less. In illustration of this point, I may mention that in the Paneput district, where, before the introduction of the Delhi Canal, the springs were from 30 to 40 feet below the surface, they are now from 15 to 30 feet, whereas in Hurriana (the Hissar District) the springs have been raised since Feroze’s Canal was opened, in some instances as much as 60 feet.”

The preceding scheme has never gone further, but the case is very different with that of which we have now to speak.

It was after examination of two minor irrigation projects that he took up the larger, to which we refer. The object in view, was the supply of irrigation to parts of the great tract of country between the Jumna and Sutlej rivers. The two small projects, which were the subject of enquiry in the first instance, were these:—First, a canal which was to leave the Sutlej near the village of Tihara, between Ludhiana and Ferozpur, to convey water, at the time of the periodical rise of the river, into two natural channels running through the protected Sikh States and the Bhatti Territory (now part of the Hissar Division). Certain difficulties caused this project to be abandoned, and Baker then proceeded to report on the capabilities of the small river Gaggar, for the irrigation of parts of the same British Districts. This was the revival of a project briefly reported on by Colonel Colvin in 1836. The Gaggar is one of the streams which, rising in the sub-Himalayan range or in the narrow valley between it and the higher hills, and fed by numerous minor rivulets, are subject to great variation, at one time dry or



carrying a mere thread of running water, at another filling quickly after local storms, rushing with impetuous flood, and spreading over the wide valley through which the river channel runs. The tract of country, which was greatly dependent on the precarious supply of water from this little river, had been nearly depopulated by the great famine of 1783, and had not recovered its fertility. The method that had been in use for turning the Gaggar to account was the common plan of holding up the water at times of high supply by great earthen dams, forming large reservoirs from which the water was drawn off to the fields. The method was not materially altered by the new project, but improved and regulated. But it was a very limited and uncertain irrigating power that a river like this afforded after all.

So Baker then took up the larger scheme of a great canal from the Sutlej with continuous supply. For long this project had to bide its time after it was thus first investigated and reported on, but the delay was not without its advantages. Captain Baker's choice of the proper site for the head works of the canal, at a place some miles above Rúpar, involved the execution of some very heavy and expensive works. And in days when even moderate schemes of public works looked big, and cost what were really serious sums, and when the system of borrowing money for large undertakings of this kind had not yet been adopted, every alternative that added to expense had to be carefully considered, and if possible, eschewed. An inferior site had to be taken for the head of the proposed canal, to avoid the obstacle that barred the other line,—a formidable ridge which bounds the left bank of the Sutlej at that part, and turns the river westward. But the work was not destined in any form to be taken in hand at that time. Its feasibility, however, had been shown, and its postponement was a cause of much regret to those who knew the fertile nature of the country, the unsettled character of the people, and the immense advantages to be gained from ample and secure means of irrigation.

One of the objections raised against the scheme was, that the canal would pass through a great extent of foreign territory. This, Captain Baker said,—



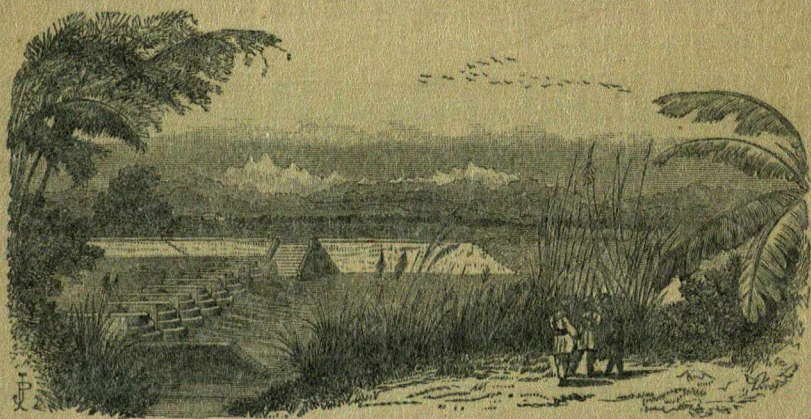
"would be unattended with much detriment, unless the intermediate foreign state had facilities for intercepting the supply ; and such is not here the case." "Granting," he added, "that it would be fair to allow a share of the benefit to the Sikh chiefs, there is no doubt that they would gladly pay a proportionate share of the expense, either in the shape of a contribution towards the original outlay, or as a water-rate, to be levied on subsequent irrigation."

All this has now been done as Baker proposed. The Sirhind Canal, designed on the lines of his project, is now nearly completed. The proper site for the head works has been adopted, and the ridge has been cut through. The Sikh chiefs have contributed to the cost in proportion to their share of the benefits. And thus, after more than forty years, has ripened the fruit of his well directed labours. It was with good reason and with true prescience, that the Lieut.-Governor of the North-West Provinces commented in these terms on the work that he had done in connection with this scheme and the others above mentioned :—

"His Honour cannot close these remarks without remarking on the zeal and ability which Captain Baker has shown in these researches, without any assistance in the discharge of his usual laborious duties on the Delhi Canal. Even when sickness or the exigencies of the public service have deprived him of the aid of the officers usually placed in subordination to him, he has, during two successive seasons, executed tedious and difficult surveys far beyond the sphere of his usual operations, and has placed the result of them most clearly and usefully before the Government. It is to be regretted that the peculiar circumstances already stated preclude the expectation of the immediate execution of any undertaking of correspondent magnitude and importance ; the information and materials, however, thus brought together are of the greatest value, and whatever be the result, Captain Baker has already secured the high merit of being the successful pioneer in this hitherto little-known tract, and of having suggested and pointed out plans which future experience and opportunity may mature into works of great national value."

Captain Baker's examination of the line of country for the Sirhind project, brought him upon the traces of an old canal, said to have been dug by a Governor of Sirhind, Mirza Kundi, in the time of the emperor Muhammad Shah (1719-48), and to have been taken from the Sutlej near Búnga, thirteen miles above Rúpar. The first trace found was two miles below Búnga. At several parts of the line, which could be followed at intervals, were found remains of old masonry works : one near the village of Majra, said to have been a dam or aqueduct across the Salima or Sarsa nulla, but of which all that remained above ground was

a straight wall about a hundred feet in length; and others, further down, which were evidently, Baker said, intended to pass drainage water over the canal, like similar works on the old Delhi line. Through the low range of hills, on a spur of which the town of Rupar is built, the canal had been carried by a deep cutting, a "gigantic undertaking", he calls it. And again, beyond this, portions of the old canal were found at intervals to near Sirhind. In his account of these traces of a former canal, Captain Baker wrote that it appeared "not to be the one recorded in Dow's *Firishta*, as having been undertaken by Feroze Shah for the purpose of throwing a stream of water from the Saleema (or Sirsa) in the direction of Sirhind and Soonam." His report does not state what were the reasons which led him to this conclusion. From the accounts we have of Firoz Shah's work, it



Dam at Dadupur (sketch by H. M. D.)

appears probable that this was really his canal. *Firishta* mentions two in this tract of country. One is briefly described as a canal 40 *kos* in length, from the Sutlej to Jhajar (read "to the Gaggar"), dug in A.H. 755 (A.D. 1354). Of the other, A.H. 762 (A.D. 1361), an account has been given above (p. 15) from Briggs's translation. The description in *Firishta* is not quite clear, but the emperor's design, it may be understood from this and other accounts, was, by cutting through a piece of high land separating a large river on the north side of it, a tributary of the Sutlej, from a smaller stream which flowed southward, to bring a great supply of water into the latter, to be conveyed by it to the dis-



tricts of Sirhind and Mansúrpúr. In making this cut the fossil bones were found. There is sufficient agreement between Baker's survey and these old accounts to suggest that this is the canal which they describe, that the masonry work on the Salima or Sarsa was the dam by which that stream was to be caught and turned, and that all which was done by the Governor of Sirhind, 150 years ago, was an attempt to re-open the canal. In his hands it only worked for one season. It is probable, therefore, that it was really a piece of 14th century work which Baker traced, and that it was Firoz Shah, not Mirza Kundi, who cleft the low range of hills at Rupar.

In December 1842, when the armies of Pollock and Nott were on their way back to India from Kabul, the Governor-General, Lord Ellenborough, assembled at Firozpúr a large body of troops, under the name of the Army of Reserve, to watch the Punjáb, which had been in a very disturbed state since the death of Ranjít Singh, and to form a support, in case of need, to the British forces returning by Lahore. Captain Baker was one of the Field Engineers attached to this Army of Reserve. The only work for engineers on such an occasion would ordinarily be the arrangements for the crossing of the river. But this had already been taken in hand by the civil officers, who had collected boats, and constructed two substantial boat-bridges. All that was left to be done by the Engineers in connection with these arrangements was the less appropriate work of decorating the bridges, according to Lord Ellenborough's views, for the reception of the victorious troops on their return to British territory. Baker, however, at once proceeded to examine the several kinds of boats in use on this part of the Sutlej, of which he made measurements and drawings for each kind of boat, preparing detailed bridge projects, with descriptive memoranda, to be ready for any future need. The Sutlej boats are of three descriptions: the *zohrak* is a massive flat-bottomed boat, with broad stem and stern, stiffened with thick ribs, having strong gunwales, and partly decked at both ends; the *námak*, a vessel of lighter build, with curved ends, more raised and narrow; the *chappú*, a very shallow boat, of thin plank, with broad stern, and a peculiar lofty and sharp-pointed prow. Of

the boat-bridges, one was built entirely of *chappús*, aranged in contact, with bows alternately up and down stream; the other was of *námaks* and medium-sized *zohraks* together. By these two bridges Pollock's and Nott's forces crossed the Sutlej, and were received with the warmest demonstrations, special honours being paid to the "Illustrious Garrison", Sale's Brigade, the defenders of Jalálabad, which was received first, on the 17th December. The rest of Pollock's force marched over two days later, and then General Nott's on the 23rd. The next day, the Sutlej, which had been rising with the winter rains of the past week, came down in full flood, and carried away both bridges.

With the last of the returning troops arrived a trophy in which the Governor-General took a special interest; the gates of the Temple of Somnath, popularly believed to have been carried off by Mahmúd (on his sixteenth invasion of India, A.D. 1023), which General Nott had been desired to bring away with him from the conqueror's tomb at Ghazni. The recovery of these gates after more than eight centuries, and their restoration to the place from which they had been taken, Lord Ellenborough believed ought to be a great gratification to "all the Princes and Chiefs and people of India", to whom he issued his celebrated address shortly before the return of the troops. He committed to "the Princes and Chiefs of Sirhind, of Rajwarra, of Malwa, and of Guzerat", "this glorious trophy of successful war", to be transmitted by them to the restored temple of Somnath, whilst the gates were to be committed to the guardianship of the Chiefs of Sirhind at the Sutlej Bridge.⁷ But this grand programme was not carried out, and the gates have quietly rested ever since in the British Magazine at Agra.

At the Ferozpúr Camp also, on this occasion, Captain Baker first

⁷ When Sháh Shújá treated with Ranjít Singh, in 1831, for aid in recovering the throne of Kábul, one of Ranjít's stipulations was the restoration of the Gates to Somnáth. This probably put the thing into Lord Ellenborough's head. But a remarkable fact is that the Sháh reminded Ranjít of a prophecy that foreboded the downfall of the Sikh Empire on the removal of the Ghazni Gates. This is quoted from a report of Captain Wade's, dated 21st November 1831. The gates were removed to India in the end of 1842. The "Sikh Empire" practically collapsed with the murder of Sher Singh in September 1843.

(April 1843). On the death of the last Raja of the protected Sikh State of Kaithal, without an heir, his people refused to surrender the fort to a small body of native infantry and cavalry which had been sent to take possession. Baker, with his then assistant, was sent out to give his services as engineer in obtaining possession; but about half-way to Kaithal they met the



detachments, which had been driven away with loss, in full retreat. A force of some 4,000 or 5,000 men was then assembled from the nearest cantonments; and Baker, who had become Field Engineer for the occasion, had prepared a bold project for blowing in the gate. But when the force arrived at Kaithal the recusant Sikhs had evacuated the place.

The matter was, perhaps, hardly worthy of so much detail, but one of the present writers looks back with interest to this little episode, during which he first saw a number of men since more or less notable in Indian history, such as R. Napier, George Clerk, Henry and John Lawrence, Edward Lake, and Hervey Greathed. The place, too, was a wonderfully picturesque combination of palace and fortress, and was strewn with all manner of curious gear hastily abandoned.

In June of this year (1843) Sir Charles Napier, who had just completed the conquest of Sind, and been appointed Governor, wrote to Lord Ellenborough, saying the three chief things required in that new Province were these: to control the robbers; to control the waters; and to open out roads. The first of these, he said, he would undertake himself. For the second, he wanted a good canal engineer sent to him. The Governor-General at once asked Captain Baker to undertake this duty, and in September he left Karnál, appointed "Superintendent of Canals and Forests in Sind", and taking with him three assistants.⁸ Going down the Sutlej by boat from Firozpur, Baker and

⁸ His last few weeks at Karnál were occupied with the preparation of instruments of various kinds, levelling staves, rain-gauges, etc., such as could be made on the spot under his own directions, as well as in the examination and testing of the surveying and other instruments received from Calcutta. All this work was seriously impeded by the extraordinary sickness of that season at Karnál. Half of the shops in the city were shut, and each house was a temporary hospital. The cantonment was in the same state, and when Baker started from Karnál three-fourths of the 3rd Dragoons were on the sick list, and nearly as large a proportion of the other troops—European and Native alike. It was this sickness in several successive seasons at Karnál which, along with other reasons, led to the abandonment of this cantonment and the occupation, instead, of a more advanced position at Umballa. And when Baker passed through Umballa, his friend, Captain Robert Napier, was laying out this great new station, which has ever since, notwithstanding difficulties about water, now remedied, been one of the finest and most favourite cantonments in India. Regarding this great sickness at Karnál and other places on the line of the Western Jumna Canal, Captain Baker



his assistants arrived at Sukkur in the end of October, to find that place prostrated by fever, one of the annual results in those days of the unrestrained flooding of the country by the waters of the Indus, which it was one of Sir Charles's purposes to control.

Of a different class from the Jumna irrigation works, in the management of which Captain Baker had been gaining varied experience for many years, were the canals from the Indus in Upper Sind, which were now placed under his superintendence. Like most of the native canals drawn from the Indus and its tributaries, in their course through the alluvial plains, they were simple channels cut from the river bank, to be filled by the rise of the river on the periodical melting of the snows and fall of the summer rains in the hills. For great part of their length these canals ran in natural watercourses, which had been adopted with all their windings and irregularities of level. These were at one time closed by banks of sand, deposited by the Indus at their head, and shutting off the river; at another, deserted by the stream that was to feed them, which had shifted to a different part of its channel. And annually, when carrying their supply of water to be spent in irrigation, these canals were filled up to a great depth with silt, which had to be cleared out to allow of their doing their work another time.

Under the rule of the Amirs of Sind this clearance-work had been much neglected, and was left to be done irregularly by the cultivators. The result of the silt-clearance of many years was seen in the enormous banks of earth which lined the canals and their branches. The chief canals from the Indus in Upper Sind were the *Begári*, the *Sind*, and the *Larkhána*. Something had been done for their improvement by the British Political Agents under Major Outram, before Sind became British, and much importance had been attached to their usefulness for boat traffic as well as for irrigation.

To raise the water that is wanted for the fields,—for these canals and their branches do not deliver it on the surface of the ground by natural flow till the very end or tail of the channel, was, two years later, to conduct an important inquiry, which will come to be noticed further on.



when the water gets so far,—numerous Persian wheels are ranged along the canal banks at short intervals, with an occasional lever and bucket, the *shadûf* of the Nile.

None of these canals were of any antiquity or historical interest, like those of the Jumna. In Lower Sind were the *Kalleri*, *Khánán*, *Jáma* Canals, and others. Proposals for making these canals navigable had been made by Major Outram in 1840. The Kalleri is believed to have been a natural branch of the Indus. The Khánán Canal is reputed to have been an ancient work, dug by the Khán Khánán, an officer of Shah Beg Arghún, one of the invaders of Sind in the 15th century. The Jáma was dug, or perhaps only cleared, by the *Jám* of Tatta, about 1765.

Captain Baker's appointment was that of Superintendent of *Canals and Forests* in Sind. The *forests* were the *shikárgáhs*, or hunting preserves of the Amirs, together with large tracts of jungle land in various parts of the province; dense groves of tamarisk near the river and on its islands, abounding in wild hog; and, further inland, extensive areas covered with thorny acacias, and tall and sturdy reeds. Forest trees of fine size were to be found in the *shikárgáhs*, which had been protected with care by the former rulers. River steamers were now making increased demands for fuel, and it was needful to make systematic arrangements for the supply. The Indian Forest Department, which has taken such an important position among the active agencies of the Government in the present day, had then no existence.

In the absence of all accurate knowledge of the old canals and watercourses, which would be the first things needing to be brought under regulation, a survey with connected levels had to be taken in hand, and the several officers were started on their appointed lines of work, according to a plan which Baker sketched out for this first cold season.

At Sukkur, where they were encamped for a few days, making preparations for the survey-work, he found another field of geological interest, of a different kind from that which he had explored in the Sub-Himálayas, and presenting in less degree the attractions of research and discovery. But he soon, in the course of his surveys, began to collect the many varieties of shells, of nummulites, and other fossils of the white limestone hills of



Upper Sind, to be examined and classified in the times of leisure. This was mostly left for Karáchi, where the survey parties spent part of the hot season, compiling their work. The brown limestone hills of Lower Sind furnished many more specimens of similar and different fossils, and much interest was found in the comparison of a number of the shells from the rocks with corresponding, and sometimes identical, recent species on the Sind coast. It was a very frequent recreation in the afternoons, after some hours of map drawing and other work, to lay out and compare the collections which each one had brought in from the morning's surveys along the foot of the hills, or rambles on the shore. But shore with shells has to be sought a mile or two away from Karáchi. Baker had thus soon infused some of his own love of natural history into his assistants, or at least he had made them collectors, and had taught them what to look for, and how to get it. But he had put much more than this into their power, for work was fairly stirred up by one who worked so steadily himself. A desire for accuracy and completeness was derived from his example in all he did. His active mind, and no less active body, roused the attention and the energies of others. Something was ever to be learned from one who was a reader, and had brought a small stock of books with him to this newly-acquired and not half civilized land. In all the work and all the play, rarely perhaps has a party of assistants, in any kind of duty, had such full and instructive enjoyment of the daily fellowship of their master. They all lived together at Karáchi. Mrs. Baker had not accompanied her husband to Sind, while the country was still imperfectly settled, and the nature and extent of his own work was uncertain.

One of the first notes which Baker received from Sir Charles Napier, after his arrival at Karáchi, was to ask him and his assistants to dinner. It had a characteristic termination, which recalls one of the Anglo-Indian customs of by-gone days. Most things that Sir Charles wanted done quickly and easily he did himself, and no aide-de-camp was called to send this invitation. His dinner hour was in the afternoon, two or three hours before sunset—a hot time, even though the air at Karáchi is

tempered by sea breezes—and the General wished his guests to have the comfort of wearing white jackets. This kind of garment, which has disappeared from the wardrobe of the English in India, was the ordinary dinner dress on informal occasions in the hot weather. And when it was necessary, as a matter of etiquette, to appear in black coat or scarlet jacket, it was a piece of customary civility on the part of the host (except at ceremonial parties) to ask each friend, after he had made his



Sir C. Napier, as he appeared at a Durbar at Hyderabad in 1844. (Anonymous Sketch among Baker's papers.)

bow, to put on a white jacket, which was readily done at the door, as this was expected, and the jacket was there in the hands of a servant, who was to take home the other. Sir Charles's invitation was meant to make this all smooth beforehand, and save trouble, by adding a P.S., which said:—"White jackets, of course, or no jackets at all, if you like it better!"⁹ The Governor of Sind was not punctilious in the matter of his own attire, and no hesitation was needed in adopting the first, at least, of his suggestions in this instance. But we have got over those easy habits. No outfit list now-a-days includes "two dozen white jackets".

In the beginning of 1844, the political agent in Cutch wrote

⁹ He had said to Baker, who in 1880 told the story to a young friend: "Whatever you do, don't come as a hog in armour."



to the Governor of Sind on the subject of certain earthen dams which had been made by the Sind people on the most easterly branch of the Indus delta, called the Purán, the boundary, for some distance, between Sind and Cutch. These dams turned off the water for irrigation of Sind territory, and kept it back from the other. Sir Charles Napier would not agree at once to the removal of these dams, but decided to have them examined and reported on. Amid his many occupations, however, at that time, the matter was overlooked till the middle of June, when he desired Captain Baker to visit the places and make a report. He would on no account allow the work to be now deferred, on account of the season of the year, but required it to be done immediately, and Baker, with one of his assistants, started from Karáchi on the 25th June. * Crossing the Indus at Tatta, he had time there to pick up a number of fossils, which he found more nearly allied to those of Róri in Upper Sind than to those of the nearer hills about Karáchi. A long and dreary way had to be traversed from the Indus at Tatta to the borders of Cutch, and it was after a five weeks' absence that they returned to Karáchi, on 30th July. Their most distant point was the Purán channel, and the remarkable *Allah Band* or "God's Embankment," the history of which, and of the changes connected with it, is curious. This great bank, or raised tract of land—for it is 50 miles in length, 15 broad, and 8 to 10 feet high—was cast up by the violent earthquake of 16th June 1819. It stretched across the eastern channel of the Indus, the Purán, which flows into the sea by the *Kori* mouth. This new-raised mound stopped the supply of water from above, whilst below it a great length of the river channel sank, and with it the fort and town of Sindri, on its bank. The lowered channel let in the sea water on the sunken fort and village, forming a great salt lake, with the tops of some of the buildings standing out from it. The flow of river water in the Purán, which had to find new ways to the sea, was for a time very unsettled. At length, after ten years, a flood in the Indus sent such a body of water down this branch that, with the aid of what had been going on before, it worked its way through the great barrier into its old course, freshening, for a short time, the salt lake of

Sindri. But when fresh supplies were cut off from above, the salt soon prevailed again. Then, the influx of sea water, in turn, had diminished, the lake had gone down and exposed more of the buildings, whilst the shores became, as Baker found them in 1844, thickly encrusted with dry salt, in which were found numbers of little fish, completely preserved. On the shores of the lake he found also remains of some snakes and of several birds, the skull of a panther, and bones of other animals.

It was the manner in which the varying supply of river water in the Purán branch was being dealt with by the Sind people, and the arrangements which required to be made, that Captain Baker was to investigate and report upon. It was a work of interest and importance, but at that season a very trying one. For a considerable distance from the Allah Band and Sindri lake there was no fresh water. Leaving his camp, he surveyed and levelled in one day the whole length that remained to be done, which was 19 miles. He mentioned afterwards having been struck by the remark of one of the survey-men, a Muhammadan, which he overheard in the evening when in his tent. "If God had not sent us such clouds to-day," said the man, "we should have had an awful time!" Having had one or two slight attacks of fever in the course of this excursion, Baker was a little knocked up on his return to Karáchi, but soon regained his strength. He had surveyed the line of march daily.

When Captain Baker was sent to Sind by Lord Ellenborough, his former appointment in the North Western Provinces was, by order of Government, kept for him, and only temporarily filled up. After a year, he availed himself of this provision. His resignation of his appointment in Sind was accepted, though greatly regretted by Sir Charles Napier.¹ He left Karáchi by steamer for Bombay and Calcutta in October 1844, and was succeeded by Captain Walter Scott, of the Bombay Engineers, nephew of Sir Walter of Abbotsford.

¹ "These grand schemes of irrigation," Sir Charles Napier wrote in this year, "will, I hope, be executed by Baker, who was chosen by Lord Ellenborough especially, and appears to me to enter into the spirit of his work." (*Life*, iii, 5.) And when Baker returned to his own Presidency, Sir Charles wrote again:—"I have lost Baker. He is very clever and very active—it is a great loss to Scinde." (*Ibid.*, 286).

Baker's year's work in Sind is represented by the following reports, projects, maps, and memoranda, which he submitted:—

1. "Memoranda on the mode of irrigation at present practised in Scinde, and the general system of management now recommended for adoption.
2. "Memorandum on the Shikargahs and Forests of Sind.
3. "Project for conveying a supply of fresh water from the Mulleeree River to the station of Kurrachee, with a map and profile of the ground. Designs for the masonry works, and estimates of the cost of effecting the object by three several methods.
4. "Report on the Bunds across the Goonee and Pooraun Rivers, obstructing the flow of the Indus waters through the Koree or Lukput branch of that river towards Kutch, accompanied by a map of the country from Mora to the Allah Bund.
5. "Report on communications between Sukkur and Shikarpoor, and on the feasibility of draining the land lying between these places, accompanied by an estimate, a map, a sheet of profiles, and designs for masonry works.
6. "Report on the Eastern Narra, its sources of supply, and the feasibility of restoring it as a permanent stream, with sheets of profiles.
7. "Plan of the rocks bordering the Indus in the vicinity of Roree, showing the proposed site of the head of the supply channel for the Eastern Narra.
8. "Report on the canals west of the Indus in the Sukkur Collectorate, with sheet of sections.
9. "General map, in three sheets, to illustrate the reports on the Eastern Narra and canals west of the Indus in Upper Scinde.
10. "Plan of the Fort of Deejee belonging to His Highness 'Ali Morad.
11. "Map of the new 'Ali Baha Canal.
12. "Route from Tatta to Raoma Bazar and the Allah Bund, with a map."

An interesting note by Sir Bartle Frere on Baker's work in Sind, and on his own personal knowledge of him at a later date, will be found in Appendix III.

In the "Report on the upper portion of the Eastern Narra, its sources of supply, and the feasibility of restoring it as a permanent stream", the references he made to the traditions regarding this channel, together with his general description of the basin of the Indus, were suggestive of certain interesting geographical questions, not yet fully determined. The observed results of the action of all large rivers in their course through alluvial plains, he thus briefly described:—"The silt with which their waters are charged is deposited during the season of overflow most abundantly near the edge of the stream, and in a proportionally smaller quantity at a greater distance from it. It thus forms a natural glacis, the crest of which is on the river's bank, and the slope falls away gradually. A continuation of this pro-



cess would gradually raise the level of the river bed", and "the cross section of the valley would present the general features of a raised central channel with a depression on each side". By cross sections which accompanied the Report, he showed that the Indus was no exception to this rule. An opening through the hills east of Rori, in the line of this depression on the left bank of the Indus, and the traces of an ancient channel in continuation, supported, he said, the accounts given in the *Chach Námah* and other local histories, from which it appeared that the river itself followed this course and flowed by the old city of Alór, eleven miles south-east of Róri, in the time of Dáhir the last Hindu sovereign of Sind (beginning of eighth century).

In one of these old histories (*Tárikh-i-Táhirí*)² is given the legend of the construction of the *Alór Bund* or dam, by means of which the river was said to have been turned from this old course into its present channel. This work and its effects had been frequently mentioned to Sir Alexander Burnes, when he was investigating the causes of an extraordinary flood in the Eastern Narra in 1826. Baker writes that Sir Alexander, "on the occasion of a subsequent visit to Sukkur, supposed that he had found the Bund, and described under that name the old masonry bridge across the canal near the ruins of Alór; but this erection could never have had the effects attributed to the Alór Bund." (The reference is to Burnes's *Travels into Bokhara*, i, 66.) The existing supply of the Eastern Narra was, from causes described in the Report, very variable. Baker indicated the works required to give a permanent flow of water drawn from the Indus near Rori, but he had not the data for a detailed estimate. The works subsequently designed by others, after the data had been obtained, have been since carried out.

Mrs. Baker had come down to meet her husband at Calcutta, and together they now returned to the North Western Provinces. The best of his Sind fossils and shells he left with the Asiatic Society of Bengal at Calcutta. He was required now for a new duty, and was not to return to his former charge. Major Cautley, the designer and the *Director of Works* of the Ganges Canal, now

² See *Elliot, Hist. of India, &c.*, i, p. 257.

in course of construction, was going to England for a season, and Baker was appointed to take his place. His residence was to be at Rúrki, the Head Quarters of the Canal, twenty miles from the head at Hardwár, and in the neighbourhood of the largest works.

In December 1845, Baker, with nearly all his canal officers, was summoned to join the army which had hastily taken the field against the Sikhs. They went up to the front by long marches, passing through no stations, and quite unable to obtain any news of what had occurred, though on the 21st December, the guns of Ferozshah were distinctly heard in their camp at Pehoa, at a distance of 115 miles south-east from the field,³ and some days later, they came successively on the fields of Múdkí and of Ferozshah itself, with all the recent traces of battle. When the party of irrigation officers reached head-quarters, the arrangements for attacking the Sikh army in its entrenchments at Sobraon were beginning (though suspended till weeks later for the arrival of the tardy siege-guns), and the opposed forces were lying in sight of each other.

"Baker", writes Lord Napier, "was active and fearless to rashness in making reconnaissances of the enemy's daily increasing works". When the day of attack came (10th February) he was told off to conduct the main attack made by Sir Robert Dick's Division, accompanied by Lieutenant (now Lieutenant-General) John Becher of his corps. The attack in question is thus spoken of in Sir Hugh Gough's despatch of 13th February 1846 :—

"At 9 o'clock Brigadier Stacy's brigade, supported on either flank by Captains Horsford's and Fordyce's batteries, and Lieut.-Col. Lane's troop of Horse Artillery, moved to the attack in admirable order. The infantry and guns aided each other correlatively. The former marched steadily on in line, which they halted only to correct when necessary ; the latter took up successive positions at the gallop, until at length they were within 300 yards of the heavy batteries of the Seikhs. But notwithstanding the regularity and coolness, and scientific character of the assault, which Brigadier Wilkinson well supported, so hot was the fire of cannon, musquetry, and zambooraks, kept up by the Khalsa troops, that it seemed for some

³ The same cannonade was heard at Simla, 134 miles E. by N. ; at Sirsa, 88 miles S. by E. ; at Karnál, 150 miles S.E. ; at Umballa, 119 miles E. by S. These instances rest on European testimony. But there was good native evidence of the fire, during the night of the 21st, being heard at Rúrki, 189 miles E.S.E. from the field. See *Prof. Papers, R.E.*, x, 185.



moments impossible that the entrenchments could be won under it. But soon perseverance gallantly triumphed, and the whole army had the satisfaction to see the gallant Brigadier Stacy's soldiers driving the Sikhs in confusion before them, within the area of their encampment."

Again:—

"On him (Brigadier Stacy) devolved the arduous duty of leading the first column of the attack, turning the enemy's right, encountering his fire before his numbers had been thinned or his spirit broken, and, to use a phrase which a soldier like your Excellency will comprehend, taking off the rough edge of the Sikhs in the fight."

The General of the Division, Sir Robert Dick, was mortally wounded by a grape shot, and died that evening; Brigadier Stacey received a contusion; Lieutenant Becher was severely wounded. The General Order of Lord Hardinge, the Governor-General, contained the following passage:—

"To Captain Baker and Lieut. Becher of the Engineers the Governor-General's acknowledgments are due for leading the division of attack into the enemy's camp. These officers well maintained the reputation of their Corps, whenever gallantry or science may be required from its members."

Lord Napier writes:—

"When the division of General Dick was awaiting the order for the attack, I had, as Brigade Major of Engineers, to carry an order to the division, and I found Baker in high spirits, and eager for the order to advance.

"During the memorable advance of the attacking column, Baker's intelligence, coolness, and intrepidity, were warmly appreciated by Sir Robert Dick.

"That gallant officer, who was mortally wounded, in his last moments repeatedly charged the officers by his side to convey his dying recommendation of Baker to the Commander-in Chief."

This was Baker's only campaign, but the part he played in it was, it has been seen, a distinguished one. The somewhat slender reward of a brevet majority, which he received, disappointed his friends, but none of them ever discovered an indication that it disappointed himself.⁴

During a considerable part of Baker's tenure of the direction of the Ganges Canal, Government was in a state of hesitation as to carrying out to the full Sir P. Cautley's great project; and it was not till after much investigation, in which Baker took the chief part, and after further correspondence with the Court of Directors, that the full sanction was given, and that funds began

⁴ In the Appendix (IV) will be found copious extracts from Captain Baker's letter to his wife detailing the day's events as he witnessed them.



to be liberally supplied for the work. Lord Hardinge, then Governor-General, took a great interest in the matter, and visited the canal works at Rūrki and Hardwār in the cold weather of 1846-47. The following extract from a public letter of his on the subject, dated Simla, 3rd September 1847, will show how fully Baker had acquired his confidence :

“It will scarcely be necessary to caution Major Baker in the interval to proceed with those portions of the works only on which opinions are not divided, knowing that perfect reliance can be placed on this officer’s singleness of purpose to sacrifice preconceived opinions of his own, if convinced that the suggestions offered are really improvements, and your Honourable Court will always find this excellent officer ready to make his talents subservient to the public interests.”

To explain matters more particularly, we should state that to the whole project of the Ganges Canal, as designed by Major Cautley, objections had been raised on two grounds. (1) “That injury would be caused to the Ganges as a navigable river, by the abstraction of water for the canal supply”; and (2) “because of the probable effect of irrigation in introducing malaria into the higher land of the Doab”. The first objection having been disposed of, the malaria question was to be made the subject of a special inquiry. For this purpose a Committee, with Captain Baker as President, was appointed, in September 1845, to investigate “the causes of the unhealthiness which has existed at Kurnaul, and other portions of the country along the line of the Delhi Canal”, and further to report “whether an injurious effect on the health of the people of the Doab is or is not likely to be produced by the contemplated Ganges Canal”. The Committee met at Karnāl on the 30th November 1845, and had proceeded southward through the irrigated districts of the canal as far as Hissar, when it was broken up by its members being required to join the army of the Sutlej. On the 1st November 1846, the inquiry was resumed, and the Committee’s Report, dated 3rd March 1847, was submitted to the Governor-General, Lord Hardinge, on his visit to Rūrki. A very elaborate investigation was made by the Committee, directed principally to ascertaining what relation subsisted between certain physical conditions of the different districts, and the liability of their inhabitants to miasmatic fevers; and the examination of the actual condition of a large number of people in those districts, to test

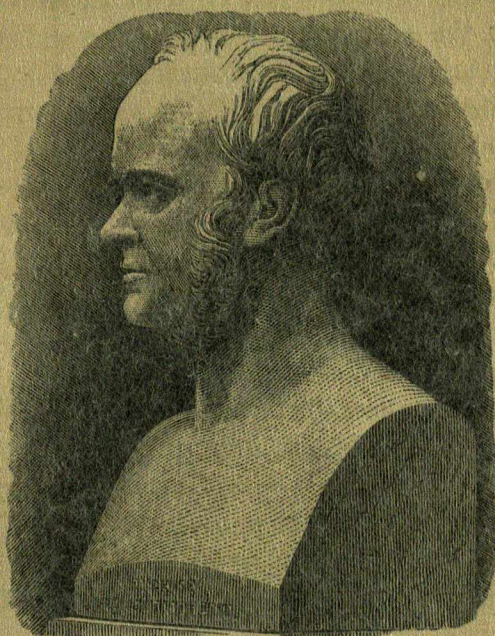


the degree to which they had suffered from malarious influences, was pursued after a system proposed by the medical member of the Committee, Dr. T. E. Dempster.⁵ The principal conclusions of the Committee were (1) that in the extensive epidemic of 1843, when Karnál suffered so seriously, the fever was generally, but not uniformly more prevalent and severe in the canal-irrigated districts, than in other situations; (2) that in certain situations, neither irrigated from the canal nor within reach of its influence, fevers prevailed to an extent and with an intensity as great as in the worst of the canal villages; (3) the greater part of the evils observed had not been the necessary and unavoidable results of canal irrigation, but were due to interference with the natural drainage of the country, to the saturation of stiff and retentive soils, and to natural disadvantages of site enhanced by excess of moisture. Where the soil was light, the drainage perfect, and irrigation carried on chiefly by *rājbahas* (great distributary channels from the main canal) the Committee recognised the blessings of the canal with scarcely any of the evils. As regarded the Ganges Canal, they were of opinion that, with due attention to drainage, improvement rather than injury, to the general health, might be expected to follow the introduction of canal irrigation. And with reference to this very important part of the question, the Committee prepared a memorandum of measures connected with the execution of the Ganges Canal, which they strongly urged upon the attention of the Government. The Supreme Government, accepting the conclusions and the recommendations of the Committee, issued its orders to proceed vigorously with the execution of the project. Meantime, the system for the execution of the works, and for keeping the accounts, had been organised by Baker.

In 1847, during Baker's incumbency at Rūrki, the Lieutenant-Governor of the North Western Provinces, Mr. Thomason, brought to the notice of the Government of India the want of engineer assistants, English and native, for public works, and

⁵ Practically this consisted in examining the *spleens* of a certain considerable number of villagers at each locality. Spleen-enlargement is so frequent a sequela of malarious fever that the proportion of such cases gave a truer indication of the prevalence of ague than was otherwise attainable under the circumstances.

more immediately for works of irrigation, then being undertaken on a larger scale than at any previous time. In particular, he desired to provide means of training young natives of India for the engineer profession. With the hearty concurrence and support of the Governor-General, Lord Hardinge, he proposed the establishment of a college for instruction in civil engineering, to be placed at Rūrki, the head-quarters of the Ganges Canal. Major Baker entered warmly into the plan, and was much con-



Sir P. T. Cautley, from a Bust by Sir John Steell.

sulted by the Lieutenant-Governor with respect to the details. The college was started at Rūrki in the end of that year. Major Baker, as Director of the Ganges Canal Works, was the first *ex-officio* visitor of the college, which was greatly helped forward in its early stages by his advice and assistance.

In January 1848, Colonel Cautley came out from England to resume charge of his great project, and Major Baker went on furlough, after twenty years' absence from England. Cautley, shortly after resuming his office, wrote to Government:—

“In re-assuming the duties that I had left three years before, I relieved Major Baker from a charge which had, by the most judicious management on his



part, and by the best tact in organisation, become one of comparative ease and simplicity."

A full description of the state of the works, at the time of his giving over charge, was completed by Baker as he embarked on the Ganges (11th Jan. 1848), on his way to Calcutta and to England. It concludes with this notice of the labours of the engineers employed under him:—"The Executive Officers have had to struggle with many difficulties, the conquest of which, though it has smoothed the path of their successors, has doubtless enhanced the cost of their own work; and it is important to bear this in mind, and to be cautious in drawing unfavourable comparisons between the cost of past and future work, and in attributing to the superior care and management of future executives an improvement in economy, which may be chiefly due to the results of their predecessors' labours. The power requisite to maintain the regular and equable motion of a vast machine is no measure of the force required to set it going."

On giving up at the same time the office of Superintendent of Canals in the North Western Provinces, he also prepared, by desire of the Lieutenant-Governor of those Provinces, an exhaustive Note on the Western Jumna Canals, his former special charge. This Note, which is still of much value and interest, he completed when enjoying his needed rest, at the house of his father-in-law General Duncan, in the neighbourhood of Melrose. It gave a short notice of the early history of the works executed by the Mahomedan Kings (of which some account has already been given in this Memoir), followed by detail of the gradual development of the canals, after the restoration which commenced in 1817. Of this work of development and improvement, embracing many important additions, a large share belongs to the time of Baker's superintendence. The needs of irrigation since that time have required much more extensive alterations of the old works, amounting in certain parts to the formation of new sections of canal of considerable extent.

Major Baker remained absent from India till the beginning of 1851, devoting a good deal of time and attention to the study of the English Railway system. In 1851, soon after his return to Calcutta, he was appointed by Lord Dalhousie member



The Ganges Canal Works, from the Bridge at Rurki, 1849. (Sketch by H. Y.)



of a Commission, instructed to draw up a report on the re-organisation of the Public Works Department in the Bengal Presidency. We believe it is to the report of this Commission,* or to a section thereof, that reference is made in the letter, which we are about to quote, from Mr. Thomason, then Lieutenant-Governor of the North-West Provinces. The Honourable James Thomason died three years later, whilst still holding the office just mentioned, and his name is little known in England. Yet all who served under that good man look back on him as the most capable civil ruler whom they have ever known, as well as the most loveable.

"My dear Baker,

"Simlah, April 16th, 1851.

"I ought not to be slow in thanking you for your very interesting Report. It reached me just as I was starting for Simlah, and I have only just arrived here. Cautley and MacLagan have seen it. The latter met me at Deobund Bungalow to talk over College matters, carried it off with him to show his Roorkee friends, and has now returned it.

"I need not say that I like your scheme greatly. Only give me the Inspector and his deputies, and new life will soon be put into everything. You, I fear, are lost to me for ever, or else how joyfully would I say: Do come and be my Inspector! Your hand, I suspect, is holding with a firm grasp another plough.⁶ It is a good implement, work it well. It will yield a fine crop, I trust.

"You nobly help me in my plans for Roorkee College. I am just about to propose a great enlargement of it, and shall make good use of your Report.

"I wrote to you the other day about a paper on Indian Railways. That you may understand the plan better I send you by letter *dawk* Nos. I and II of the papers prepared for the use of the Civil Engineering College, Roorkee. These are MacLagan's. Oordoo translations will soon be out. So we propose taking up all important subjects: *Roads* (Willis has undertaken it); *Bridges* (Abbot has done it); *Railways* (Baker will do it!); *Canals* (Baird Smith would be our man), &c., &c. Do help us. We need every nerve put forth.

"Believe me, yours ever sincerely,

"J. THOMASON.

The great experiment of railway construction under Government guarantee had just then been initiated, and the post of Consulting Engineer for Railways to Government—the officer on whom it chiefly depended to shape the entirely new system by which the Railways (the East Indian Railway in the first instance) were to be constructed by the agents of a Company, but under Government control,—a post which had been held for a brief space by Colonel J. Pitt Kennedy (who had gone

* Viz., the Railway.



to India in 1849 as Military Secretary to Sir Charles Napier),—was in 1851 bestowed upon Baker.

For some years he co-operated indefatigably with Sir R. M. Stephenson and Mr. George Turnbull, the able Agent and Chief Engineer respectively of the East Indian Railway, in the design and construction of that line. The nature of Baker's position necessarily involved differences of view, but he won so thoroughly their respect and regard, and the Government control in his hands was exercised with so much courtesy as well as firmness,—in personal intercourse much more than in writing,—that a difficult system could hardly have had a fairer initiation than in his hands.

Whilst he held this appointment, Lord Dalhousie was in the habit of making use of his advice in a great variety of matters connected with Public Works projects and questions, but which had nothing to do with guaranteed railways; there being at that time no officer attached to the Government of India whose proper duty it was to deal with such questions. In August 1854, the Government of India sent home to the Court of Directors a despatch, and a series of Minutes by the Governor-General and his Council, in which the constitution of the Public Works Department as a separate branch of administration, both in the local Governments, and in the Government of India itself, was urged on a detailed plan. Lord Dalhousie, in one minute from his pen, which formed part of these papers, stated his desire to appoint Major Baker to the new office of Secretary to the Department of Public Works, adding that, in his opinion, a better selection could not be made.

In the spring of 1855 the Court's authority was received, the new Secretariat was constituted, and Baker, being appointed the first Secretary, had to organise a large office, and to formulate the system of Public Works Budgets, under which the assignment of funds to all the objects of the Department over India was for many years conducted.

A little before this new departure the section of the East Indian Railway from Howra, opposite Calcutta, to Burdwan was publicly opened (3rd February 1855), a great event in the modern history of India. On this occasion, Mr. (now Sir John

Peter) Grant, a gentleman not given to indulge in undeserved eulogies, drew attention to Baker's great services in connection with the work, services of which those engaged on it were well aware, though the public knew little of them.⁷

Lord Dalhousie, who had learned to value Baker, as all did whom he served, left Calcutta March 6th, 1856. We find a letter from him, dated a week later, from Point de Galle :

"One line, my dear Baker, to thank you for your note, which I received at Kedgerree, and to thank you again for your constant and most effectual aid.

"I shall be rejoiced to meet you again in England whenever your return may take place.

"Always yours sincerely,

"DALHOUSIE."

Later in the same year, we find another letter from the same great Governor-General, whose health was fast breaking :

"My dear Baker,—

"Edinburgh, December 6th, 1856.

"You would find it not easy to believe how perfectly uninformed I am upon all Indian matters since I left Calcutta. The state of my health has prevented my keeping up any active knowledge of what was going on, and indeed the doctors forbade it. Kennedy, however, wrote me a doleful letter regarding the prospects of his company,⁸ praying for aid. I was obliged to tell him that my locks were shorn (although not the work of any Dalilah), and that my strength was gone from me. It makes me so savage to hear of things going wrong, at the East End or at the West End, in which one had long taken a strong interest, that one's only safety is in evading to hear anything about them.

"I am sorry to hear into what hands your railway contractors have fallen ; between the Sonthals and the Supreme Court it is hard to decide which is the worst !

"It is needless for me to say what pleasure it would give me to see both you and * * * * on this side the water. By the time either of you arrives, I hope I shall be in my own old castle, which I have not yet been able to occupy.

"I am very slowly mending, and continue still very weak and very lame."

Early in 1857 Colonel Baker's health began to fail, and he contemplated the relinquishment of the Secretariat ; but on the Mutiny breaking out, he deferred his arrangements for departure, and it was not till after the fall of Delhi and the relief of

⁷ "There was one name . . . which he (Mr. Grant) could not sit down without mentioning . . . his esteemed friend Colonel Baker. . . To Colonel Baker's energy, to his experience in Indian works of vast magnitude, to his industry, to his judgment, and to his imperturbable temper, the Government of India owed much, this railway owed much, and he would venture to say every passenger who might in after years travel on the railway from Calcutta to Delhi would owe much."

⁸ The Bombay and Baroda Railway Company.



Lucknow that he again addressed the Government on the subject. His office note, dated 19th October 1857, says:

“Public events having interfered with my purposed retirement, I now find that my previous apprehensions were but too well founded, and the opinions expressed from time to time by my medical adviser, have now convinced me that I can no longer, with justice either to myself or to the Government, continue the attempt to discharge the duties of my office. . . . I would request permission, under the new Furlough Rules, to retain my civil appointment for fifteen months ; but as, in the event of my service not being required in India, I would apply for extended leave, I do not, in reference to G.O. No. 583, dated 10th April 1856, wish to draw any portion of the civil emoluments of my office, for the period of absence.”

A minute of Lord Canning's on this application, dated 10th November 1857, runs :

“I see Colonel Baker's departure from India, and the relinquishment of his office, even though it should be but temporary, with the greatest regret.

“The Government of India does not, so far as my experience goes, possess a more able, zealous, indefatigable, and useful officer in the ranks of its service, or one more thoroughly well fitted by knowledge, temper, and character, to the discharge of very trying duties.

“Colonel Baker will, of course, retain his appointment for fifteen months ; and I recognise no reason for his abstaining to draw the usual portion of his civil salary, which should be paid to him accordingly.”

Colonel Baker sailed for Europe on the 11th November. A little later, by a subscription among those who had served under him, a fine bust by (Sir John) Steell, of Edinburgh, was procured, and this memorial of the first Secretary of the Department stands in the Public Works Office at Calcutta.

He had not been a year at home when Lord Stanley (the present Earl of Derby), who was Secretary of State for India, and the first statesman who held that office, invited him to take the post of Military Secretary in his department, which was then still abiding in the old India House in Leadenhall Street, and just beginning to organise itself more or less on the lines of the Company. The invitation was communicated in very gratifying terms by the Minister's private secretary, the Hon. Gerald Talbot, who had held the same confidential office under Lord Canning in India, and thus had already ample experience of Baker's value. The latter, after laying before Lord Stanley, with characteristic candour, what he considered objections to his own nomination, and finding that the invitation was not the less



pressed upon him, accepted it, and took charge in December 1858.

The charge in question is always a laborious one,—in that respect perhaps equalled in the same office only by the Financial Secretaryship. And at that time, when all the questions connected with the new state of things in India, and with the schemes for the amalgamation of the armies, were rising rapidly above the horizon, the labour was immense. Baker's heart, indeed, was not in the work of amalgamation, nor was he likely to be reconciled to it by certain of the methods in which it was accomplished. And a year or two later this feeling was so strong, that it was only on public grounds that he was persuaded to retain office; it being pressed on him that the embarrassment of that time of transition would be seriously aggravated by his resignation. So he remained, to work hard in carrying out the distasteful measure, with all its complex details.

In 1861 (8th July) he was, under the then constitution of the Indian Council, which gave every alternate nomination to the members, elected a member of that body, taking his seat 8th August, and continuing to belong to it till the termination of his public career, fourteen years later. The office is not one that brings its occupants much before the public eye, or affords much matter for biographers. Baker, however, did his work there, as he did it everywhere through life, with all his might. We have seen in India how he was in war daring and indefatigable in reconnaissance; in the peaceful field-work that occupied so much of his time in connection with many projects, he always seemed to do in a day several more miles of survey or levelling than anybody else; and at the India Office we believe the porter's slate would have borne witness that Gen. Baker (directly the reverse of Charles Lamb, who pleaded that if he came late, at least he went away early) was ever the earliest at his desk, the latest to quit it.⁹

The Military Department, and that of Public Works were those in which he chiefly worked, and he was probably oftener

⁹ Indeed some one said it was of no use to write Baker's name on the slate, as present; it might as well be engraved once for all! But he took his Saturday holiday regularly.



than any other member chairman, for the year, of one or other of those Committees. We shall quote below a testimony from his chief to his especial aid at an anxious time. He was also for many years the representative of the India Office on the Army Sanitary Commission. Of that body, the excellent Dr. Sutherland has always been the *primum mobile*; but Baker was a conscientious and efficient coadjutor, and, when he quitted office, Miss Nightingale, in her own gracious way, bore to the value of his services a warm testimony, dated October 8th 1875, from which we venture to extract a few lines:—

“We shall miss you so much, that, though I am a stranger to you, I cannot help telling you so. We seldom find the like of you. . . . We do not often find such high-minded, thoroughly well-informed help, so free from crotchets and prejudices, so open to reasoning and conviction, even when superior experience might well make its owner positive in his own judgment, with which, however, the wildest reformer could never be angry, expressed in so courteous and mild a form.”

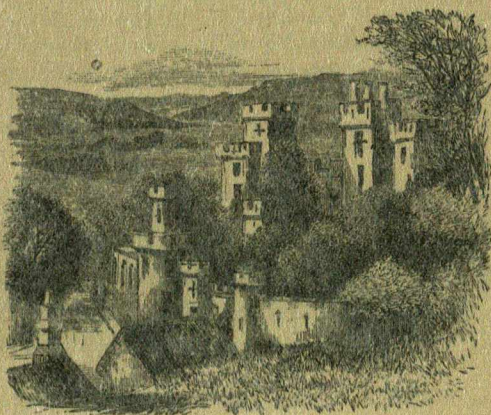
In 1870 he received the Commandership of the Bath. Three years later he had a serious illness, and from that time his letters begin to suggest that at last there was a longing for retirement. In June 1874 indeed, he still uses words implying that he felt it not, but yet the tone suggests that the feeling was there:

“Work has much increased of late. The ‘new broom’ has raised a good deal of dust,—I may say ‘new brooms’, for the present Under-Secretary is a much more stirring man than his predecessor M——. I have now six committees a week, besides the Council, which sits three or four hours a week instead of one or two; not that I complain of the additional work, or of the ‘brooms’!”

In August of that year he made a tour, which he much enjoyed, in Holland, Sweden, Denmark, and Germany, accompanied by Lady Baker and a company of his numerous nieces,—

“to one of whom, however”, he writes, “it might have had a terrible conclusion. We were arriving at Rotterdam by a steamer at 10 p.m., and the usual gang-board was put down to the quay. I went ahead with cloaks, etc., and the ladies followed, each carrying something. I heard a splash, and soon found, though I could not see, that one of the girls had missed her footing, and fallen into the Maas, between the boat and the wharf. In an instant one of the wharf-men had jumped in after her, and caught her up so quickly that her head was never under water. Poles and ropes were soon put down, and she was brought up, with no worse consequence than a chill and a fright. . . . The man was rewarded not by me only, but by the municipality. One loss I did sustain—the old ‘bamboo-root’ which you gave me in India” (a great many years before), “and which sank to the bottom.”

In September, again he writes: "I have not come back to office with my usual appetite for work. Time I should be going!" In the winter there was a return of illness; but he did not resign till September 1875. He had lived, since he entered the Council, on the Surrey side; first at West Hill, Putney; then at Tooting; for the seven last years at Morden Park, beyond Wimbledon. He never went much into Society, but his hospitable house was often filled, and rarely without visitors, either some of his many relations (to all of whom it was a second home), or old Indian friends. On leaving the India Office he gave up his house in Surrey,¹ and migrated to Somersetshire, where he had a



"The Castle," Banwell. (Sketch by H. Y.)

house and garden to his liking near Banwell, called "The Castle", (a "castle" of the present century) on a spur of the Mendips, overlooking the alluvial plain (the *kádir*, as he liked to call it in the phraseology of the dear old canal regions) that stretches to the Bristol Channel. One great attraction to this locality was the vicinity of his elder brother, but unhappily that attraction was lost, almost before he was settled in his new home, by the death of Admiral Baker. Anglo-Indians usually gravitate to London, and his friends often regretted that he had gone so far away; perhaps he regretted it himself. But he took up country duties, those of the Board of Guardians and the Bench; and his help was valued in these as it had been in every branch of the

¹ In Appendix V is a letter showing how he was regarded at Morden.



public service. Plants had always been a delight to him, and now he had leisure to bestow on his gardens and greenhouses. But though quick in sympathy, and generous to all in suffering or need, he spent little on himself, or his own hobbies. His visits to London became rare, for travelling had become difficult to him. On his last visit but one (in the spring of 1879), he and Lady Baker spent a week with an old Indian friend (one of the writers of this sketch), to which memory often recurs. One day, on that visit, the first Indian Public Works Secretary, with his wife, sat down to dinner at a round table with his three immediate successors in that office² and their wives. It was a very bright and mirthful party; but of the eight who sat round that table, he was not the first to pass away.³

His health, even then, had been slowly giving way; and though nothing indicated a near termination when the same old friend visited him in October of last year (1881), truly delightful as the visit was, at parting there was an unspoken and solemn sense, perhaps on both sides, that it might not improbably be the last. Latterly he seldom went beyond his own "compound" (as he delighted to call it), reserving his strength for the walk to church on Sunday, to which he looked forward with pleasure through the week. On that occasion, however, he again, on Monday, descended the hill with his friend to visit an old Indian officer living in Banwell (Colonel Cotgrave).

On the 16th of December, about noon, he was seized with paralysis, and died that night. He was buried in the New Cemetery at Bournemouth on the 21st, under a sunshine that seemed to belong rather to the Mediterranean than to an English Christmas.

All who have known Baker and his work, at any time for forty-five years past, have regarded him as the most faithful, pure, and valuable of public servants. Yet certainly he cannot be spoken of as

"lifted high,
Conspicuous object in a nation's eye".

The nation wist little of his name, as it often knows little of

² In order of succession H.Y., R.S., C.H.D.

³ M. W. Y. obdormivit in Domino, Apr. xxvi, 1881; W. E. B., Dec. xvi.



those who fulfil its most essential tasks, and serve it most faithfully. The reward of the Bath was only given tardily, and it seemed almost grudgingly, after four Indian Ministers had asked it. The "leading Journal", as it is called, did not think him worthy of a further notice than the jejune catalogue of offices and promotions⁴ derived from printed books of reference. And it may be thought by some who glance at the number merely of these pages, that too much has been said of the subject. But does anyone think so who has *read* these pages? Lord Napier writes:—

"In Sir William Baker, with courage of the highest order, were combined a very high military intelligence and a spirit of enterprise, which would have made him more eminent as a soldier even than he became as a high civil officer."

This is no small testimonial, considering who gives it; but still it pertains to what *might have been*. Let it be considered what actually *has been*. Let it be reckoned, in recapitulation, that to this one man it fell—we will not say, to show what irrigation could do in Northern India, for in that respect Colvin and Cautley may claim at least as much—but to lay the foundations of British irrigation in Sind; practically to found the great railway system in Bengal, and the Indian Public Works as an organised department of the State; in great part to guide the transition between the old and new army systems of India; besides the conduct of many other tasks of public importance, a part only of which we have indicated. And let it be remembered that through all and every duty he was regarded by every statesman under whom he served as a pillar of strength; by every officer who served under him as an object of unbounded confidence and affection.

Mr. Thomason, Lord Dalhousie, Lord Canning, are gone, but we have quoted words enough of theirs, to indicate, in some degree at least, how they looked upon Baker. And we feel confident that Lord Derby, Lord Halifax, Sir Stafford Northcote, and Lord Salisbury, would endorse Baker's praise to the full, as

⁴ The Editor of the *St. James's Gazette*, with promptness and courtesy, gave space for the notice which the *Times* had declined to insert (see the *Gazette* of Dec. 27th, 1881).



indeed letters of some of them before us prove.⁵ Sir Henry Rawlinson, on the day the news of Baker's death reached the India Office, said, at the Council table, in words that were touching from their very simplicity, that he had been for years associated with Sir William Baker, in the Military Department at the India Office; that he had often differed from him at first, but that he could hardly remember an instance in which he had not afterwards seen reason to admit that Baker had been right.

Sir William was small and slight in figure, but, till very recent years, full of activity and vigour; and his noble countenance was a true reflexion of his character. What he did, he did,

"As ever in the great Task-Master's eye."

Loyal in the widest sense of the term, wise, chivalrous, self-denying, tender, and devout, we know not where to find a more true example of the stainless knight.

We dare hardly allude to what the severance has been to her who was hardly ever parted from him (except during his service in Sind) for four-and-forty years. But imperfect as is our attempt to delineate Baker, it would be too palpably so if we failed to say a word of what he was as the most steadfast, true, and delightful of friends:

"To me," writes that oldest friend, who has contributed so many touches to this little memoir,⁶ "his loss is infinitely great. So bright an example, so true a friend! No one who ever relied on him was disappointed."

The daughter of another friend (the children of his friends were *his* friends) writes:—

"I hoped we were to have him many years longer; indeed there was something

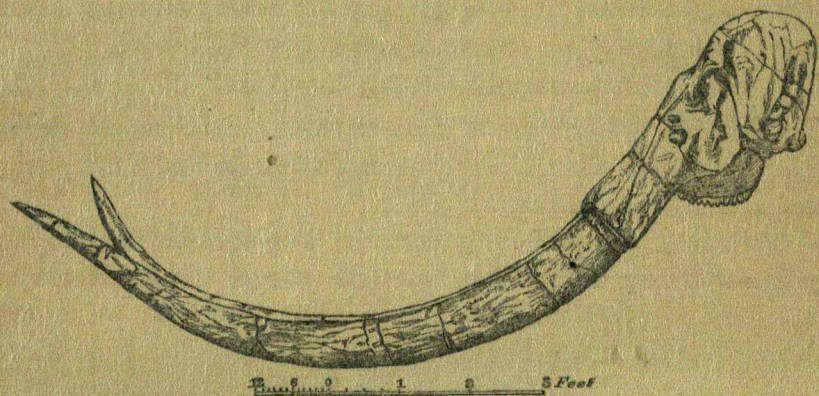
⁵ Sir Stafford Northcote wrote (December 1st, 1868) of General Baker:—"Since I have been at this office, I have found in him one of the most valuable public servants with whom it has been my good fortune to become acquainted in any Government department. At the time of the preparations for the Abyssinian campaign, in particular, he rendered the most important assistance to us, and undertook a very unusual amount of labour."

The following is part of a letter written by Lord Salisbury, when Baker was leaving Council:—"I not only lose a kind and courteous friend, who has made consultation pleasant on a very difficult and thorny subject, but an adviser of tried judgment and experience. . . . It has been my unpleasant lot, during my short term of office, to fill several vacancies in the Council, but *this* will be the hardest of all."

⁶ Lord Napier of Magdala.

so steadfast about him and his friendship that I never connected the thought of change or death with him. He is simply irreplaceable."

To some of us, not too old to have been his pupils, old enough to have enjoyed his friendship for nigh forty years, his departure seems like the closing up of a window to the south, through which poured continually warmth and sunshine, consolation and counsel.



Fossil Tusks of the *Elephas Ganeca*, see page 18. (Reduced from the "*Fauna Antiqua Sivalensis*.")



APPENDICES.

APPENDIX I.

*Extracts from a Letter to William Baker from his Mother on his leaving England.**

"I thought, my dear Will, that I could say so much to you before we parted, but I feel I cannot. I am so much confused by grief, that when I see you I forget it all; now that I am writing, my thoughts and feelings are so mingled together, I know that when my letter and you are gone I shall remember many things I meant to say and did not.

* * * * *

"I should have thought myself very neglectful had I not done everything in my power to provide for your bodily comforts: surely the mother acts rightly who proves that, to her, the soul of that child is most valuable.

"Don't be afraid, my dear Willie, that I am going to give you a great deal of advice after this long preamble. I am only going to tell you what I think, and what I can only think about; for, in speaking of religion, I am very fearful to injure the Divine cause I am pleading for. Snow must be touched only by delicate, clean fingers, if we would preserve its whiteness unsullied; it is the same with religion. But I must speak, and may God, who sees my intentions, give his blessing to them.

"You are going, my beloved son, into countries where the name of our Saviour is unknown or disregarded—where perhaps the only temple for his worship may be your own heart; guard, then, the issues of that heart. Watch and pray that it may become pure and holy; and never forget God in a strange land. Be like Abdiel in Milton, whose simple faithful character we must admire—

"His loyalty to Right, his love, his zeal;
Not number, nor example with him wrought,
To swerve from truth, or change his constant mind,
Tho' single—

* * * * *

"Oh, my son, my own dear son! let Religion possess the first place in your every thought and action: it will not consent to hold a second place;

* Lady Baker has endorsed on the cover: "A most delightful letter from his mother, which has been treasured up, and must have had a great influence on his life."



it must be no theory, but practice. It must be mingled with all your thoughts. Do not suppose I would wish to appear superior, or pretend to eloquence. I only wish to touch your heart with that pure and glorious truth, with that joyful hope, which now makes me indeed reckon the sufferings of the present time as not worthy to be compared with the glory which shall be revealed to us. Soon, very soon, you will be removed where everything around you [is] different, in another quarter of this immense world; but, with God, this immense world is but a little speck, and God will be with us both at the same time: we may both be kneeling to him at the same hour; and to him we shall appear very near to each other.

“Think how I shall be repaid for all my sorrows by your return. Be careful then of your health. And should we never meet again on this earth, accept, my dear Will, of my sincere and heartfelt thanks for your affectionate conduct and industry. To say I love you and pray for you would be only repeating what I am sure you are convinced of; but till you are a parent, and the *only* parent, you can never know the painful solicitude of my heart. To the protection and care of Heaven I commend you, my beloved son. Adieu,—ELIZABETH BAKER.”

APPENDIX II.

*Extract from “GAUDRY, Animaux Fossiles et Géologie de l’Attique”,
1862, tom. 1, p. 19.*

“Du temps de Cuvier, on ne connaissait pas des singes fossiles: ‘*Ce qui étonne*’, a dit ce grand naturaliste, ‘*c’est que parmi tous ces mammifères, dont la plupart ont aujourd’hui leurs congénères dans les pays chauds, il n’y ait pas eu un seul quadrumane, que l’on n’ait pas recueilli un seul os, une seule dent de singe*’ (‘Disc. sur les Révolutions du Globe,’ 6me edit., 1830). L’existence d’un singe fossile fut pour la première fois signalée en 1836. MM. Baker et Durand décrivirent, dans le Journal de la Société Asiatique du Bengale, une demi-machoire supérieure d’un singe grand comme l’orang outang, voisin des semnopithèques par sa dentition. Cette machoire avait été trouvée dans le terrain tertiaire moyen des Monts Himalaya près de Sutlej. Bientôt après (1837) MM. Falconer et Cautley rencontrèrent dans l’Inde quelques autres débris de singes appartenant à des espèces différentes de celle qu’avaient décrite MM. Baker et Durand.”



APPENDIX III.

The late SIR WILLIAM BAKER, R.E. By the Right Honourable SIR BARTLE FRERE, Bart., G.C.B.

"I first became acquainted with Sir William Baker's work when I took charge of the province of Sind as Commissioner in 1850. He had been selected by the Government of India as one of the best canal officers in the North-West Provinces, and had been deputed to take charge of the Canal Department in Sind, under Sir Charles Napier, soon after the conquest of the province in 1843. Almost the whole of the Land Revenue of that part of the valley of the Indus depended on the inundation canals, and other works of irrigation, so that Captain Baker's duties were, next to those of the Governor himself, the most important of any civil official in the province. The canal system of the former native rulers of the province had been different in some important respects from anything which could be seen in other parts of India; the natural conditions of the country were widely different from those of the North-West Provinces, to which Baker was accustomed; little of any value regarding the practice of the post was to be found on record; all had to be gathered by oral communication with the officials of the former Government, generally men of limited education, suspicious, and corrupt, or with cultivators yet more suspicious and uneducated, who had been taught by almost immemorial experience that their best interests required them to mislead their rulers in any matter connected with the cultivation of the soil. The canal management was interlaced with the duties of the Revenue Officers, who belonged to a separate department, and were naturally very sensitive as to external interference with their work, and there was great pressure from every side to develop the resources of the country by extending irrigation.

"Under such circumstances, to do justice to his work required not only the highest scientific qualities and acquirements as an engineer of irrigation works, but an almost superhuman combination of patient industry with active energy, and of temper with determination; above all, judgment and practical sagacity were essential. Baker had left before I arrived, and I could only judge of him from the work he had done or left on record, and the estimation in which he was held by those who had worked with or under him, and I soon found that he was not only respected and beloved by all who had had anything to do with him, but that he had left a reputation as of a man who never made mistakes. What he had done or recommended seemed universally regarded as the right thing, and his opinion was not to be questioned. He had touched on almost every great question connected with irrigation, and "*nihil tetigit quod non ornavit*". He had left numerous papers on great works which he had not been able to commence, and all were marked with the same clearness, simplicity, and businesslike



brevity, sound sense, and keen appreciation of the real crucial points of every question.

"His assistants were characteristic of the man. Anyone whom he had selected or relied on was certain to be a good and sound man of his kind. All cherished a warm regard for him personally, and all worked for and with him in a spirit which can only be inspired by a master of his craft, and with something of the same simple straightforward devotion to duty which he always showed.

"I first met him personally many years afterwards, when I joined the Indian Council, of which he was then a member, in 1867. There are many others who were our colleagues then, and who can testify that time had only ripened and improved the great and valuable qualities as a public servant which I have described as marking his work in Sind. He was always one of the most laborious and most trusted of the members of Council, always thorough and conscientious, and though I sometimes ventured to differ from him in opinion, I never did so without feeling how strong his reasons were for the view he took. I cannot recollect anything he ever slurred over, nor any work of his which was not that of a master hand. I do not think that he ever wittingly made an enemy, and I am very sure in the many weighty matters he had to decide and give opinions on, he never gave an opinion which he was not thoroughly convinced was right morally, as well as on grounds of practical utility and expediency. His was a rare combination of judgment and common sense with the highest principle. H. B. E. F.

"10th February 1882."

APPENDIX IV.

*Letter from Captain Baker, describing the battle of Sobraon.**

"Koonda Ghat, February 13th, 1846, 8 p.m.

"I have been waiting for an opportunity to write to you quietly, and give you as distinct an account as I can of the events of the battle on the 10th, before the first vivid impressions are effaced. It will be of course but a *personal* narrative, but not the less interesting on that account to my dear wife.

"I have already told you that Abbott arrived from Ferozepore on the night of the 8th. His errand was to convey to the Commander-in-Chief the Governor-General's consent to his attacking the enemy's entrenchments, and his views as to the best mode of attack. The Governor-General's plan, as far as I can understand, was to bring artillery near enough to throw shells,

* Captain Baker had, it would appear, written a short letter immediately after the battle, reporting his own safety and that of some relations, Becher's being wounded, etc.

etc., into the enemy's camp for some hours, and then to attack the west face of the trenches, which was considered to be the weakest, by a column of two brigades, which were to spread out after they had got in, and to be supported if necessary by all the other troops, entering at the same place, or as many as might be necessary.

* * * * *

The Commander-in-Chief's plan was different, and though he nominally adopted the Governor-General's, all the arrangements were made with reference to his own. When all was determined on, the Heads of Departments were told to arrange details; and an engineer officer being required to head the column, I was selected as the one who had been oftenest employed in reconnoitering the enemy's position, and therefore most likely to know something about the entrenchments.

"17th February.—At 3 in the morning of the 10th I left our camp, with John Becher, who was appointed to be with me. We had first to go to the 43rd (Stacey) to get a party of fifty men to carry ladders (in case we should find the intrenchment steep), and bundles of grass (to throw into the trenches should we find them deep). These men were all drawn out ready for us, but to my horror I perceived that they had on only their red coats, with *puggies* on their heads and *dhoties* on their lower extremities. This was precisely the Sikh uniform, and it struck me that if they went into action in such trim, they would be mistaken for the enemy, and shot. I therefore, on my own responsibility, broke them off, and told them to get their full uniform. * * * When the men were again fallen in, I marched them off to the park, to which I knew the way, but the Sipahis pretended to know better, and I was foolish enough to yield to them; and we lost our way and half-an-hour of precious time. However, we got there at last, but so late, that I was obliged to leave Becher to bring on the things, whilst I rode to Sir R. Dick's camp, where I should have been a quarter of an hour before. I found him, however, just starting, and conducted his division to the post they were to occupy preparatory to the attack. I posted them in two *nullas* which would have hidden them from the enemy had they chosen, and which *did* cover them from the effect of the shot which they subsequently sent in our direction. * * * * *

For some time after we had got into position all was perfectly quiet, except a little drumming in the Sikh camp. It was a hazy morning, and we could see nothing of the entrenchments. Bye-and-bye we heard the fire of our artillery open, but could not perceive that it was answered by the enemy. So much was this the case, that we all considered that the entrenchment was deserted, and Sir R. Dick said: 'Well, the next best thing will be to go home and get breakfast!' Bye-and-bye, we saw a troop of Sikh horse come out and reconnoitre us, and immediately after they had retired, the enemy's shot began to fall thick around us, but so well were the troops covered that I do not think a man was hit in this part of the operations. The air had by this time cleared, and Becher and I were employed in taking

bearings to the Batteries which we could now distinctly see, and I sat down to protract them on my plan of the ground. This I did satisfactorily, and we settled the true point of attack, and then got up and went down into the nulla to tell the General. But we had not left the spot half a minute, when a shot struck on the very spot where I had been sitting, and raised a cloud of dust! I certainly felt this to be a providential escape, but perhaps it was not more so than a hundred others which I had during the day. My bearings had shown me that we were upwards of a mile from the enemy's trenches, and I knew that there was another nulla about half a mile further on, more suitable for the purpose. I had watched the Sikh horsemen descend into this, and again reascend when they retired. I mentioned this to Sir Robert, and offered to go and examine the nulla, which he told me to do. I started off accordingly, keeping my horse well in, in case I should require his full strength to carry me back, should I find the enemy in the nulla; but this was not the case. It was empty, and when I returned, Sir R. Dick would not move the troops; and in truth I did not press it much, for they would have been more exposed. We remained some time longer, and I had just ordered my horse to get his gram (which I had brought for the purpose), when Colonel Gough rode up with the order 'to advance'. I then sent back the syce and, mounted on old Heratee, went on to direct the troops to the true point of attack. Stacey's Brigade was to advance, flanked by Fordyce's Light Field Battery, which was admirably served, and must have done great execution among the defenders of the trenches. We had to march over a long bare plain, and the fire opened upon us was very heavy. The shot ploughed up the ground in all directions, but at this time did little damage. One only awkwardness occurred during the advance, and that was not of much consequence.

* * * * *

"When near the entrenchments, the order to charge was given, and with a deafening shout on they rushed. We were advancing in line, and on coming up to the trench, which was respectably strong, we came to a pause, for there was not mass enough of men to force their way over, and whilst we were collecting a body for that purpose, a good many casualties occurred. The pause, however, was not of long duration; a knot of our brave soldiers soon rushed in, and I on Heratee in the midst of them. The poor beast was terribly frightened, but jumped over the first ditch beautifully, and scrambled over the rest. We soon carried the first battery, and, the way now open, numbers of troops rushed in, and the Sikhs recoiled on both sides. It was on this occasion that a soldier of the 10th came up to me (who had forgotten, or not thought it worth while to draw my sword) and offered me a tulwar which he had just taken from a dead Sikh, saying: "Perhaps, Sir, you may find this useful!" I gladly accepted his offer, and shall endeavour always to keep the sword as a memento of his kindness. Stacey's Brigade then turned down to the left, driving everything before them; and I accompanied them for some distance, until I perceived that the enemy



had opened a fire upon us from the opposite bank of the Sutlej. I called out to Stacey to beware of this, and not let his men go too far in that direction. He replied that he would attend to my advice, but wished I would go and tell General Dick what had happened. I returned for that purpose, and found that the reserve Brigade under Brigadier Wilkinson had entered at our place, and had turned to the left, but had not met with such complete success. There was some desperate skirmishing going forward, and before I could force my way to the General, an immense mass of Sikhs had formed up against us, and were advancing steadily, while our straggling troops were flying before them. When at last I saw General Dick, he was riding slowly back among the retiring troops looking annoyed, but saying nothing. I immediately concluded that he was taking back the troops in order to form them more compactly to resist the enemy, and asked him, 'Is it by your order, Sir, that the troops are retiring?' His reply was a hurried 'no, no, no', and immediately commenced rallying them, and being joined by several other officers we soon got them to stand. The Europeans fell into line, but nothing could induce the Sipahis to do so. * * * However, on we went, and though we met with many checks, there was no other repulse. Our advance was frequently stopped, but there was no step backward. Meanwhile, the temporary repulse which I have just described had a considerable effect on the Commander-in-Chief's dispositions. When he observed it, he ordered the other two divisions of infantry on the centre and right, to advance and attack the batteries immediately on their front. It was first ordered as a 'demonstration', but the old Chief, getting impatient, turned it into a real attack, which was entirely unsuccessful. General Gilbert's division, in which was John's regiment,* was opposed to the strongest part of the enemy's entrenchment; they tried desperately hard to get in, but were fairly beaten back, and when they afterwards rallied, and returned to the charge, they changed their point of attack, the left Brigade going round and entering by the face which had been cleared by Dick's division, and the right brigade joining General Smith's, and eventually going on with him.

"General Smith's division, however, had at first not fared better. They appear to have regularly turned and run for it, but, being rallied, renewed the attack and forced their way in. All this regarding the 1st and 2nd Divisions is a digression, as far as I was concerned; for, being employed with General Dick's division, I saw nothing of it. I will now return to myself. After the troops of the 2nd and 3rd brigade of General Dick's division (for Stacey's Brigade had gone down towards the river) had been rallied, they proceeded in the work of clearing the trenches, and driving the Sikhs out of their Batteries, which, being fortified all round, acted as so many redoubts. The men who defended them appeared to be desperate, for the men in the open trenches generally either collected into the batteries or ran away; so that these isolated posts were left with no apparent means of

* The 29th Foot.

escape, save by desperate resistance ; and our men, brave as they are, feared to rush in upon them until their numbers were thinned by the musketry fire. We had, therefore, a stand of more or less duration at each of the batteries ; but as we were mostly behind them, there was only one instance in which they were able to turn their guns upon us. Here they got one gun to enfilade (or fire along) the trench, now lined with our men, and with fearful execution. General Dick was killed by it, and Colonel Gough wounded. It was a very long time, and not till the officers were hoarse roaring to the men, that this destructive gun was silenced. Up to this time, from that at which I had rejoined General Dick, I remained near him, outside the trench, for he had not gone in again, after having gone out with the retreating troops. The soldiers had advanced along the trench, partly inside and partly out ; the latter being, perhaps, in greater danger, as the enemy's artillery could bear upon them. I had joined with the general, partly because none of his own staff were there with him. He was riding coolly on, under a very hot fire, apparently indifferent to it and everything else. He was *saying* rather than shouting, 'Come on, come on !', 'Charge, charge !' but quite mechanically. Whenever an officer came and asked, 'Shall I do so and so ?' He answered 'Yes, yes, thank you', and seemed much obliged to me for issuing orders in his name, which I did latterly without reserve. About the time we came into close quarters with the gun I have mentioned, I saw his aide-de-camp coming to rejoin him, and thinking that I could be more usefully employed inside, I again scrambled in, and I believe it was very soon after this that he was hit.

"The state of affairs at this time was not very promising. The Sikhs still obstinately held this fatal battery, and our troops, though continuing to fire, showed a strong objection to a closer attack. At last, however, they were got into motion ; a charge was made accompanied by a shout, and in a few moments the battery was in our possession, and the troops then went on from battery to battery, for a long time without further check. Leaving them in their victorious course, I was going across to another part of the field where there seemed to be much confusion, when looking round I recognised Napier followed by Shehab Khan, and accompanied by Colonel Smith ; with Napier and the Colonel I exchanged a hearty shake of the hand and a warm congratulation. Adverting to the scene of confusion to which I had been referring Colonel Smith wished there were more troops to reinforce those which we supposed to be hard pressed in that quarter. I thought of Stacey's Brigade, which I believed to have suffered no check, and looking round saw some of our troops apparently idle at a considerable distance towards the river.

* * * * *

"It was on my return from this fruitless errand that a Sikh soldier rushed out upon me from a trench in which he was concealed, and struck at my head with his sword. I warded the blow with my tulwar, but not so effectually as to prevent his weapon descending on my head, luckily with

the flat, and a slight bruise was the only mischief. In return, I made a slight, and, I believe, ineffectual blow at his head, and at the same time pushed on my horse, and saw no more of my enemy; but as he was by himself in the middle of our men, he is not likely to have escaped. This finished my *active* participation in the battle. On my return I missed Napier, but fell in with Strachey and Spens, and watched the progress of our troops, now in full possession of the enemy's lines; though there was an immense mass of infantry (said to be Avitabile's battalions) still unconquered, and apparently determined to make a desperate stand. By this time, also, almost the whole of our cavalry had entered the trenches in single file, and were drawn up in a *threatening* but inactive mass. They had been repeatedly told to charge, but were prevented, or said that they were so, by the numerous trenches with which the ground was seamed. At last a demonstration was made, and I believe that the 3rd Dragoons did get up a charge, though I do not think that they had much to do with the defeat of these men, who preserved their ranks admirably under a heavy fire of musketry. Their chiefs and officers appeared to be in a state of great excitement, and so far as we could judge, were exhorting them to advance against some portion of our troops who were surrounding them. No forward movement, however, was made, and at last we saw this beautiful body of men retreating steadily and in perfect order towards the ford, on which our Horse Artillery fire had begun to open, as well as a furious fusillade from the infantry lining the bank. The sight presented by this ford was one of the most fearful that can well be conceived. The bar of shallow water was oblique to the river, long and tortuous, so that, besides the effect of our shot, many were drowned in their attempts to pass the mass of dying and dead that crowded the proper road. An immense mass of people were entering the ford at one end, whilst a few stragglers only were emerging at the other. The masses of dead heaped up on each other rose above the surface of the water, marking the course of the shoal water by large islands of dead bodies. It was a sickening sight to me, though apparently one of great triumph to the old Commander-in-Chief, who was sitting on his horse on the river bank, with Sir ——— by his side flattering him, and saying, 'A most glorious victory, Sir; you will be famous; you will be renowned in history,' etc., etc. Then there seemed to commence a universal shaking of hands, everyone congratulating his neighbour on the result of the day. I met at this time Abbott and Irvine; both of them congratulated me warmly, and said that they had not expected to see me again in life.

* * * "On another occasion I saw some of our soldiers going to kill an unarmed man. I interfered and saved him; the poor wretch threw himself on his knees before me, and begged to be allowed to hold on by my stirrup during the rest of the day. This was manifestly impossible, but I pointed out to him a little hut where he might hide; but not I fear in much security. Abbott had the good sense to think of a better plan of saving a



poor man who threw himself on his mercy in a similar way. He made him carry a wounded European to the Hospital, making the European promise that he should then be allowed to go free.

"This is all I can think of at present. I hope it may be interesting to you as a record of the first battle participated in by" etc., etc.

APPENDIX V.

From the Rev. R. Tritton, Vicar of Morden.

"September 14th, 1875.

"May the best blessings of God attend you, and reward you and your lady, for your many deeds of kindness to myself, and to my parishioners; especially for the aid and encouragement I have derived from your influence and pious example during your residence in this parish. For this I must say I owe a debt of gratitude to yourself and Lady Baker, which I shall never cease to cherish."

APPENDIX VI.

Extract from the Sermon preached in Banwell Church on Christmas Day, 1881, by the Rector, the Rev. W. H. Turner.

* * * * *

"Be pitiful, be courteous, the Apostle tells us, should be our invariable rule of conduct; and never, in the course of a long life, have I met with one in whom those virtues were more eminently combined. I have known many with kind hearts, ever open to the claims of the poor and suffering; but in the departed the pitifulness of his heart was in his intercourse with all, rich and poor alike, invariably combined with the kind and loving courtesy of the christian gentleman.

"Well know I that, in the first moment of earthly separation, the voice of human consolation must fall dead upon the ears of his sorrowing family. Their great consolation comes from the memory of him they mourn. We would not be thought to say any life was passed undefiled, unsinning. One only in the form of frail humanity was without sin. But for his sins Jesus Christ gave Himself; and it was the living consciousness of this which tended to fill his heart with the grateful and adoring love which he possessed; a love which made him so regular and constant a worshipper in these walls, on every occasion when he could meet the Saviour that he loved. And think ye that that love has not already met with its reward?

* * * * *

"And how cheering in their sorrow must it be to those who loved him to



know that, although the hour of death came with the unexpected suddenness of a thief in the night, it did not find him unwatching, unprepared ! And *Blessed is that Servant whom his Lord, when he cometh, shall find watching.*"

APPENDIX VII.

Resolution of the Board of Guardians at Axbridge, on the death of Sir William Baker.

"The Guardians of this Union desire to record their deep sense of the loss they have suffered by the sudden and lamented death of General Sir W. E. Baker, R.E., K.C.B. His wide experience, keen and vigorous intellect, and quick and ready grasp of all questions brought before him, made his counsel and services especially helpful and valuable. With a judicious solicitude for the poor, he combined a watchful regard for the interests of the rate-payers; and to this end his labours as Chairman of the Finance Committee, upon which his colleagues cannot set too high a value, were directed."

APPENDIX VIII.

Dates of Sir William Baker's Commissions, etc.

Second Lieutenant	15th Dec. 1826.
First Lieutenant	28th Sept. 1827.
Captain	31st March 1840.
Brevet Major	19th June 1846.
Major	15th Jan. 1851.
Brevet Lieut.-Colonel	20th June 1854.
Lieut.-Colonel	21st June 1854.
Colonel	} 10th March 1857.
Colonel Commandant	
Major-General	2nd Aug. 1865.
Civil K.C.B.	1st Feb. 1870.
Lieut.-General	1st April 1874.
General	1st Oct. 1877.
Placed on Retired List	29th Nov. 1878.