

temples, the measure of the decadence of their religious art can be computed.

In the case of the carvings upon their civil buildings, this iron bound adhesion to given types has been relaxed, and the influence of their Mahomedan conquerors is very apparent. Full play is also given to the



THE "TRIMURTI" AT THE CAVES OF ELEPHANTA.

natural aptitude of the race, for intricate design, based upon natural forms. The bases, and caps of their columns and the spandrels between their arches, are enriched with beautiful and delicate ornament carved in low relief, while the workmanship of their pierced screens fully holds its own with that of the Mahomedans, which it excels in artistic interest. The two stone screens at Ahmedabad, though inserted into the openings of a Mahomedan mosque, are purely Indian in feeling, and were undoubtedly executed by Indian workmen. They are too well known to need description, and are admitted to be unexcelled in beauty, of both design and workmanship.

The sculpture upon the Civil buildings of Indo-Aryans is almost entirely confined to pure ornament; the figures, which form so large a part of the decorations of their temples, having never been adopted to celebrate the achievements of their heroes or rulers. No isolated statues, such as were executed by Roman and Medieval sculptors in Europe exist. The Mahomedan influence was against it, and the carvers of figures on the temples had become incapable of original effort, at the time the great civil works in architecture of the Hindus were constructed.

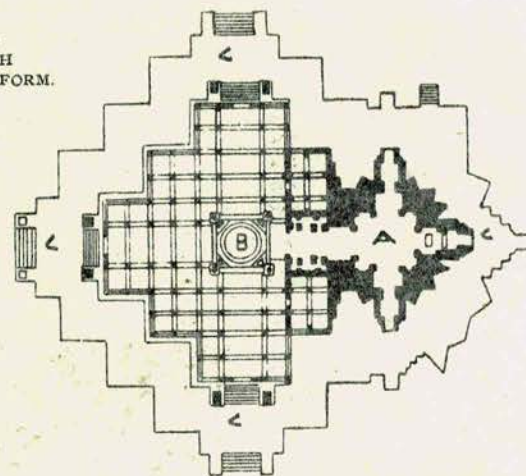
HINDU PAINTING.

Such painting as exists in Hindu buildings is purely ornamental. The art appears to have failed to appeal to their peculiar genius, which craving for the concrete, sought expression in sculpture rather than in painting. The traditions of the painters of Ajanta died with them, and in the centuries which have passed, since those works were completed, no sign of a revival has shown itself.

CHALUKYAN STYLE.

The Chalukyan Kingdom rose into importance about the year A. D. 500, and occupied a strip of territory extending across India from east to west, and as far north as Dowlatabad, and southward as Mysore. The Kalyan kings, who founded the Chalukyan kingdom, are supposed to have originally sprung from the solar race of Rajputs, but there seems to be a certain amount of evidence that they were Jain by religion. It is suggestive that the rise and fall of the Jaina religion were nearly coincident with the sway of the Chalukyans. Like all dynasties in Central and Northern India, the Chalukyans suffered eclipse in the Dark Ages that intervened between A. D. 750 and 1000, when many of their earlier buildings were destroyed. Those that survived, or were built subsequent to this cataclysm, were nearly all pulled down by the Mahomedan conquerors of the Deccan. The chief specimens are consequently to be found on the western side of the Peninsula, in the neighbourhood of Mysore. As in Jaina and Hindu religious buildings, their temples consist of a sikra or cell to hold the image of the Saint or God, with a porch or hall in front, supported upon pillars. The cell differs in plan, however, from all other styles, being star-shaped, of twenty-four sides, instead of square. These projecting sides are not obtained by increments added flatly to

- A. CELL
- B. PORCH
- C. PLATFORM.



PLAN OF A CHALUKYAN TEMPLE SHOWING THE STAR-SHAPED CELL OR SIKRA.

a square, but are based upon points touching a circle. There are four principal faces, however, to these sikras or cells larger than the others, three occupied by niches, and the fourth by the entrance. The sikras, instead of rising in a tall curvilinear tower, capped with an

Amalaka, as do those of the Jains and Indo-Aryans, are straight lined cones, and rise in steps to their apexes. Their details, however, are as dissimilar from the storied spires of the Dravidian temples and gateways, as they are from those of the Northern temples.

The porches are open, the roof being supported upon columns spaced equidistantly over its floor, without either the bracketing arrangements of the Southern, or the domical forms of the Northern styles of Hindu Architecture. Situated locally half-way between the Dravidian and Northern styles, the Chalukyan borrowed occasionally a feature or form from one or the other, but never to such an extent as to entirely obliterate its individuality, as a separate and distinct style of architecture.

One feature distinguishes the Chalukyan temples from any other ancient Hindu style. It is the use of pierced stone screens in the windows, which are highly ornamental and appropriate, and give a richness of texture to their façades, by creating a diaper of intensely black spots in panels, over the upper portions of their walls, close to the deep cornices, which overshadow and protect them. Their columns approximate more nearly to the Buddhist ideal than to that of the Jains or Dravidians; they display a fine feeling for outline and an appreciation of the value of contrasted plain and decorated surfaces. The Chalukyan buildings are pre-eminent for this quality, and for the artistic combination of horizontal and vertical lines, in the ornaments and outlines of their elevations. They are built of stone, which in the neighbourhood where most of the temples are found, is of a pleasant creamy colour, and of so close a grain as to take a polish like marble. Some of the plain round pillars in their buildings appear as if turned in a lathe, so finely are they wrought; while the carving, which forms the sole method of enriching them, and the fabrics they support, is executed with an elaboration and patient industry,

marvellous even in India, where mere labour counts for so little.

The finest specimens of Chalukyan architecture are to be seen at Buchropatty, Warangal, Somnathpur, Baitlur, Hallabid and Mysore. These are all of the earliest period when the style was less tainted with Hindu influence than it afterwards became.

CHALUKYAN SCULPTURE.

Although almost as minute and elaborate as that of the Jains, the Chalukyan sculpture shows more artistic taste. While on the one hand it is more realistic, some of the representations of animals being excellent in drawing, character, and proportions, it is on the other, fuller of riotous fancy than any Indian style, except perhaps the Dravidian. The five-fold friezes, which are peculiar to this style, often show both qualities. The friezes are composed of five bands of ornament, placed one above the other, each band consisting of the representations of one animal. The lowest is composed of elephants, the second of lions, the third of horses, the fourth of oxen, and the fifth of a bird which somewhat resembles the sacred goose and swan of Brahma. Many of these bands of animals are exceedingly spirited, and are purely naturalistic in treatment; but in others they are transformed into mythical beasts of composite structure, terminating, or beginning in elaborate foliated ornaments.

The types of ornament used for the decorations of temples were freely copied in civic buildings, and are to be seen to the present day in the sandal wood and ivory carvings of Mysore, which differ from any other produced in India.

The art of painting does not appear to have been practised by the Chalukyans, or if it were, no trace of it has come down to us in ancient art, nor does its tradition survive in that of the moderns.

(To be continued).



History of the Telegraph Department.

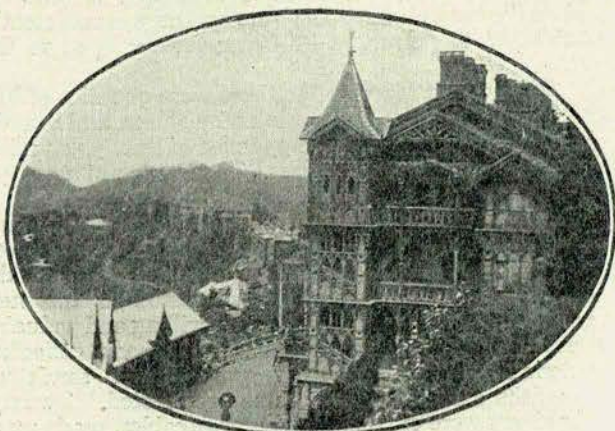
GENERAL.

IN the first year of the reign of Her Majesty Queen Victoria, the first practical electric telegraph line was patented in England by Messrs. Cooke and Wheatstone, and was opened for public use between Paddington and West Drayton on what is now the Great Western Railway. Two years later, in May 1839, Dr. William

unnecessary to use a return wire, but that the earth could take its place. He also proved that by increasing his battery power, or the diameter of his wire, or by making his receiving instrument more sensitive, he could very greatly increase the distance over which he could work.

It was not until 1850 that permission was accorded to Dr. O'Shaughnessy to erect an experimental line half overhead and half subterranean thirty miles in length. This line was commenced early in 1851 and connected Calcutta with Kedgerree, and by the 30th March 1852 eighty-two miles had been opened for public business. There were offices at Calcutta, Moyapur, Bishtopur and Diamond Harbour opened in October 1851, and Kedgerree and Kookrahutty were opened in February 1852. The success of the line was immediate, and in December 1851 the old semaphore signalling service along the river was finally abolished.

Though this line was of no great length, yet it merits special attention, as it was the first telegraph line erected in a tropical climate exposed to conditions utterly unlike any other line had to experience. The Gangetic delta is exposed to violent storms and cyclones accompanied by torrential rain; during the south-west monsoon much of the country is under water; while in the cold weather dense fogs prevail during the night and early morning. The conditions are very prejudicial to good telegraphic communication, and it is interesting to note how they were met. Dr. O'Shaughnessy had no European experience to guide him, and his originality and indomitable perseverance were tried to the full and triumphed in the face of difficulties that are even now found formidable. The results of his experiments led him to believe in very heavy iron conductors, welded together, and laid in the ground buried in a cement of melted rosin and sand, and the quality of the work can be imagined from the fact that when some of this underground line near Calcutta was dug up in 1888, not only the iron but even the Madras cloth in which it was wrapped were found to be in a perfect state of preservation after being buried 37 years! The great obstacles to perfect communication were the rivers, and numberless experiments were conducted, in the course of which Dr. O'Shaughnessy achieved the remarkable feat, as it must be considered, of signalling across the Hughli without a metallic conductor. The battery power required was, however, enormous and too expensive for practical purposes, and he did not achieve complete success until he received some gutta-percha-covered copper wire from England.



TELEGRAPH OFFICE, SIMLA.

O'Shaughnessy, an Assistant-Surgeon on the Bengal Medical Establishment of the Hon. East India Company's service, commenced experiments with reference to the transmission of signals by electricity. To quote his own words he erected in the Botanical Gardens near Calcutta "the first long line of telegraph ever constructed in any country. The line was twenty-one miles in length, embracing 7,000 feet of river circuit. The experiments performed on this line removed all reasonable doubts regarding the practicability of working electric telegraphs through enormous distances, a question then and for three years later disputed by high authority and regarded generally with contemptuous scepticism." Being thus firmly convinced himself of the possibility and practical utility of electric telegraphy, he endeavoured to bring the authorities round to his views, and the next ten years were occupied with endless experiments and equally numerous reports to the Government of Bengal and to the Court of Directors. It speaks volumes for his energy and perseverance that he at last gained his end, the more so as these experiments were all carried out in his leisure time. During the course of his experiments he proved that it was

Though this gave him easy communication, the problem yet remained how this fragile thread was to be protected from the effects of the climate and from mechanical injury when lying in the bed of a river. Many means were tried, including laying parallel guards of iron rods or wires fastened at intervals by transverse bands or loops, and in fastening the cable to a heavy chain. In the Hughli the danger of dragging anchors fouling the cable was ever present, and in addition to the actual cable crossing being indicated by beacons, guard boats and notices, signal guns were fired as ships approached the crossings. Dr. O'Shaughnessy, after trying all patterns of instruments in use in England and America, discarded them in favour of a simple galvanometer coil with a horizontal needle, delicately pivoted, and provided with a light pointer, which he found more suitable, and more readily replaced.

Very shortly after the completion of this line an interesting example of the value of rapid transmission of news occurred, which is thus described by Dr. O'Shaughnessy: "The *Rattler*, steam frigate, bringing intelligence of the first operations of the war (Burma) had not passed the flagstaff at Kedgerie on the 19th April 1852, when the news of the storming and capture of Rangoon was placed in the hands of the Governor-General in Calcutta, and posted on the gates of the Telegraph Office for the information of the public."

The value of electrical communication was fully recognised by Lord Dalhousie who, in April 1852, in forwarding Dr. O'Shaughnessy's report to the Court of Directors, recommended the immediate construction of lines from Calcutta to Peshawar, Calcutta to Bombay, and Calcutta to Madras. He also recommended that Dr. O'Shaughnessy should proceed to England to arrange for the necessary stores, and that he should be granted a bonus of Rs. 20,000, and acknowledged the value he placed on Dr. O'Shaughnessy's services in the following terms: "I believe I am doing no more than expressing the universal opinion of the community when I say that for them (the results obtained) the Government of India is indebted to the ability, the undaunted energy, the perseverance and skill of Dr. W. O'Shaughnessy. He has accomplished the whole unaided within a comparatively short time, in the midst of other important duties and without any remuneration whatever." Thus after 12 years the unceasing efforts and perseverance of Dr. O'Shaughnessy met with their reward, and the prompt action of Lord Dalhousie met with equal promptness on the part of the Court of Directors who sanctioned all the proposals. This promptness, which is thus alluded to by Dr. O'Shaughnessy, "such rapidity in the despatch of an important measure is perhaps without parallel in any department of Government," had far-reaching results; for had the question been discussed in a more leisurely fashion, the telegraph would not have been the valuable instrument it proved when five years later the Mutiny burst over the land.

Dr. O'Shaughnessy went to England in May 1852 and by the November of that year had made himself acquainted with the state of telegraphy in England and Europe. He had enlisted sixty artificers who were sent to Warley for training and had also placed contracts for the stores he required. He also drew up a manual

for the guidance of employees of the department, a document which was the forerunner of the many codes of instructions now in force. From the time Dr. O'Shaughnessy returned from England in July 1853 the Telegraph Department may be considered to date as a regularly organised department of the State, and its progress since then has been rapid and continuous. The programme of work was a heavy one. Means of communication and transport were few and slow. The staff were untrained and had to be taught their work. Numerous rivers, unbridged and with ill-defined banks, had to be crossed either by spans or cables, and unhealthy jungles had to be traversed. Construction commenced in the autumn of 1853 and by the end of March 1854 connection with Agra, 800 miles from Calcutta, had been established. The first message from Bombay to Calcutta was sent in August 1854 and by the end of November the Bombay Government reported that communication with Calcutta had been completed. The lines from Agra to Peshawar and from Bombay to Madras were completed shortly afterwards, and by the 1st February 1855 the system was sufficiently established to permit of its being thrown open to the public.

On the 31st March 1854 there were 91 miles of line and 91 miles of wire and cable and 7 offices, and exactly one year later there were 3,255 miles of line, 3,314 miles of wire and cable and 48 offices. The number of messages had risen in the same time from 23,430 to 64,810.

The remarkable rapidity with which these long lines were constructed was largely due to the help given by the local administrations under the orders of the Government. Every one was interested in this new means of communication, and gave willing and valuable assistance. Wooden supports were cut and collected, materials were distributed, granite and sandstone monoliths and masonry pillars were erected. Twenty-four rivers were crossed with massive cables, made up as a rule with the roughest appliances on the river banks. Forty rivers were crossed by spans. A single heavy iron wire weighing 1,200lbs. a mile was used, with various kinds of insulators and brackets.

It was soon found that the climate and the attacks of white ants rapidly affected the wooden supports, and first cast-iron sockets and subsequently tubular iron standards replaced them.

In 1856 Dr. O'Shaughnessy again went to England and while there received the well-deserved honour of knighthood. The main object of his visit was to arrange for the introduction of Morse instruments which had been proved to be superior to the needle pattern. Even in 1852 the superiority of the Morse was admitted, but there were so many patterns in the market, that exhaustive trials had to be made in India to determine which were best suited for the climate and tropical conditions. Arrangements were made during this visit for the recruitment of officers specially trained in Morse signalling at Gresham House. There were 74 of these "Morse Assistants," the first batch of whom arrived in India in 1857 and were sent to Bombay, Madras and Calcutta where they gradually introduced the Morse. The Morse instrument as first introduced indented a tape with dots and dashes which were subsequently transcribed, one advantage claimed being that



TELEGRAPH OFFICE, CALCUTTA.

THE CALCUTTA TELEGRAPH OFFICE

THE CYCLOPEDIA OF INDIA.

there was a record of the signal sent and thus greater accuracy would result. The operators soon learnt to distinguish the sounds of the signals, but to read by sound was at that time held to be objectionable. In fact, Sir W. O'Shaughnessy thus replied to the suggestion made by one of the Morse Assistants, who subsequently proved himself one of the ablest of the Directors General the Department has had, Sir A. J. Leppoc Cappel, "receiving by ear is in my opinion almost as objectionable as by the eye with the needle, and defeats the real object with which the Morse has been introduced into this country." Two years later, however, reading by sound was firmly established, and we find Sir William admitting "the saving effected by discontinuing the use of the tape amounts to at least 30,000 rupees per annum, while two-fold greater accuracy is obtained in our work."

During the absence of Sir W. O'Shaughnessy in England the department was controlled first by Lt. Chauncey and subsequently by Captain Stewart, R.E., and up to May 1857 satisfactory progress was made in every direction, 980 miles of line being added. The Mutiny broke out in May 1857 and the peaceful expansion of the department was immediately stopped. The first section of the line destroyed was between Meerut and Delhi, and the same day Mr. Charles Tod, the Assistant in charge at Delhi, who had gone out on the Meerut road to ascertain the cause of the interruption, was murdered. Two lads, Pilkington and Brendish, remained in the office and telegraphed thence to Umballa incoherent accounts of the murder and pillage taking place in Delhi. Before they had to seek safety in flight they had given the alarm, which being flashed across the Punjab, enabled the authorities to take timely steps to disarm the disaffected troops. "The value of that last service of the Delhi office," says Sir W. O'Shaughnessy, "is best described in the words of the Judicial Commissioner Mr. Montgomery—'THE ELECTRIC TELEGRAPH HAS SAVED INDIA'!"

The lines between Agra and Indore, Agra to Cawnpore, and Agra to Delhi were speedily and completely destroyed—the posts being used as firewood, and the wire being cut up for slugs. The lines between Allahabad, Cawnpore and Lucknow were completely destroyed. The line, however, between Delhi and Peshawar was maintained intact, and, as can be readily imagined, proved invaluable.

As soon as possible the work of repair and reconstruction was commenced, but it was eight long months before communication was re-established between Bengal, the North-West Provinces and the Punjab. The work of repairs was carried on under conditions of great difficulty and danger, but the spirit which animated the whole English community was not wanting in the telegraph officials, who never slackened their endeavours till the long slender wires again stretched their delicate network over the country. Space does not permit of any detailed description of the telegraph operations during this period of stress, but the following extract from Sir W. O'Shaughnessy's report is full of interest: "By far the most interesting occurrence in the history of the restoration of our lines is found in the dashing exploit of Captain Stewart, Mr. Harrington, Mr. McIntyre, and Mr. Devin in running up a

flying line from Cawnpore to Lucknow in the last advance of the Commander-in-Chief in that city. The cool intrepidity and ready resources displayed by Captain Stewart on this occasion gained for him the hearty applause of the whole army. His report is one of the best proofs yet given of the value of the (Telegraph) Department in military operations, as well as in its political and civil bearings." The department not only lost many hundreds of miles of material, but suffered severely through the murder of many of its officers, and when the Mutiny had been finally quelled, Sir W. O'Shaughnessy found that traces of the terrible strain were apparent in the temporary loss of morale which was evident.

The services rendered by its members are commemorated on a granite obelisk subscribed for by the Department and erected in front of the Delhi Telegraph Office in 1902. Of the two Delhi signallers, Pilkington died not many years after the Mutiny, but Brendish received a pension of full pay; and received the medal of the Victorian Order when he stood by the obelisk when it was unveiled by Lord Curzon.

Having recovered from the effects of the Mutiny, the expansion of the telegraph system was pushed on apace, and during the next three years lines were constructed down the East and West Coasts of the Peninsula. Rangoon was connected with Calcutta *via* Dacca and the Arakan coast. Karachi was linked up with Bombay and Lahore, and extensions to large cities and trade centres on the main routes were erected.

During 1857, some officers of the department were sent across to Ceylon and by the end of the year lines extended from Galle to Colombo and Kandy and northwards to Manaar. In September 1858, a gutta-percha-covered cable was successfully laid across the Palk Straits. This cable was 25 miles long, and was laid by Mr. Wickham in bad weather with a native sailing vessel. Sir W. O'Shaughnessy says: "The operation was as difficult, the line as long, the navigation at least as dangerous, as that of placing the cable across the Straits of Dover, for which a squadron of steamers and costly machinery were employed. Mr. Wickham performed his task under sail, and with no other apparatus than the rude windlass of a native vessel." This cable lasted well until 1867 when it failed and was replaced by one of a later type.

Sir W. O'Shaughnessy left India in June 1860, and shortly afterwards retired from the service and died at Southsea in January 1889. So passed from India one of the most interesting personalities of the day, and one whose services were of Imperial significance, and deserved more public recognition than has ever been accorded. The sole memorial of him in India is a portrait, presented by his eldest daughter, which hangs in the Signal Room of the Calcutta Telegraph Office.

At the close of this formative period of ten years when Sir W. O'Shaughnessy left India, there were 11,000 miles of line and 150 offices. The total number of messages dealt with in India, Pegu (Burma) and Ceylon was 202,428. The total revenue (excluding State messages) was Rs. 4,23,991 and the expenditure Rs. 17,20,427.

Major (afterwards Colonel) Douglas, R.E., succeeded Sir W. O'Shaughnessy, and he was the first to hold

the title of Director-General. During his time there was a steady expansion of the system, till in 1865 when he retired there were 13,390 miles of line, 172 offices and a revenue of ten lakhs of rupees.

In January 1860 what is now known as the "Check" Office was instituted by Sir W. O'Shaughnessy, and for some time after its establishment, considerable difficulty was experienced, when tracing delays, owing to the uncertainty of the ordinary method of expressing time, especially when near noon or midnight consequent on the risk of substituting A.M. for P.M., or from their omission. This difficulty was got over by counting time from midnight to midnight, the day being considered as consisting of 24 hours commencing at midnight. The following year the introduction of "Telegraph" or "Madras" time was effected. Madras sun time was chosen, as the longitude of that place is about equidistant from Calcutta and Bombay. In addition the fact that there was a Government observatory there ensured the correctness of the time given. The correct time was signalled throughout India from Madras at 8 o'clock every morning.

In 1860 a distinct stores branch was opened and Lieut. Mallock, who eventually became Director-General in 1889, was placed in charge. With it was associated the workshop.

With the increasing use of the telegraph for commercial purposes, it was soon discovered that it was imperative to insulate all the lines, and in many cases, lines had to be reconstructed. New patterns of insulators and instruments were introduced, several of them being devised by the Director-General. A reorganization of the department with increased pay and improved prospects was sanctioned in 1861. A new system of accounts was also introduced, which at first was by no means successful. Although considerable progress was made during the five years ending with 1865, yet it is on record that there were numerous complaints from Chambers of Commerce and in the public press against the inaccuracy and delays in commercial messages.

Colonel D. G. Robinson succeeded Colonel Douglas in 1865 and at once inaugurated his vigorous administration by the introduction of many needed reforms. He introduced a complete reorganization of the department in all grades. Salaries were increased, promotion regulated, certain privileges were granted to the signalling staff, who were paid according to qualifications, and were thus given a strong incentive to improve themselves by private study. A new tariff was introduced, and the compulsory use of stamps in lieu of money payment for telegrams was prescribed.

In 1865 through communication with England was first established. The route was *via* Turkey and the tariff was £5 for 20 words. Delays and errors in messages were so great as to be the subject of universal complaint, with the result that in 1866 a Parliamentary Select Committee was appointed to take evidence on East Indian communications. The result was the establishment of two additional routes: that known as the Indo-European, through Persia, which was opened in January 1870; and that *via* Suez and Aden to Bombay in March of the same year. The following January, 1871, Madras was connected to Penang by a cable.

Col. Robinson left India on two years' leave in 1866, and during his absence the department was administered first by Colonel Glover, R.E., and subsequently by Major Murray. One of the most important operations carried out in 1866-67 was the laying of a new cable between India and Ceylon. It was laid by Captain Stiffe, Commander of H. M. S. *Amberwitch* and Engineer of the Indo-European Telegraph Department, assisted by Captain Mallock. The cable was laid across the Palk Straits from Talamanaar to the island of Rameswaram, near the celebrated temple. A land line of 10 miles was erected to the village of Pamban, whence two cables, each a mile and a half long, completed the communications to the mainland. This cable was insulated with Hooper's core and lasted well. Another very important work was doubling the line between Bombay and Karachi, which involved much difficulty, passing as it does through the Runn of Cutch and the Sind Deserts. Other extra wires were erected along the main routes, and new lines were constructed along the railways. At the end of March 1867 there were 11,826 miles of line carrying a single wire; 1,332 carrying two wires; 11 miles carrying three wires; 198 carrying four; and 4 carrying five wires.

During his stay at home Colonel Robinson made arrangements for regularly recruiting the staff with well-educated young gentlemen, who received nominations from the Secretary of State. After passing a preliminary examination they received a special technical education mainly under the eminent Engineer and Electrician, Sir William Preece, and eventually came out to India under a ten years' covenant. Between the years 1868 and 1871, seventy-two officers were appointed, the last one now remaining in India being Sir Sydney Hutchinson, Kt., the present Director-General.

When Colonel Robinson returned to India in 1868, he brought with him two instructors who travelled from office to office giving lectures on technical subjects to the staff. One of them, Mr. Louis Schwendler, remained in India, and was appointed Electrician to the Department. It is difficult to overstate the importance and value of the services he rendered. He introduced a regular system of line testing and localization of faults and drew up a most valuable code on the subject. He also introduced duplex telegraphy on the Indian lines. His researches gained him a European reputation as one of the most eminent telegraphists of the day; and he possessed in addition an enthusiasm and powers of imparting knowledge that made him a most successful teacher. To him, more perhaps than to anyone else, Calcutta is indebted for the magnificent Zoological Gardens at Alipore, where a granite obelisk, with a medallion portrait, has been erected in appreciation of his services.

Closely associated with Mr. Schwendler in his scientific work was Mr. (now Professor) W. E. Ayrton, who did not remain long in the Department, and whose scientific attainments are world renowned.

In 1870 the first attempt to open a "combined" postal telegraph office was made at Mussorie and Naini Tal, and proved a complete failure. Colonel Robinson thus writes on the subject: "The fact is the two duties are totally dissimilar and to endeavour to combine them is as extravagant as to yoke together a race

horse and a cart horse." As mentioned some time back, the proposal to read Morse signals by sound was absolutely condemned, the proposal being made in advance of its time. This failure of combined offices and Colonel Robinson's emphatic condemnation of the principle is an even more striking instance of the same thing. India had, however, to wait for thirteen years before the system of "combining" small offices was introduced.

In 1868 the system of training British soldiers in telegraphy was introduced, and the offices at Kamptee, Muttra, and Ferozepore were manned entirely by military Telegraphists, while employment was found for other soldiers in various offices. Their great value was first proved in 1873-74 when there was a famine in Tirhoot and the resources of the Telegraph Department were strained to their utmost. In order to cope with the requirements, 541 miles of temporary line and 13 offices were opened in 35 days. Had it not been for the military telegraphists who were utilized to set free civilians at various offices, it would hardly have been possible to meet the sudden demands made on the signalling staff.

Another direction in which there was urgent need of reform was the design and manufacture of the material used for the lines, and Captain Mallock was employed in England on this duty. He brought to bear on this subject a thoroughly practical knowledge of the requirements for India, together with great energy, and it is to him the Department is indebted for the high class of material now generally in use. It was at this time stranded steel wire for use at river spans was introduced, by which means the constant failure of many river cables was obviated. By the use of specially constructed high masts, or by taking advantage of precipitous banks, many very long spans were erected. In 1873 a span was erected across the Kistna river at Bezvada in the Madras Presidency which measured 5,070 feet from post to post. This span is still in existence, and is probably the longest in the world.

In 1868 India was for the first time formally represented at the International Telegraphic Conference held at Vienna, and has since taken an important part in all subsequent conferences.

Major-General Robinson retained charge of the Department till his death in 1877, and the progress in all branches of the service was continuous and unbroken. During his tenure of office the line and wire mileage had increased from 13,258 miles of line and 14,137 of wire to 17,232 of line and 39,113 of wire. The number of offices increased from 174 to 222, and the number of messages sent had increased to considerably over a million. The value of the messages had risen from Rs. 9,06,376 to Rs. 23,71,359. In the same period the revenue had risen from Rs. 9,26,210 to Rs. 26,78,578, and in 1877 for the first time in its history the net revenue, excluding interest on capital, showed a profit of Rs. 19,995.

It was a matter for deep regret that Major-General Robinson, to whose commanding administrative abilities this gratifying result was due, did not live long enough to report to the Government he had so faithfully and zealously served, that the success he had striven for so ably had at length been achieved.

Major-General Robinson was succeeded by Colonel R. Murray who had been with the Department since the days of the Mutiny and had proved himself an able coadjutor to his distinguished chief.

The first of the long extensions on the frontier was erected by Mr. Pitman during the cold weather of 1876-77. It consisted of a line from Jacobabad across the Sind desert to Quetta and Khelat *via* the Bolan Pass. This line proved invaluable during the Afghan War.

In the year 1877-78 for the first time since the establishment of the Department the receipts more than covered the working expenses. The following year there was a surplus of Rs. 6,08,246, which included a loss of Rs. 18,162 sustained in working the Ceylon system of telegraphs.

Owing to the large number of "nomination" officers engaged in the years 1868 to 1871, a serious block in promotion had been caused, and in the latter year further recruitment had been stopped. In 1877, however, it was decided that more officers were required, and an examination was held for seven appointments. The successful candidates underwent training at the Royal Indian Engineering College at Coopers Hill, and arrived in India in November 1878 and January 1879. Since then up till the date the College was closed in October 1906, officers have been trained there and sent out yearly. From time to time selected officers have also been appointed from England, and from the Engineering College at Rurki.

On the 1st July 1880, the Ceylon Telegraphs, which had been administered by the department since 1869, were re-transferred to the Ceylon Government, under which administration they have since remained.

In 1881 the department lost two officers whom it could ill spare in Mr. Schwendler whose services have already been mentioned, and Major Eckford. The latter had been employed chiefly in connection with the stores and workshops, and had done much in forming and administering these very important branches.

The following year saw the introduction of the Licensed system regularizing the rules under which railways and other systems outside the Imperial Telegraph Department were permitted to undertake the transmission of paid messages for the public. The monopoly of despatching messages on payment is strictly enforced, but it was decided by the Government of India that in the interests of the senders of telegrams, railways should be encouraged to carry public telegrams, "to as great an extent as is compatible with the proper use of their telegrams for the primary use of railway traffic." Officers in canals and other licensed systems as well as railways were authorized to accept messages from the public and to retain the charges. It was also laid down that there should be but one public telegraph message system throughout India. Col. Murray retired from the Department in June 1883 and was succeeded by Mr. (now Sir) A. J. Leppoc-Cappel, who was the senior of the "Morse Assistants," whose services had been characterized throughout by marked ability. Under his management the Department made great progress.

The year 1883 witnessed the most radical change yet made in the department when what is now known as "combined" offices were introduced. Where the

telegraph message revenue was not sufficient to justify departmental offices being opened, the cheaper agency of the Postal Department was employed; and the work was carried out by Postal officials (trained for the purpose by the Telegraph Department), in addition to their postal duties. The whole scheme was carefully worked out by Mr. (now Sir Albert) Leppoc-Cappel and Mr. (now Sir Frederick) Hogg, the two Directors-General. The system has been a success from the first; the two departments have worked in perfect accord, each placing its resources at the disposal of the other, and the result has been the extension of the telegraph into parts which it could otherwise never have reached, thus aiding mercantile enterprise and earning a large revenue for the Government. In addition to opening telegraph offices in many Post Offices, the further change was introduced that every Post Office was authorized to accept messages for transmission to the nearest telegraph station.

So early as 1875 a private line, worked with dial instruments, was supplied in Bombay for the Peninsular and Oriental Steam Navigation Company, and shortly after similar lines were supplied in various parts of the country. The invention of the microphone in 1877 and the rapidity with which it was improved and combined with the telephone, led to particular attention being given to these instruments. After a series of trials an instrument invented by Mr. W. P. Johnston, the Electrician, was adopted, and installed in the majority of the private lines. In 1881 the Government decided that private enterprise in telephone business should be encouraged, and licenses were granted to the Oriental Telephone Company, Limited, to establish exchanges in Calcutta, Madras, Bombay and Rangoon. In 1882 an exchange was opened by the Company in Karachi. The rules regulating the grant of these licenses were revised in 1883. While Government does not compete with the licensed telephone companies, such connections as may be required for Government officials are usually supplied by the Telegraph Department. In 1905 Local Governments were permitted to use any agency they preferred for connections they require.

Following on the annexation of Upper Burma a heavy strain was thrown on the resources of the department to meet the demands for telegraphic communications required. It was found that the existing telegraph lines and cables were practically useless and all had to be reconstructed.

Sir Albert Leppoc-Cappel was succeeded in 1889 by Col. H. Mallock, who held charge till April 1890.

In 1887 the use of hard-drawn copper wire, with which many experiments had been made on the long main routes was decided on. Its main advantage over iron wire is that it is practically free from electro-magnetic inertia, which is the great obstacle to long distance telegraphy.

Up to 1888 the only communication with the Province of Burma was by a line running down the Arracan coast as far as Taungup whence it crossed the hills into Prome. Following on the annexation of the upper province, it was found practicable to erect a line through the valleys of the Yu and Chindwin rivers and thence northward *via* Tamu and Manipur to Assam. This

line runs through a country, parts of which were almost unknown at the time of its erection. It proved of much value during the rebellion at Manipur in March 1891, when the Chief Commissioner of Assam and many other officers were murdered. In this outbreak the Department lost two of its officers, Mr. W. B. Melville, the Superintendent of the Assam Division, and Mr. James O'Brien, signaller, who were both murdered at Myankhoung, near Manipur. This line has proved a most valuable alternative route into Burma, and direct communication is maintained between Calcutta and Mandalay over about twelve hundred miles of as difficult and diversified a country as can well be imagined.

In 1878 Mr. J. W. Duthy, an officer of the Department, was lent to the Kashmir State for the purpose of constructing telegraph lines, which were subsequently handed over to the State. Native management however was such that the line could not be depended upon. In 1891 when the British frontier was extended to Gilgit, a reliable line was required, and the Telegraph Department was called on to undertake the task. The problem was a most difficult one, as the lines had to be maintained in good working order over the Tragbal and Burzil passes (the latter 13,500 feet above sea-level). Not only had the line to be of sufficient strength to resist the snow, but a route had to be chosen clear of the track of avalanches. To admit of the line being properly maintained and repairs effected, stations had to be fixed at frequent intervals. In these stations the staff pass the winter entirely isolated from the outer world. Mr. H. S. Olphert was put in charge of this very important work and for four years he and his staff were employed. Each working season the damage sustained during the preceding winter was repaired, and the experience gained utilized in improving the alignment, till by 1894-95, when trouble broke out in Chitral, a magnificent line existed from Murree in the Punjab Hills to Gilgit, nearly 400 miles in length, which proved of the greatest value. The maintenance of the line in winter still presents the greatest difficulty and danger. On the 14th January 1897 a repairing party was swept away in an avalanche with a loss of five lives. Again on New Year's Day, 1900, eight lives, including Mr. Scott, a signaller, were lost. Such accidents cannot be guarded against, and the lives thus lost are a portion of the price to be paid for the protection of the North-West Frontier.

Almost as difficult a task was the extension of lines on the Eastern frontier into Siam, though the difficulties encountered was of an absolutely different nature. In 1884-85 the Burma lines were extended from Tavoy down the valley of the Tenasserim river to the Siamese frontier on the road to Kanburi and Bangkok. The valley of the Tenasserim is in dense forest, practically uninhabited, and the sickness and fever that more than decimated the working parties practically stopped communication. The difficulties encountered in transport and cutting a track through the heavy forest were almost insurmountable, and it took several years before the line could be considered reliable. A shorter line which did not present equal difficulties was also erected from Moulmein to Myawaddy to meet the Siamese line from Raheng.

In 1894-95 a further extension on the Eastern frontier was made to Kentung, 197 miles east of Mone (the most easterly station in the Southern Shan States). A line of temporary material, uninsulated, was run up in May to July. Communication was maintained on this line during the rains with vibrating sounders. The work was of the most arduous nature, greatly due to the time of year at which it was undertaken. The staff suffered greatly from sickness, and Mr. G. Brace, Sub-Assistant Superintendent, died of fever contracted on the Salween river. This line was made permanent the following cold weather.

Sir William Brooke, K.C.I.E., retired in April 1895, having held charge of the Department since 1890. He, like his distinguished predecessor, Sir Albert Leppoc-Cappel, K.C.I.E., was one of the "Morse Assistants." Like his predecessor, he displayed exceptional merit and ability from the date he entered the department, a promise amply fulfilled by the success of his Administration.

The lines of the Department in Bengal, Eastern Bengal and Assam suffered greatly in the earthquake of the 12th June 1897. Two cables across the Brahmaputra river at Jogigopa, near Goalpara, and three cables across the Megna were destroyed, as also were the two large spans. A mast 68 feet high at the Teesta river crossing near Kaunia sunk into the ground till only 2 feet of the top was visible. Widespread damage was also done to the land lines and to offices, which disorganized the usual traffic arrangements for the time being. It was not possible to lay new cables over the Megna till the 29th of June nor on the Brahmaputra till the 17th of July, owing to the state of the rivers, and offices had to be opened on the banks of those rivers at which messages were transferred by boats.

In January 1899, Mr. C. H. Reynolds, C.I.E., who had held charge of the department since 1895, retired. He was the senior of the "nomination" officers, and entered the department in 1868. His service was one of great brilliance, his administration of the department was most successful, and by his retirement Government lost an exceptionally capable officer.

He was succeeded by Mr. C. E. Pitman, C.I.E., whose characteristic energy at once manifested itself by the introduction of various improvements. Amongst the most notable of these was the introduction of the Wheatstone automatic instruments on the Calcutta-Madras, Calcutta-Bombay and Calcutta-Rangoon circuits.

In May 1900 the Department came to the aid of the Great Indian Peninsular Railway by manning their offices on the occasion of a strike among the railway signallers, and thus prevented much inconvenience to the public.

Mr. Pitman was succeeded in May, 1900, by another "nomination" officer, Mr. F. G. Maclean, who in this, the Jubilee year of the Department was able to report that the earnings had exceeded those of any previous year by Rs. 5,70,000. Also that with the exception of the years 1897-98 (when owing to the disturbances on the North-West Frontier, the revenue from State messages was abnormally high), the percentage of net revenue on Capital outlay was the highest on record. An interesting evidence of the growth of

the Department is afforded by the following figures:—

Miles of line had increased	100 per cent. in 15 years.
" " wire " " " "	" 13 "
Number of offices " " " "	" 9 "
Number of private messages " " " "	" 10 "
Value of " " " "	" 13 "
Total number of paid " " " "	" 11 "
" value " " " "	" 14 "
" receipts " " " "	" 14 "
Working expenses " " " "	" 16 "

Early in 1902 negotiations that had been in progress since 1899 were brought to a successful issue, and the tariff between India and Europe was reduced from 48. (5 francs) to 2s. 6d. (31.25 francs) a word. At the same time the Government of India abolished the extra terminal charge on messages to and from Burma. In gaining this concession the Government of India undertook to guarantee the Indo-European and Eastern Telegraph Cable Companies' routes against loss for 10 years to a maximum extent of £45,000 a year.

The same year electric power was introduced into the workshops at Alipur, and a good many automatic and semi-automatic machines were installed at the same time. The Department made special arrangements in connection with the Delhi Coronation Durbar. Some 3,500 miles of wire for general and railway requirements and 138 miles of wire for local offices in and around Delhi were erected.

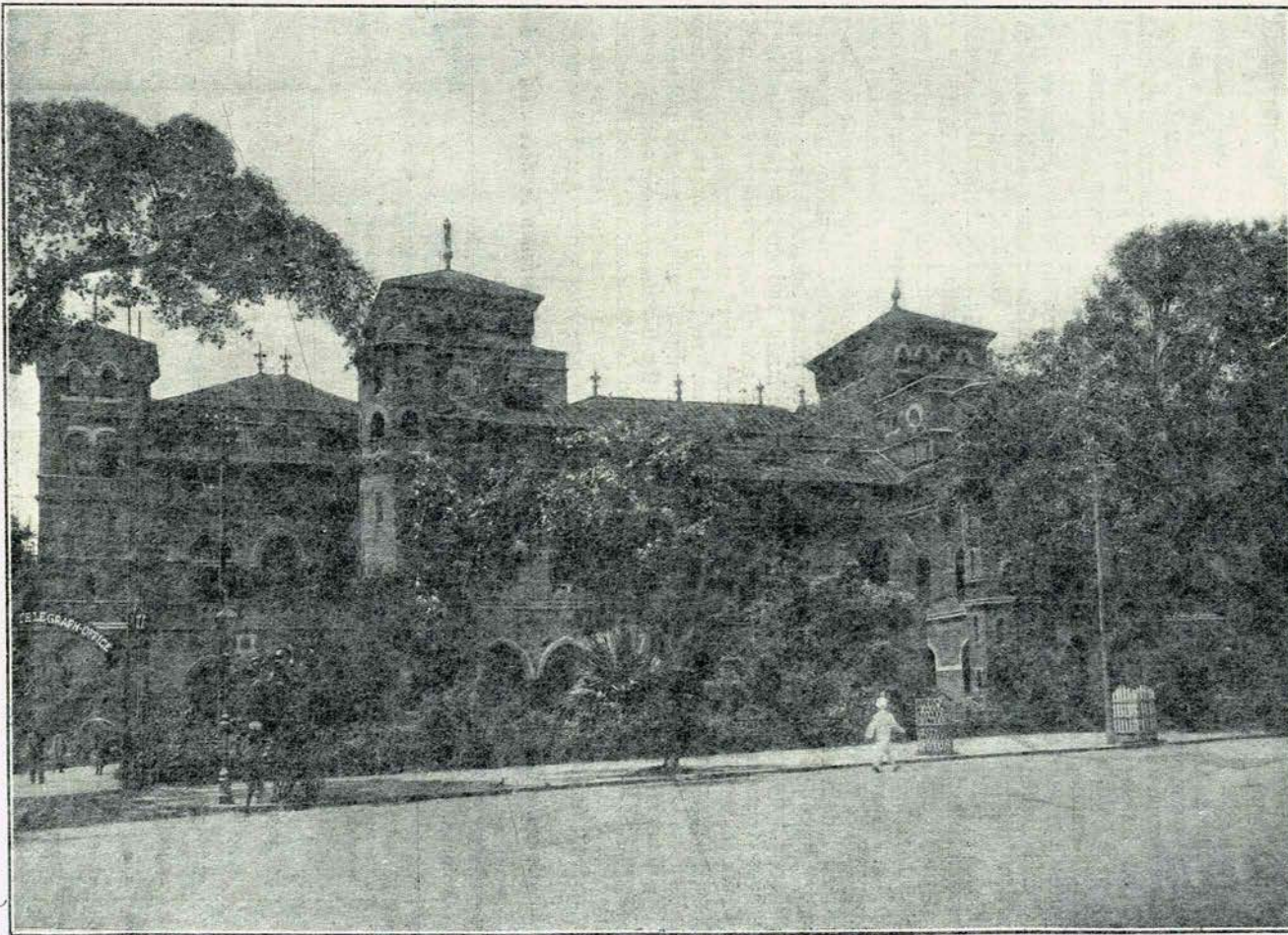
In 1903 a reorganization of both the Superior and Signalling and Upper Subordinate Establishments was sanctioned, which afforded some much-needed relief, and improvements in pay and prospects.

The same year saw the erection of another of the long frontier extensions from Nushki to Dalbandin, a line which runs through a desert, and the construction of which proved most trying to the endurance of the staff.

Wireless telegraph experiments, which had been started the previous year, were continued, and the practicability of establishing communication between Saugor Island and the Sandheads was proved.

In November 1903 Mr. F. G. Maclean retired and was succeeded by the present incumbent Sir Sydney Hutchinson.

The last three years have witnessed considerable progress. A printing system of telegraphing called Bandot has been introduced on some of the main circuits, and a world's record for distance with this system has been established. Wireless Telegraphic communication has been established between Diamond Island on the Burmese coast and Port Blair in the Andamans with a subsidiary station at Table Island. This latter has in consequence been converted into a Lloyd's signalling station. Wireless communication has also been established between Saugor Island and the pilot vessel at the Sandheads. Experience has shown that wireless work in the tropics have special difficulties to contend with, especially in the effect of atmospheric electrical discharges. These are so severe at certain times of the year as to disturb and occasionally prevent work being carried on. Communication was established with H. M. S. *Terrible*, *Renown*, and *Hyacinth* when they were in the Bay of Bengal. The *Terrible*



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reported that she had read the Port Blair signals at a distance of about 300 miles.

The introduction of the 4-anna telegram gives the Indian public the cheapest telegram in the world, when the great distances such messages are carried are considered. Consequent on its introduction there has been an enormous increase in traffic and corresponding increase in the wires erected to deal with it.

In the end of 1904, the Director of the Traffic Branch, Mr. T. D. Berrington, was sent on deputation to China to arrange a new convention for the working of the land line between Burma and Yunnan, *via* Bhamo, the former convention having expired in September 1904. Negotiations were satisfactorily concluded, and the revised convention came into force from the 1st June 1905. The rates between India and Burma on the one hand and China on the other were considerably reduced, the reduction ranging from 7 to 13 annas a word all round.

Considerable preparations had to be made to cope with the increase of traffic expected in consequence of the tour of Their Royal Highnesses the Prince and Princess of Wales in India. Nearly 1,200 miles of extra wires were erected, and wires were duplexed and Wheatstone's instruments installed in offices where a press of traffic was expected.

From the 1st March 1905 the control of the Telegraph Department was transferred from the Public Works Department under which control it had been since 1870, to the new Department of Commerce and Industry.

The Superior Establishment now consists of the Director-General, Deputy Director-General and 2 Directors, 2 Deputy Directors, 4 Chief Superintendents, 31 Superintendents and 58 Assistant Superintendents.

The Upper Subordinate Establishment consists of two grades of Sub-Assistant Superintendents, 36 in the 1st and 37 in the 2nd Grade. The Signalling establishment consists of 20 Traffic Sub-Assistant Superintendents, 2,658 Telegraph Masters and Signallers, 19 Unattached List Warrant and Non-commissioned Officers and 627 Military Telegraphists. There are in addition 2,554 postal employes. Of lower subordinates employed on construction and maintenance of lines, there are 360 Sub-Inspectors and 1,900 line riders, line men and spare and cable guards.

Volunteering has always been encouraged among the signallers, and there are now 902, of whom 837 are efficient or extra-efficient. Grants for prize money are made annually.

From time to time legislative powers have been taken by the Government with regard to the Telegraph Department. The first Telegraph Act for India was XXXIV of 1854. The Acts which have since been passed are VIII of 1860, I of 1876, XIII of 1885 and XI of 1888. These Acts deal with the privileges and powers of Government in respect to telegraphs, their authority to grant licenses for the establishment of telegraphs, and the regulations under which telegraphs are to be worked. They provide and regulate the powers of the department to place telegraph lines and posts on public and private lands, and declare penalties for infringement of licenses, and all other offences connected with telegraph lines and the transmission of telegraph messages. Rules and regulations for the acceptance, transmission and custody of telegrams are published from time to time in the *Gazette of India* and have the force of law.

The Government of India have also legislated for the supply and use of electrical energy throughout India, in the Electricity Act III of 1903.

The following Table gives the Capital, Revenue and Expenditure of the department in decennial periods up to 1890, for 1895, 1900, and the last five years.

	CAPITAL ACCOUNT.		REVENUE.			EXPENDITURE.			NET REVENUE (EXCLUDING INTEREST ON CAPITAL.)	
	Expenditure of the year.	Expenditure to the end of the year.	Messages.	Miscellaneous.	Total.	Construction (Capital).	Working (Revenue).	Total.	For the year.	To end of each year.
	£	£	£	£	£	£	£	£	£	£
1850-51	24,200	24,300	...	...	...	24,300	...	24,300	...	...
1860-61	333,210	6,493,660	624,520	3,140	6,227,660	333,210	1,394,040	1,727,250	- 766,380	- 2,212,980
1870-71	665,080	23,632,340	1,244,777	45,893	1,290,670	665,080	2,417,440	3,082,520	- 1,126,6770	- 10,204,610
1880-81	839,043	25,499,765	3,912,649	588,968	4,501,637	839,043	3,171,470	4,010,513	+ 1,330,167	- 9,380,687
1890-91	1,968,580	50,241,676	5,216,610	1,612,245	6,828,855	1,968,580	4,688,802	6,657,382	2,140,053	+ 5,707,995
1895-96	1,384,286	58,768,582	7,189,825	1,785,124	8,974,949	1,384,286	5,783,731	7,168,017	3,191,218	18,970,188
1900-01	3,259,337	70,923,416	9,460,119	2,038,563	11,498,682	3,259,337	7,084,371	10,343,708	4,414,311	37,023,939
1901-02	3,716,122	74,639,538	8,849,928	2,264,233	11,114,161	3,716,122	7,550,075	11,266,197	3,564,086	40,588,025
1902-03	4,929,177	79,568,715	8,807,474	2,433,408	11,240,882	4,929,177	7,934,730	12,863,907	3,306,152	43,894,177
1903-04	3,669,442	83,238,157	8,642,221	2,485,765	11,127,986	3,669,442	8,074,169	11,743,611	3,053,817	46,947,994
1904-05	4,122,392	87,360,549	8,929,399	2,668,498	11,597,897	4,122,392	8,203,715	12,326,107	3,394,182	50,342,176
1905-06	57,07,114	930,67,579	9,394,309	2,839,863	12,234,172	5,707,114	8,985,785	14,692,899	3,248,287	53,590,463



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At the present time the total Capital stands at £6,204,505 of which £380,474 was added during 1905-06. The message revenue is £626,287 and from miscellaneous sources £189,324, giving a total of £815,611. The working expenses are £599,052.

The subjoined table gives for the same periods the line and wire mileage, number of offices and traffic dealt with, Inland, foreign and free, with the revenue and charges per mile.

	NUMBER OF MILES.		Number of Signal Offices.	NUMBER OF MESSAGES.				VALUE OF MESSAGES.				REVENUE & CHARGES PER MILE.	
	Line.	Wire.		Inland.	Foreign.	Total.	Free.	Inland.	Foreign.	Total.	Free.	Revenue.	Chargess.
1851-52	82	82	6	..	..	..	..	£ 6,000	£ ..	£ 6,000	£ ..	72'29	64'82
1860-61	17,093	11,502	145	..	..	..	..	624,520	..	624,520	..	56'58	125'67
1870-71	13,534	22,834	197	510,341	67,020	577,361	3,873	973,978	327,567	1,301,545	45,350	95'37	178'62
1880-81	20,346	56,088	254	1,358,477	297,753	1,656,230	2,417	2,706,804	1,182,436	3,889,240	46,498	221'25	155'87
1890-91	37,070	113,763	949	2,917,464	489,636	3,407,100	2,561	3,509,395	1,664,611	5,174,006	45,839	184'3	126'59
1895-96	46,374	143,188	1,461	4,094,937	641,797	4,736,734	3,189	4,736,983	2,338,616	7,075,599	114,226	193'53	124'72
1900-01	55,955	182,179	1,939	5,549,395	899,977	6,449,372	12,906	6,710,842	2,557,051	9,267,893	192,226	208'85	128'67
1901-02	55,827	192,887	2,006	5,566,951	908,594	6,475,545	12,460	6,225,806	2,465,890	8,691,696	158,232	199'08	135'08
1902-03	56,830	200,533	2,051	5,840,658	901,436	6,742,094	12,105	6,523,706	2,101,052	8,624,758	182,716	197'79	139'62
1903-04	59,692	212,330	2,127	6,393,787	913,300	7,307,087	11,303	6,370,537	2,168,608	8,479,145	163,076	186'42	135'26
1904-05	61,684	227,749	2,189	8,082,904	1,015,441	9,098,345	10,960	6,427,748	2,382,861	8,810,609	118,791	188'02	132'99
1905-06	64,730	243,840	2,309	9,354,282	1,106,834	10,461,116	18,689	6,930,550	3,315,802	9,246,352	147,957	189	123'2

Of the offices 280 were departmental and 2,029 combined. Of the 243,840 miles of wire, 153,492 miles are in departmental use, the remainder is rented to canals, railways, etc. There are in addition 347'66 miles of cables.

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TRAFFIC.

When the telegraph system was first thrown open for the use of the public on the 1st of February 1855, the lines were uninsulated and only carried one wire, while there were but 3,255 miles of line, 3,314 miles of wire and 48 offices open. The value of the traffic disposed of was Rs. 24,050 State messages and Rs. 40,760 private, a total of Rs. 64,810. During the first six months the system was open, 9,971 messages were despatched, of which 1,438 were sent on State service. Of the remaining 8,533 messages, 2,864 were sent by natives. The cash receipts were Rs. 60,534-7-0. It is remarkable to notice how from the very first the wires were used by natives, and what is equally interesting is the fact as recorded by Sir W. O'Shaughnessy, that "not only do they use the lines for financial business, but on the very most delicate and secret matters affecting family arrangements, betrothals, marriages, and other domestic affairs, of which they treat with an absence of all disguise which is almost beyond belief."

As has been mentioned in the first part of this article, an experimental line from Calcutta to Kedgerie and Diamond Harbour was erected in 1851-52, over which the public were permitted to send messages. The tariff then charged was as follows:—To any station on the Diamond Harbour line, four annas for each word of not more than two syllables, and one anna for each additional syllable. To any station beyond the

Hooghly on the Kedgerie line double these rates were charged. When the system was thrown open to the public, a charge of one rupee for sixteen words per zone of 400 miles of telegraph line was made. This tariff remained in force until April 1859, when it was altered, the alteration being that the *direct distance* was charged for. Coincident with the opening of the telegraph system to the public was the receipt of complaints regarding delay, non-delivery and inaccuracy, and from the very first special attention has always been paid to this, every complaint receiving attention. Sir W. O'Shaughnessy in his reports on this subject draws attention to the fact that similar complaints were rife in England and in America, and mentions that in England it was possible to *insure* against losses incurred through telegraphic blunders or delays. The signalling establishment was enlisted on the spot to commence with, and the conditions of service are so dissimilar from other work, that it can hardly be surprising that a very large number of the lads employed proved useless, and Sir W. O'Shaughnessy reports "of every ten persons we employ on trial, we consider ourselves fortunate indeed if two or three are found to possess the qualities and habits essential for the duties of the Telegraph."

During the year ending 31st March 1856, fourteen months after the opening of the system to the public, 574 miles of line wire were erected and the revenue rose to Rs. 2,31,380.

By October 1858 the Morse instruments had displaced the needle instruments nearly all over India, and the system of reading by sound was established as by far the best, and it is noted that "Mr. Hills, at Mysore, can receive 40 words per minute spelt in full," a very high rate even now.

A notable change was introduced in May 1858 in the treatment of Service, *i.e.*, State messages. Up to that date they were sent free, and the privilege had been abused. From that date they had to be prepaid, and the right of priority of transmission was cancelled except in cases of special and indisputable emergency. The effect of the change was apparent at once. In March the value of Service messages was Rs. 28,738-9 and in June Rs. 6,449-14, a result that needs no comment.

In April 1859 the tariff was changed in two important particulars. First, the distance by the map and not the telegraph line was charged, the rate still remaining one rupee for 16 words for 400 miles.

Further the rates for messages exceeding the 16-word unit were :—

16 words	Rs.	1	0	0
17 to 24 "	1	8	0	
25 to 32 "	2	0	0	
33 to 48 "	3	0	0	
49 to 64 "	4	0	0	

} for 400 miles.

So that one additional word above the limit of the group caused the next higher rate to be charged. The sensible change was made of charging 1 anna a word per 400 miles over the 16-word unit group. The effect of this may be judged from the fact that a 33-word message from Calcutta to Bombay (charged as 1,200 miles) cost Rs. 6-3 instead of Rs. 9. The effect of the change was to render the Indian Telegraph Tariff cheaper than that prevailing in any other country, and the immediate effect was a large rise in the number of telegrams despatched.

The same year a school for the instruction and training of signallers was opened at Coonoor in the Nilgherries for lads of European and Eurasian parentage. After passing out from the training school they spent two months in the departmental workshops in Bangalore, where they went through a course of practical work regarding repairs and adjustment of instruments and were then taken on in the department under an indenture for five years. This school only remained open for one year, being closed in 1860. The following February four training classes were opened at Barrackpore, Meerut, Madras and Bombay.

The year 1859-60 saw the introduction of telegraph stamps, one object being to enable persons residing at places where there were no telegraph stations to send their messages prepaid by post to the nearest telegraph office. Telegraph stamps were supplied to all treasuries and stamp offices. In his final report before relinquishing charge of the department he had created, Sir W. O'Shaughnessy prophesied only not that the lines would yield a clear profit, but that a uniform charge for messages may then be adopted for all India. He expected this to occur sooner than it actually did, but that it did not occur within the "two or at most three years" was largely due to the absence of his own strong personality.

In May 1860 the Red Sea cable, which had been opened for the transmission of Indian telegrams on the 1st November 1859, failed. During the time it was opened, only 344 messages of the value of Rs. 18,514 were transmitted by it from India.

Complaints about errors and delays still continued, and as it was found that most mutilations occurred in the names of natives, several native senders were in the "habit of adopting familiar English names, such as Peter, Dr. Green, Grant, John, etc." In order to ensure a closer check on the messages sent, a new branch of the "Complaint" Office, called the "Fault" Branch, was opened, its function being to examine messages regarding which complaint had *not* been made. In order also to afford a check on the speed of transmission, a register of the maximum and minimum time intervals on the main routes was instituted, and the results were made public.

In March 1862, messages of European public news received by the Overland Mail was accorded precedence of transmission over private messages, and later on in the year this priority of transmission was extended to all Press messages of European news, irrespective of the channel through which they reached a telegraph office. This privilege was accorded on the understanding that the whole message was published immediately after receipt and that no use was made of the news before publication.

In January 1866 an important change in the tariff was introduced. For the first 20 words the charge was eight annas per 100 miles, one rupee for 200 miles, and one rupee eight annas per 400 miles.

The same year the state of communications to India were so unsatisfactory that it formed the subject for a Parliamentary Commission, and according to the evidence given before it, the Indian signalling staff "were then deplorably ignorant and thoroughly incompetent," and Colonel Robinson's energies were devoted to improving this unsatisfactory state of affairs. He introduced a new method of grading the men, and gave them good prospects, permanent service, and regular treatment. The hours of duty were reduced to 8 hours daily, and various minor concessions were given, with the result that the service was greatly improved.

In October 1868 the tariff was again altered, the charge being one rupee for ten words irrespective of the distance, a very bold measure, and one which was premature; the more so as there was a heavy loss on the total working of the department. It is interesting to note that in the year 1869-70 six offices, *viz.*, Karachi, Bombay, Calcutta, Galle, Madras and Rangoon, disposed of 84.15 per cent. of the total traffic of India, and the value of these messages was 99.76 per cent. of the total message revenue. This affords a proof of how little the telegraph was used outside the main seaports, and is therefore not to be wondered at that out of 187 offices no less than 160 were worked at a loss. The department had been extending so much that in 1869 a Director of Traffic was appointed, under whom all the offices and signalling establishments were placed. The appointment was much needed, as the Director-General and his Deputy could no longer deal with the transactions of the entire department. The appointment of a Director of Traffic was the more necessary after India

had taken her place among the International administrations, and her lines formed integral links in the lines of communication to the Far East. In 1870 a further concession in the tariff was made, namely, of allowing three words to count for one in the address. The object of this was to encourage the public to use fuller addresses, and so prevent the mis-delivery and mis-carriage of telegrams. This concession did not prove successful, and in January 1872 the tariff was altered to a charge of one rupee for six words, the *address being free*, irrespective of distance. An extra 50 per cent was charged for messages to Burma and Ceylon. On the same date a further concession was allowed to all *bonâ fide* Press messages. In order to induce natives to take full advantage of this low uniform rate, by which a message could be sent from or to any station in India for one rupee, notices were posted up in all but Presidency offices, that native messages would be translated free of charge for all persons unable to read or write English.

There had up to this time been considerable difficulties with the various Railway administrations, who had competed with Government; but it was now arranged that messages could be accepted at any railway station for a Government office and *vice versa* at the above rate. Also a start was made to connect by wire the Government with the railway telegraph office, where there were both in the same station. The new tariff, though there was an increase in the number of messages, did not prove very successful, for while the number of private inland messages increased 100 per cent, the revenue only showed an increase of 11.43 per cent in three years. This was less than might have been expected under the previous tariff with normal expansion.

A general examination in educational and technical subjects of the Signalling Establishment was held early in 1870. The results of the examination proved that the staff as a whole possessed a very creditable amount of knowledge. One hundred and ten prizes were given, in addition to promotion to higher grades. Instruction of military telegraphists was extended and classes were opened in 38 offices. The following year some signallers were taken on in Madras on what was called the "local" scale, for service within the limits of the Madras Presidency. In consideration of their immunity from general service, they were paid considerably less than the "general" scale signallers.

A privileged rate for *bonâ fide* Press messages was introduced in 1873, and it is curious and interesting to note that only 2,375 were sent. The concession cost the department Rs. 44,188-12, being the difference between the ordinary and the new Press rates. That same year the *London Daily News* paid one-tenth of the entire amount spent by the Indian Press during the year, over one telegram containing information from the famine districts. Next year saw the practical introduction of duplex telegraphy on the long main routes, which for anything but short lines had proved very difficult to establish. It is to Mr. Schwendler's industry and inventive genius the difficulty was overcome. The practical result was doubling the message-carrying capacity of the wires.

On the 1st April, 1880, several changes were introduced in the tariff. The extra rate between India and British Burma was abolished, as was also the extra charge for messages sent at night and on Sundays and certain holidays. The double charge for cipher was abolished and letter cipher was declared inadmissible. Press messages were charged one rupee per 24 words by day and one rupee for 36 words by night.

The next important change was introduced in January 1882 when telegrams were specified as "deferred," "ordinary" or "urgent," the first class being despatched at half the ordinary rates and the urgent at double those rates. In addition "local" messages were introduced at a tariff of 4 annas for six words intended for places within six miles of a telegraph office. It was at once apparent that the "deferred" class of messages met a public want, and was at once largely used by native senders.

In order to increase the carrying capacity of the wires, an endeavour was made to introduce Wheatstone's automatic transmission, but it was found that the instruments were unsuited for the country. Their introduction was deferred till the year 1900 since which date they have been in general use. Quadruplex telegraphy was also tried, and was introduced between Madras and Bombay in January 1887, but did not prove very satisfactory, the distance, combined with climatic effects, operating against its stability.

The usual quinquennial International Conference was held at Berlin in 1885, and India was represented by Colonel Sir J. Bateman-Champain, R.E., Director-in-Chief of the Indo-European Telegraph Department, and Mr. C. H. Reynolds, a Superintendent of the Indian Telegraph Department. Many improvements and simplifications in the rules for International messages were effected, together with a reduction in the rates. Between India and the United Kingdom the rate was reduced from Francs 5.60 to Francs 5 per word, or from 4s. 7d. to 4s. The international tariffs are all fixed in francs in gold, and the continued fall in exchange prevented India from benefiting by the reduction.

The next Conference was held in Paris in 1890.

An International Conference was held at Budapest during June and July, 1896, and the Indian representatives were Messrs. P. V. Luke, C.I.E., Deputy Director-General, and B. T. Finch, C.I.E., Director-in-Chief of the Indo-European Telegraph Department. Forty-three Government administrations and twenty-seven cable companies were represented. Substantial reductions were made in the rates between India and East and South Africa, including Mauritius; also between India and the Straits, China and Japan. An increase in the length of a permissible word in telegrams wholly in plain language was made, 15 letters being allowed as a maximum instead of 10. Also the number of figures and signs permissible as one word when written in series was increased from three to five.

It had long been recognized that many advantages could be obtained from the use of accumulators in working telegraph circuits, and as an electric light installation in Bombay had been established in 1897 and power for charging the accumulators was therefore available, a start was made there in 1899 with 100 cells and proved very satisfactory. Accumulators were shortly

afterwards installed in the Calcutta and Madras offices, and every year since has seen an increasing number of offices fitted with oil engines and dynamos for accumulator working. This is a very important advance, and has resulted in much economy of space and material, for the increased work required from the lines required such large numbers of galvanic cells that space could not readily be found for them.

In 1900 Wheatstone's system of automatic telegraphy was introduced between Calcutta and Bombay, Calcutta and Madras, and Calcutta and Rangoon. Owing to the inexperience of the operators in preparing the tapes by punching, a good deal of difficulty was at first experienced, but the speed at which the instruments work enables large blocks of traffic to be disposed of very rapidly. It was found this year that the time intervals had greatly increased, and it is interesting to note that both want of rain and floods were influencing factors. On the desert lines between Deesa and Karachi the insulators get caked with damp salt, dust and sand, which cause so great a drop in the insulation that work is occasionally brought to a standstill. As soon as rain comes and washes the deposit off the insulators, work immediately improves. On the other side of India in Eastern Bengal floods caused immense damage, and the interruptions thus caused were very prolonged owing to the impossibility of moving about.

The Coronation Durbar at Delhi called for very special arrangements, some 2,800 miles of extra wires being erected to carry the heavy traffic expected. Ten local offices were opened in Delhi itself and a staff of some 300 men were employed there. There were 63 Press correspondents, including 9 for Foreign papers. His Excellency Lord Curzon's speech at the opening of the Durbar was telegraphed *verbatim* to the London Press, the first time in the history of the Department of a speech being so telegraphed.

In 1903 the signalling staff of the Department was reorganized and their pay and prospects considerably improved. The same year witnessed the first systematic experiments in wireless telegraphy between Saugor and the Sandheads.

An International Telegraph Conference was held in London in 1903 at which the representatives of India were Mr. H. A. Kirk (Director-in-Chief, Indo-European Telegraph Department), Mr. (now Sir Sydney) Hutchinson, Director of Telegraphs, and Mr. I. C. Thomas. The principal changes introduced were: the admission as one word of the name of the office of destination, irrespective of the actual number of words comprised, including, when necessary, the name of the country or territorial subdivision: the abolition of the *official vocabulary* as the sole source from which words admissible in code telegrams could be taken; the admission in private telegrams of letter cipher, which had hitherto been restricted to the State telegrams: the abolition of a limit to the amount payable for a telegraphic reply. In addition the rates between Australia and certain countries in the East and Far East were reduced to a uniform rate of Francs 3.125 or Rs. 1.14.0 a word. The previous rate was Rs. 3.8.0 a word.

In January, 1904, the long-talked-of "4-anna" telegram was introduced, and at the same time Press rates were largely reduced. In order to cope with the

increase of traffic expected, a large number of extra wires had been erected, and during the first three months in which the new tariff was in operation, the traffic rose nearly 26 per cent, with a rise in value of 4.87 per cent.

Wireless Telegraph experiments were continued in 1903-04, and communication was established between Elephant Point, at the mouth of the Rangoon river, and Amherst, a distance of 85 miles.

An improved system of technical training of signallers was introduced the same year, providing for systematic training of selected men by the electrician and his assistants.

In September, 1904, an International Electrical Congress was held in St. Louis in the United States of America, to which all Governments were invited to send representatives. India was represented by Mr. J. C. Shields. One of the principal results of the Congress is that efforts are being made to secure International agreement in the nomenclature and determination of electrical units and standards. In July, 1904, the Eastern Telegraph Company reduced their rates on the section Aden to Bombay on telegrams to Africa. The Indian Government also reduced their terminal rates on the same class of traffic, which have the effect of reducing the rates to Africa by about 12 to 15 annas a word all round.

The influence of the "4-anna" tariff on inland traffic for its first year of working was very marked and showed an increase over the former year (1903-04) of 30.66 per cent in number with an increase of revenue of 7.68 per cent. The average value of an inland telegram fell at the same time by 2.3 annas. A further effect has been a large increase in the number of abbreviated addresses. At the close of the official year 1905-06 there were altogether 6,723 telegraph offices in India and Burma open for paid telegrams of the following description:

Departmental	..	..	280
Combined postal	..	..	2,029
Railway	..	..	4,403
Canal	..	..	11

In August, 1905, the rate for ordinary telegrams between Europe and India was reduced to 2s. a word.

A change was also made about the same with regard to the 4-anna telegram, allowing ten words including the address to be sent for that charge.

At the close of the year there were 82 offices at which delivery of messages was effected by cyclist messengers. Towards the close of 1905 six lead sheathed paper-insulated cables, each containing 20 conductors, were laid, underground, in bitumen across Dalhousie Square in Calcutta. This is the first time telegraph cables have been laid underground in the tropics, and should time prove the experiment to be successful, there is little doubt many more will be laid in large cities to avoid the inconvenience always occasioned by overhead lines.

Allusion has been made in the beginning of this article to the difficulties of maintaining communication in Bengal, and the year under review affords a notable instance, as four cables across the Brahmaputra suddenly failed, (a large whirlpool appearing near the cable cross-



ing,) causing much congestion on the lines into Burma and Assam.

The following table shows the work and its value, disposed of by combined offices for the past five years :—

Year.	No. of combined offices.	No. of paid Telegrams.	Value of paid Telegrams.	Percentage of total message revenue.
1901-02	1,765	2,697,047	2,456,980	29.07
1902-03	1,806	2,711,595	2,426,330	27.5
1903-04	1,859	3,040,257	2,512,935	29.08
1904-05	1,917	4,024,140	2,670,101	29.9
1905-06	2,029	4,717,436	2,920,437	30.3

Of inland traffic 80.41 per cent is classed "deferred," 14.47 per cent is "ordinary," and 5.12 per cent "urgent."

The percentage of value of the above is 55.1 per cent "deferred," 26.51 per cent "ordinary," and 18.39 per cent "urgent."

A class of traffic that shows a continuous increase is that of telegraphic money orders. The number and amount of the revenue earned under this head has risen from 174,873 to the value of Rs. 1,74,878 in 1901-02 to 214,002 with a value of Rs. 2,00,232 in 1905-06.

The average value of an "urgent" private inland message is Rs. 2.2, of an "ordinary" Rs. 1.2 and of a "deferred" Rs. .61.

For a good many years certain telegraph offices have been also meteorological observation stations; there are now 45 of them.

The following is a brief summary of the tariffs between India and Europe. Through communication between India and Europe, *via* Karachi and the Persian Gulf, was established on the 27th January 1865, and the cable route from Bombay *via* Aden and Suez was opened in the spring of 1870. The original tariff was £5 or Rs. 50 for 20 words, which was reduced in 1868 to £2 17s. 6d. or Rs. 28.5 for 20 words. In 1871 this tariff was raised to £4 10s. 3d. or Rs. 45 for 20 words. In 1875 a word rate was established at Francs 5.50 *via* Suez or *via* Teheran and Francs 5 *via* Turkey. These rates were reduced in 1885 to Francs 5 and 4.50 respectively. From the 1st March 1902 the rates *via* Teheran and Suez were reduced to Francs 3.125, or 2s. 4d. per word, and from the 1st January 1903, the rate *via* Turkey was further reduced to 2s. 3d. a word. Since the 1st August 1905 the rates have been reduced to Rs. 1.6 *via* Turkey and Re. 1.8 *via* Teheran and Suez.

Between India and Australia the rates were reduced from the 1st June 1903 to Francs 3.125, or Rs. 1.14 a word. The former rate was Francs 5.7708 or Rs. 3.8 a word, with an additional charge of two annas a word on messages to and from Burma.

FIELD TELEGRAPHS.

No history of the Telegraph Department, no matter how brief, would be complete without reference to the part it has played in the many expeditions that have

taken place on the Indian Frontiers. Space does not however permit of any but the briefest summary being given here of the field operations. Reference has already been made to what was done during the Mutiny, and for several years after that the Department was not called on for any field wires. In 1861 the Department supplied material and wires for the Abyssinian campaign. The lines were erected by the Bengal engineers, and the Indian telegraph staff only supervised the lines and offices. In the same year a short line was erected into Hazara. In connection with the Bhutan Expedition in 1865 a light line was run up from Cooch Behar to Buxa. In neither of these cases was there anything of special interest.

In 1871-72 lines were extended into the Lushai Country, and Mr. C. E. Pitman was placed in charge of the party, entering the Lushai Country from Silchar. The only special stores used were an insulator for fixing on trees and later on light copper wire. The whole of the country met with was covered with dense jungle, through which a track for the wire had to be hacked, and the difficulty of the work was enhanced by the want of transport and sickness. The line was erected to Tapai Mukh by Xmas 1871, and a short line with copper wire was taken 14 miles further. The lines were all dismantled by the end of March. In conjunction with the advance from Silchar a line was run up from Chittagong, under Mr. Flindell. The line first went on the bank of the Karnafulli river and thence through the hills to Demagiri. The difficulties of transport labour and supplies were increased by general sickness and a severe outbreak of cholera. It is noteworthy in this expedition that the enemy did not cut the wire once. In November 1875, a small party under Mr. G. L. Towers was sent to Penang to establish and work the telegraph in connection with the field operation in the Straits Settlements. In all 27 miles of line were erected with five offices, and the little expedition proved quite successful. Two years later in 1877 an expedition was sent against the Jowakis. Only some thirty or forty miles of wire were erected. The interesting feature of this campaign was that the wire was used in conjunction with the heliograph.

The following year, 1878, saw the commencement of the Afghan Campaign, in which for the first time field telegraphs were really extensively used. Telegraph parties were to accompany each of the columns, operating from Jamrud *via* the Khyber Pass, Thull *via* the Kurram and from Quetta. These parties were placed respectively under Mr. P. V. Luke, Mr. Joseph and Mr. Pitman, the latter of whom was at Quetta, having recently erected the line to that place from Jacobabad. As a preliminary, wires had to be erected from Peshawar to Jamrud, and from Kohat to Thull, and this was entrusted to Mr. Nigel Jones, who ran them up very rapidly. By the time the Treaty of Gundamuck was signed, the line had been extended up the Kurram for about 170 miles from Kohat to Karatoga, close to the Shuturgardan Pass. Incessant trouble had been caused by wire cutting, the enemy cutting the wire, burning the posts and doing all the damage they could think of. The lines worked well whenever they were given a fair chance, and on the single wire 284 messages a day were disposed of on the average.

On the Khyber side the sappers laid the wires with the advance of the troops, and Mr. Luke was not permitted to advance up the Khyber till after the fall of Ali Musjid, the reason for the delay being, the fear of the wire being cut by the Afridis. Permission to advance was given the day before Xmas, and the line reached Ali Musjid on the 29th December. It worked perfectly for two days, and it was thought that the wire cutting propensities of the Afridis had been exaggerated. Next day in broad daylight, however, the wire was cut $2\frac{1}{2}$ miles from Ali Musjid, a few yards away from a friendly police post, and 100 yards of wire were stolen. The line was immediately repaired, but was cut again the same night, the Afridis carrying off some 5 miles. The enemy having thus given clear evidence of their intentions, it was decided *not* to repair the line, and in the meantime an extension was made to Lundi Kotal. The inconvenience of not having communication through the Pass was serious, and as it was hoped the tribes would settle down, the break was repaired. The line was next erected to Dakka and then on to Jellalabad. The cold experienced in working in and beyond the Khyber was intense, and the down country men employed on the working parties suffered severely. The line was eventually erected into Gundamuck on the 24th April. The Afridis in the rear had not been idle and wire cutting was of nightly occurrence, and as it was not considered advisable politically to take too much notice of the offence, the Telegraph Department went on supplying the Afridis with wire for months. An interesting incident showing the value of telegraphic communications was that the telegram from Sir Louis Cavagnari to London, announcing the signature of the Treaty of Gundamuck, was handed in to that office at 5 P.M., and the reply to it was timed London 6-30 P.M. of the same day. With the withdrawal of the troops, the lines were dismantled, and the heat proved even more trying than the cold in which the lines had been erected. Cholera later broke out and increased the troubles the party had to bear, but every yard of wire was brought back in safety. On this section 107 miles of line and 117 of wire had been erected: the wire had been cut 98 times, and 60 miles of it had been stolen. The interruptions caused by wire cutting aggregated 49 days in the six months the line was working. The traffic on the single wire, especially during the withdrawal, was very heavy, and called for extraordinary exertions from Mr. Luke, his assistant, Mr. Duthy, and the staff. Over 30,000 messages were disposed of, Lundi Kotal office alone accounting for over 6,500.

The difficulties encountered by the Kurram and Khyber parties in the way of transport, great though they were, were less than those which Mr. Pitman at Quetta had to surmount. All the stores had to be brought by road from Sukkur on the Indus, through the Bolan Pass up to Quetta, just at the time when the demands for transport for military supplies were at their maximum. In spite of the unflagging exertions of Mr. Pitman and his staff it was impossible to get the line up to Chaman, just beyond the Khojak Pass till the 22nd February. Considerable difficulty was experienced in taking the line over the Pass, owing to the steepness of the slopes and their rocky nature. The party also suffered severely from cold. The line was extended into

Kandahar on the 31st March, a fine performance as the last 77 miles were erected in sixteen working days. Curiously enough, there was only one case of wire-cutting between Chaman and Kandahar.

By the time the Treaty of Gundamuck was signed, 420 miles of line and 20 offices had been opened by the three columns. For the first time, military telegraphists were employed in the field offices, and their great value for this work was fully established.

For the first time also the great value of the wire along the lines of communication was realized and the necessity for having a regular organization and equipment was proved. The value of the services rendered by the Department and its officers were fully recognized, and Messrs. P. V. Luke and C. E. Pitman received the decoration of the Indian Empire, which Order had just been created.

Before arrangements could be made to revise the equipments for field telegraphs, hostilities again broke out consequent on the murder of Sir Louis Cavagnari in Cabul in the early part of September 1879. At this time Mr. Pitman was at Quetta, Messrs. Joseph and Reade on the Kurram, and Mr. Duthy on the Khyber, and in anticipation of an advance, supplies had been accumulated at Karatoga in the Kurram and Dakka beyond the Khyber. General Roberts was at Kushi beyond the Shuturgardan, and every effort was made to push on the wire to him, but it did not reach that place till the troops were moving on to Cabul. Neither escort nor transport for the telegraph party could be spared, so Mr. Joseph had to return to the Shuturgardan, having a narrow escape of being cut up by the enemy on the way. The enemy then set themselves to destroy the line on both sides of the Shuturgardan, and by the 12th October it was found impossible to maintain communication with India. Finally, on the 20th October, Mr. Joseph received permission to go ahead, and leaving the wrecked line behind him, he accompanied Dr. Bellew to Cabul, arriving there on the 26th October. Next day he started erecting a line towards the Khyber and, finally, joined hands with Mr. Luke at Jagdallak on the 19th November, thus establishing for the first time telegraphic communication between Cabul and India.

The siege of Cabul commenced on the 14th December, Messrs. Luke and Kirk, who had been sent up to assist, being there at the time. All the important posts within the Sherpur Cantonments were connected by telegraph. The enemy were dispersed on the 23rd December, and the wrecked line was immediately reconstructed. The field lines back to our frontier were dismantled in June 1880.

On the Quetta side Mr. Pitman, who had taken furlough, had been replaced by Mr. R. Boteler. A short line was run up to Kach, 45 miles from Quetta, and 9 miles of line had been constructed to accompany the troops moving from Kandahar to Girishk, when the disaster at Maiwand occurred. This line had to be abandoned when the troops returned to Kandahar, and was completely destroyed. As soon as the siege of Kandahar commenced, all important posts were connected by telegraph, and in addition a telephone line was erected between the signal tower and the north-west bastion and was used for directing the fire of the guns. Four lines of wire entanglements were also carried completely round the

city. When the siege was raised by Lord Roberts, the line between Kandahar and Chaman, which had been completely destroyed, was repaired. Messrs. Boteler and Pinhey were in Kandahar throughout the siege, and the value of their services was acknowledged by Government.

In connection with the military operations of the Kandahar Field Force, a railway was constructed between Ruk and Sibi, and when the railway works were pushed on up the Harnai Pass, a temporary telegraph line was erected along the route, and was extended to Quetta *via* Kach. The greater portion of this line was destroyed by the tribes after the defeat at Maiwand.

In consequence of the murder of Mr. Damant, a Political Officer, in October 1879, an expedition was sent against the Nagas. A line was run up to Golaghat and subsequently to Kohima and Chukka. The party was under Mr. W. J. Browne, and great difficulty in procuring labour and transport was experienced. In this small expedition, field post offices in each telegraph office were established.

Great demands were made on the Department in connection with the expedition into Upper Burma in October 1885. There were existing lines and cables in the country, but they were found to be in such bad order that wholesale reconstruction had to be undertaken. The lines were maintained between Prome and Mandalay along the Irrawaddy, and the Lower Burma line was extended from Tounghoo to Myingyan, and thence on to Yamethin. The wire was constantly cut by dacoits and much difficulty was experienced in maintaining communications. There were military operations throughout the greater part of the new province for some time, and in the meantime the telegraph system was steadily developed, as each portion of the country came under our control. Messrs. C. P. Landon, C. F. H. Maclean and R. C. Barker were specially mentioned by Government in connection with these lines.

In 1888, the Department was again called on for field work in connection with expeditions into Sikkim, Hazara, and the Chin Hills. The Sikkim lines were erected by Mr. W. H. M. Hare and were remarkable for the altitude which the lines reached. In all 105 miles of line and 12 offices were opened, including an office at Bhutong, at an elevation of 13,500 feet. The offices were worked almost entirely by Military Telegraphists who, together with the construction party, underwent considerable hardships.

In September 1888, field lines were commenced in connection with the expedition into Hazara from Abbottabad to Oghi. Early in October, the lines were extended with the advance of the troops to the Black Mountain. The campaign lasted, roughly, two months, during which 158 miles of line and 48 miles of cable were laid by the Department, in addition to 38 miles of line and 8 miles of cable by the Bengal Sappers and Miners. In this campaign the specially devised equipment for field telegraphs was used for the first time and proved very successful. Field cable laid on the ground was also used for the first time and proved of the utmost service. Mr. R. C. Barker, who had already been favourably noticed by Government for his services in Upper Burma, was in charge of the field telegraphs, and received the decoration of the C. I. E., being the

first of the Telegraph officers appointed from Coopers Hill to receive that reward. The services of Mr. A. D. Hill were also specially brought to notice.

The Chin Expedition was a small one involving the erection of 70 miles of flying line and three offices. The whole party suffered a great deal from sickness.

The following year 372 miles of line were erected and 28 offices opened in connection with the Chin-Lushai Expedition. Two columns of troops were sent in to the Chin country, and two minor parties worked in conjunction with the larger ones. The first column under Genl. Tregear started from Demagiri in October 1889 with Mr. E. O. Walker in charge of the telegraph party. Offices were opened at Lungleh, Fort Tregear, and the line was extended to the Upper Koladyne by the end of March 1890, 104 miles from Demagiri. The difficulties met with were very great and the entire party suffered much from fever, and eventually Mr. Walker's health broke down and he had to proceed on leave. His services were prominently brought to notice and he received the decoration of the C. I. E.

The second column started from Pauk on the Yaw River, not far from the Irrawaddy, under General Symons (who was subsequently killed at Glencoe in Natal shortly after the outbreak of the South African War). The telegraph party was under Mr. F. E. Dempster. The actual base of the expedition was Kan on the Myitta River, 85 miles from Pauk, and a line had first to be erected to that place. The party suffered severely from sickness, and in two months lost a European (Mr. Cress), one lineman and twelve coolies by death and two Europeans, five linemen and sixty coolies sent back sick out of a party of about 130, all told. Mr. Mercer was subsequently attached to the party. The line reached the objective, Haka, on the 15th February 1890. In all 192 miles of line were erected and six offices were opened.

Mr. Elrington had charge of the third party and erected two lines, one from Kalembo to Fort White, 37 miles, and from Kalembo to Sihaung, 36 miles. Much trouble was caused on these extensions by sickness and to wire-cutting by the Chins, who out of the total length of 37 miles on the Fort White line carried off 25 miles of wire.

The fourth party started from Jhalnacheria in Sylhet, but sickness was so incessant that the party had to be withdrawn, 80 per cent of the men being ill. Work was again resumed in the autumn and the line was extended to Changsil Bazar, 44 miles, and thence another 14 miles to Fort Aijal. Messrs. J. W. Hensley and H. T. Pinhey were in charge. The same cold weather the Chin-Lushai lines to Fort Tregear and to Haka were thoroughly overhauled and repaired. Sickness was again very troublesome, and one officer, Mr. Hudson, was invalided, and Mr. Rector, Sub-Assistant Superintendent, died.

A further expedition was sent in 1891 to the Black Mountains, and 108 miles of line were erected and 25 field offices opened. Mr. Barker, C.I.E., was in charge with Mr. I. C. Thomas to assist him. The weather was very wet and trying, but the telegraph lines worked most successfully.

Mr. Oldbury Burne constructed 46 miles of line from Kohat *via* Hangu to Gulistan in connection with the Miranzai Expedition, the success of which was fully acknowledged by the Commander-in-Chief.

The same year saw a large number of lines erected on the frontier of Upper Burma in connection with minor expeditions. The most important were lines aggregating 126 miles in connection with the Wuntho Expedition. The usual difficulties were encountered and overcome, and the following year saw the majority of the lines in process of reconstruction and being included in the general system. The lines to Manipur which had been wrecked during the rebellion, were repaired in May and June 1891, and the party under Mr. Mercer suffered even more than usual from sickness. Mr. Pinhey who was working on the Assam side had almost as arduous a task before communication was re-established with Manipur.

In September 1892, a short line of 33 miles in length was erected from Haripur to Derband and thence to Tarvara in connection with the Isazai Expedition, by Lieut. Moore, R.E.

When Lord Roberts left India the following March, he left on record his appreciation of the assistance that had been given to military expeditions by the Telegraph Department. He, from the first, had recognized how important reliable field telegraphs with an expedition were, and had never relaxed his keen interest in the development of the field telegraph organization. It is no doubt largely due to that interest that the Department were afforded the opportunities it has enjoyed in perfecting its military telegraph equipment. The officers to whom the greater part of the credit is due for the admirable equipment and organization now in existence, are Messrs. Luke, Pitman and Kirk, all of whom had had practical experience in the field to guide them.

Though in the year 1893-94 there was no actual expedition, yet practically field telegraphs were in use on the Burma frontiers, and during the year an immense amount of trouble was caused by wilful damage. In the Meiktila, Myingyan and Mu Valley Districts 38 miles of insulators were destroyed by stone throwing. In the Chin Hills 18 miles of insulators were stolen, the object in this case being, not only damage to the line, but also to obtain the steel stalks which made admirable spear-heads!

The end of the year 1894 saw the commencement of unrest on the north-west frontier and for the next four years there was a succession of expeditions, all of which were accompanied by telegraph parties. The first line required was from Tank to Wano, a distance of 70 miles with eight offices, which was erected by Mr. A. J. L. Grimes, assisted by Lieut. Panet, R.E. This work was completed in January 1895, and then Mr. Grimes went to Bannu and erected the line to Sheranni, 64 miles, by the 2nd March. The last 44 miles were erected in 5 days, nearly 9 miles a day, a result only possible through the excellence of Mr. Grimes's arrangements, which were specially acknowledged by Government. The line was subsequently extended to Datoi, making 70 miles in all, with 18 offices. In the meantime there was trouble in Chitral, and an expedition under General Sir Robert Low, G.C.B., assembled at Nowshera in March. The force was a large one, and the telegraph party sent with it was a very strong one under Mr. F. E. Dempster, and Messrs. J. M. Coode, R. Meredith and Lieut. Macdonald, R.E. The frontier near Jalala was crossed on the 1st April, and the line was completed into Chitral,

183 miles, by the 17th May. In all 454 miles of wire and 279 miles of line were erected and 29 offices were opened. The average rate of construction was 5 miles a day, the maximum being 12 miles. When the troops were withdrawn, the line between Killa Drosh and Chakdara on the Swat River was dismantled. The traffic throughout the campaign was exceptionally heavy, and to cope with it three wires were erected from the base to the Swat River, and two wires up to Dir. Between March and October, 12,125 State messages of a value of Rs. 1,23,745 were transmitted between India and the field lines, while the traffic which did not leave the system totalled 75,381 of an estimated value of Rs. 5,15,500. There was in addition heavy Press traffic. As usual, the enemy cut the wires freely, but beyond that, the lines were remarkably free from interruptions. The value of the services rendered were fully acknowledged by the Government of India and Mr. Dempster received the decoration of the C. I. E.

In all expeditions beyond the frontier the brunt of the preliminary work of erecting lines to the actual base, the assembly and equipment of the party and collection of the stores, falls on the local Divisional Superintendent. It is fitting here to mention the name of Mr. W. K. D'O. Bignell who for many years held charge of the Punjab Division and to whose energy and admirable arrangements the success of the telegraph operations beyond the actual frontier were largely due. These services were repeatedly acknowledged by Government. Mr. Bignell retired in 1895, the Chitral Campaign being the last one for which he was called on to make arrangements.

June 1897 ushered in a fresh period of activity on the North-West Frontier during which the demands made for field telegraphs were very extensive. In that month, in consequence of the attack on the escort of the Political Officer at Maiza, the Tochi movable column was mobilized with a view to punish the sections of the Darwesh Khel Waziris concerned. Lieut. Green, R.E., was in charge of the telegraph operations, and was quite successful in his arrangements. The existing field line to Datta Kheyl was strengthened and a second wire run up. One new office was opened at Kajuri, which was closed at the end of the operations in February 1898.

During the attack on the Malakand in July 1897, the line was damaged on the Mardan side, and almost totally destroyed between the Malakand and Chakdara. Lieut. Robertson was immediately sent up and repaired the line south of the Malakand after it had been interrupted for 30 hours. Some 300 yards had been cut and carried away of each of the three wires. Again the wires were cut on the 30th July and 1,200 yards stolen. After Chakdara was relieved, it was found that the line from the Malakand to that place had not only been destroyed but that all the material—posts and wires—had completely disappeared. It was subsequently admitted by the tribesmen that they had thrown the material into the Swat River. Communication by field cable with Chakdara was restored on the 5th August, and by the 12th idem a two-wire line had been erected. Mr. Pitman, C.I.E., had assumed charge of the work on the 29th July. Early in September the line was extended to the Panjkora River, and was dismantled by the end of October.



In August, in connection with the operations against the Mohmands, a field line was run up to Shabkadar, 18½ miles from Peshawar, and thence to the Nahaki Pass, also to Adozai, 13 miles from Peshawar, and a third line to Abazai. This work was done by Mr. L. Truninger. Subsequently short lines were erected to Michni and Bara Fort. Transport was as usual the main difficulty, but all these lines were erected very rapidly by Mr. H. S. Pike. 52 miles of line were erected with the Buner Expedition from Mardan to Kangargali, and from Mardan to Surkhabi in the direction of the Ambeyla Pass.

The lines erected with the Tirah Expeditionary Force were under Mr. L. Truninger, who had with him as assistants Mr. E. E. Gunter and Lieut. Garwood, R.E. Later on Mr. H. S. Pike and Lieut. Robertson were also attached for a short time.

Work was commenced from Hangu towards Shinwari, 20 miles away, on the 25th September 1897, by a party under Mr. Gunter, and a two-wire line was completed into that place by the 2nd October with an office at Kai. By the 23rd October the line was erected as far as Karappa, considerable trouble having been caused by the enemy who constantly cut it. As further advances were permitted, the line was extended *via* the Sampagha Pass and Arhanga Pass to Bagh and Mardan, and two wires were completed into the latter place on the 20th November. One party under Lieut. Garwood, R.E., when returning to camp near Karappa, was fired on, and four out of the eight sepoy of the Jhind Imperial Service Infantry forming the rear-guard were wounded. As is usual on such a work, whenever the advance was stopped, the opportunity was taken to strengthen and improve the alignment of the line already up. It having been decided that no lines would be required beyond Mardan, all spare stores were sent back to Shinwari, and dismantlement commenced on the 4th and was completed on the 14th December without very much difficulty by Mr. E. E. Gunter.

In the meantime, after it had been settled that the troops would return by the Bara Valley, the line from Peshawar to Fort Bara was strengthened, and a second wire was erected from the first-named place to Ilamgudi. Stores were also sent on to Fort Bara. The line was ultimately extended to Gandao Pass, 19 miles beyond Fort Bara, by the 13th December.

In all, 87 miles of line and 138 miles of wire were erected. The enemy gave trouble from the first, caused 28 faults between the 25th September and 30th December. These faults caused 470 hours or very nearly 20 days' interruption out of 97 days' work. On one section beyond Mastura the line was cut 15 out of 30 nights. These interruptions seriously hampered the disposal of traffic, which was even heavier than is usual on frontier expeditions. During the period 1st October to 31st December, 65,000 messages were disposed of in the field offices.

The value of the services rendered by Mr. L. Truninger and his offices were specially recognized by the Military authorities and endorsed by the Government of India.

Though the Department supplied material for the China Expedition, none of the staff were employed there, and the next expedition in which it took part was in June 1903, in connection with the Sikkim-Thibet Mission, where a line was laid from Darjeeling *via* Rungpo and Gantok northwards for 95 miles to Khambajong, which place was reached on the 13th September. Khambajong itself is 15,722 feet above sea-level and the highest altitude over which the line was taken was 17,500 feet, which is believed to be the highest ever reached by a telegraph line. The labour involved at that altitude was very great. The men carrying posts or wire had to halt to regain their breath every few feet, while digging and all manual labour could only be carried out with frequent stoppages and to the great distress of the party. This line was erected by Mr. MacMahon, Sub-Assistant Superintendent. In the following December the Khambajong line was abandoned, after the Mission had moved into the Chumbi Valley, and the field telegraph was extended from Rungpo through Gnatong and reached Chumbi over the Jalap Pass on the 8th January 1904. The line was extended to Pharijong, 80 miles from Rungpo, on the 27th January. As it was considered advisable to have an alternative route to avoid the difficult Jalap Pass, a second wire was carried from Rungpo to Gantok and thence to Changu and from Chumbi to Champethang, places situated on either side of the Nathu La, and subsequently these two places were connected. From Pharijong the line was extended to Tuna on the 27th March, passing *en route* over the Tang La, 15,700 feet. A further advance was made to Gyantse where an office was opened on the 27th June. Owing to scarcity of transport, the line could not be extended any further, and Lhasa thus still remains unreached by the telegraph wire. Altogether some 300 miles of line and well over 400 miles of wire were erected, with 25 offices. There were difficulties enough in erecting these lines at such great altitudes, and it is therefore fortunate that the Thibetans did not cut the wire or damage the line very much. The party suffered severely from cold, and while working in the rarefied atmosphere, but stuck gamely to their work. The transport difficulty was even more acute than usual, though exceptionally light material was being used. Mr. L. Truninger received the decoration of the Companionship of the Indian Empire for his services.

The Department has not since then been called on for any field work.

The equipment is now such as is suited for any climate and any country. It is probable that in future campaigns wireless telegraphy will play a part, as it has already done in Africa with the German Expedition.

(To be continued.)



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BIOGRAPHICAL SECTION.

HIS EXCELLENCY THE RIGHT HON. SIR GILBERT JOHN ELLIOT- MURRAY-KYNYNMOUND, EARL OF MINTO, P.C., G.M.S.I., G.M.I.E., G.C.M.G., Viceroy and Governor-General of India.

HIS EXCELLENCY THE RIGHT HON. SIR GILBERT JOHN ELLIOT-MURRAY-KYNYNMOUND, Viceroy and Governor-General of India, is the fourth Earl of Minto. The title was created in 1813, predecessors of the Earl having been created Baronet in 1700, Baron of Minto in 1797, and Earl of Minto and Viscount Melgund in 1813. The first Earl of Minto (Sir Gilbert Elliot) was descended from an old border family, the Elliots of Minto, who were a branch of the family of Stobs, and was born at Edinburgh in 1751. His father, Sir Gilbert Elliot, was a member of the administration of Pitt and Granville, and was spoken of by Horace Walpole as "one of the ablest men in the House of Commons." He was created Baron Minto in 1797, and after filling several diplomatic posts with great success became, in 1807, Governor-General at Fort William. His great-grandson was born at London, England, on the 9th July 1845. He was educated at Eton and Cambridge, taking his degree at the latter place. During these years he showed considerable powers as an athlete; and in Minto House there are to be seen several trophies of his skill in rowing, sculling and running. Lord Minto rode in many races on the flat and across country, and in 1874 brought Captain Machell's "Defence" in fourth for the Grand National at Liverpool; and won the Grand National Steeplechase of France at Auteuil on "Miss Hungerford;" and in many other events over hurdles he rode winners trained by Mr. Richardson. It is related of His Lordship that at the Lincoln Spring Meeting of 1875, he passed the post first on five different mounts. He was also well known as a bold rider with the Duke of Grafton's, Lord Yarborough's and the Bicester Hounds.

In Military affairs the Earl has had great experience and frequently seen active service. Having finished his education, he, then Lord Melgund, joined the Scots Guards in 1867, leaving that Regiment after three years' service. In the following year, 1871, he was for a short while in Paris, with his two brothers, during the Commune. In 1874 he went as Correspondent for the *Morning Post* with the Carlist Army in Navarre and Biscay in the North of Spain. In the spring of 1877,

he went out to Turkey. There he was attached by the British Ambassador to the Turkish Army, and became Assistant Attaché under Colonel Lennox, and was the first to announce in England that the Russian Army had crossed the Balkans. He was present with the Turkish Army at the Bombardment of Nikopoli and the crossing of the Danube. In 1878 His Lordship came out to India. He went straight to the front in Afghanistan, joined Lord Roberts, and was with him in the Kurram Valley. When peace was concluded after the treaty of Gundamak, he went to Simla, and when there was asked to accompany Cavagnari's mission to Cabul, and to carry a despatch from that place across the frontier to General Kauffman, who was then commanding the Russian advanced post at Samarcand. The idea was, however, given up, owing to Cavagnari's opinion that the whole mission would become State prisoners at Cabul, and that it would be impossible to proceed further with despatches. Shortly after Lord Minto heard of the massacre at Cabul; Cavagnari and the whole of his escort, with the exception of one man, were killed. In 1881 after the defeat of Majuba he accompanied Lord Roberts to the Cape as Private Secretary. In 1882 Lord Minto went out to Egypt as Captain in the Mounted Infantry—picked shots from all the different Regiments and mounted on little Arab horses—until they were disbanded at Cairo. Most of the officers were either killed, wounded or invalided. One of the surviving officers, Major Bartelot, was killed during the Stanley Expedition. Lord Minto was wounded in action at Magfar. He was several times mentioned in despatches and was thanked in general orders.

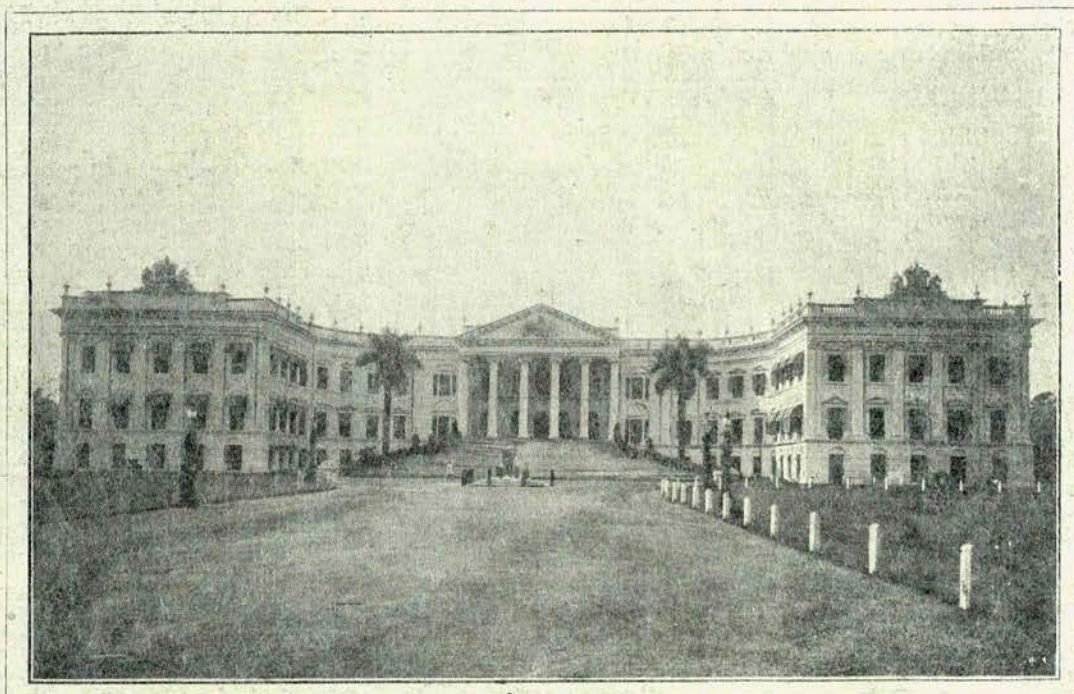
In 1883 His Lordship went out to Canada as Military Secretary to the Marquis of Lansdowne, then Governor-General. When there, telegrams arrived asking him to raise three hundred Canadian Boatmen and take them out to Egypt in Command. There were various reasons why he could not go, and he was then asked to organize the whole body, which he did. It was in the spring of 1885 that the North-West Rebellion broke out under Riel. The operations were similar to Lord Wolsley's Red River Expedition in 1870. General Middleton was sent up with a force of Volunteers to quell



His Excellency The Right Hon. Sir GILBERT JOHN ELLIOT-MURRAY-KYNYNMOUND, EARL OF MINTO,
Viceroy and Governor-General of India.

the outbreak, and Lord Melgund was appointed Chief of the Staff. In 1889 he was appointed General Commanding the Scottish Border Volunteer Brigade. His decorations include the Afghan Medal, Egyptian Medal, 1882, Medjidie Khedive Star and the North-West Canada 1885 Medal and Clasp and Volunteer Officers' Decoration. He was to the front in starting the Border Mounted Rifles (disbanded in 1888); and when the Scottish Border Brigade was formed in July 1888, His Lordship was appointed Brigadier-General. In 1898 Lord Minto returned to Canada as Governor-General, and the six years of his administration were eventful ones for the Dominion, whether viewed with regard to internal development or Imperial relations. They covered a period of prosperity unexampled in its previous history. The trade and revenue of the country increased by leaps and bounds. The Earl of Minto was a great success in Canada, and the series of demonstrations of kindly feeling that were exhibit-

ed in nearly all the large centres of the Dominion during the last few weeks of his term of office, showed how sincerely cordial were the relations that had been established between Lord and Lady Minto and the Canadian people of all races, religious denominations, and political parties. Lord Minto was known to be on terms of intimate friendship with Sir Wilfred Laurier, the trusted Leader of the Reform party, whose administration has been marked by various measures tending to unite Canada more closely with the Empire. Shortly after the resignation of Lord Curzon in 1905 Lord Minto was appointed Viceroy of India, arriving in Calcutta in December. In 1883 he married Mary Caroline Grey, daughter of General the Honourable Charles Grey, who was Private Secretary to the Queen. There are five children—Lady Eileen Elliot, Lady Ruby, Lady Violet, Viscount Melgund and the Hon. William Esmond Elliot.



Government House, Calcutta.



The Right Hon. GEORGE NATHANIEL CURZON, BARON KEDLESTON,
Ex-Viceroy and Governor-General of India.

THE RIGHT HON. GEORGE NATHANIEL CURZON, BARON KEDLESTON

(IRELAND), P.C., G.M.S.I., G.M.I.E.,
Ex-Viceroy and Governor-General of India.

GEORGE NATHANIEL CURZON, eldest son of the Rev. Alfred Nathaniel Holden Curzon, fourth Baron Scarsdale, and of Blanche, daughter of Joseph Pocklington Senhouse, of Netherhall, Cumberland, was born at Kedleston, Derbyshire, of which parish his father was Rector, on the 11th January, 1859. The Curzon family goes back to one Giraline de Curzon, lord of the Manor of Lockinge, in Berkshire, and of Fishhead in Oxfordshire, who came over from France with William the Conqueror and whose name is in the Roll of Battle Abbey. The elder line married into the family of the Earl of Dorset, and became extinct long ago. The second line, the Curzons of Kedleston, have survived and thrown off branches. Among the Curzons of this branch was John Curzon, called "John with the white head," who was Sheriff of Nottingham in the reign of Henry the Sixth, but it was not until 1641 that the descendant of John Curzon obtained a baronetcy. The son of the first baronet, Sir Nathaniel, which by the way is a familiar Christian name in the family, married into the Penn family, and after a course of Johns and Nathaniels we come to Sir Nathaniel Curzon, who died in 1758 leaving two sons, Nathaniel and Assheton. In 1761, Sir Nathaniel was created Baron Scarsdale. His brother Assheton became Viscount Curzon in 1802, and his son married the daughter of Earl Howe. He was himself created Earl Howe in 1821, and this branch of the Curzon family is numerous. The second Baron Scarsdale succeeded in 1804, and married into the Wentworth family. On the death of his first wife he espoused a Flemish lady, Felicite Anne de Wattines. By his first marriage he had a son, the Scarsdale who died unmarried in 1856, and the third Baron peerage then went to the grand-children of his second wife. The eldest son, George Nathaniel, had been killed by a fall from his horse in 1855, and his brother Alfred Nathaniel Holden, a clergyman in Holy Orders, became fourth Baron Scarsdale in 1856.

Lord Curzon is the eldest son of the fourth Baron, and has had nine brothers and sisters. Educated at Eton, and at Balliol College, Oxford, George Nathaniel Curzon at a very early period of his life gave proof of special ability, and setting a political career steadily before him, lost no time in embarking upon a course marked out for official distinction. Balliol has for long been distinguished for the intellectual attainments of its members, and its intellectual influences have spread far beyond any mere academical limits; while the Oxford Union, of which Lord Curzon became President in 1880, has attained a world-

wide reputation, chiefly on account of the weekly debates held in connexion therewith. This debating society has been the nursery of many great orators, and during his 'Varsity career Lord Curzon was one of its most powerful speakers. In later years the experience thus gained has proved of immense service, and the vigorous intellect that Lord Curzon brought to the service of India, his debating powers, his ability to clothe his thoughts in fluent and appropriate language, and his capacity to grapple with far-reaching questions which a weaker man would hesitate to enter upon, were doubtless largely due to his early training in the rooms of the Oxford Union Debating Society. On leaving Oxford, Lord Curzon at once entered upon his public duties, and in 1885 he became Assistant Private Secretary to Lord Salisbury. His first attempt to enter Parliament was unsuccessful, as he was defeated by the Liberal candidate in the Southern Division of Derbyshire in the General Election of 1885. In the following year, however, he was returned for the Southport Division of Lancashire by a majority of 461 over Sir G. A. Pilkington, and in this Division he continued to represent in the House of Commons, in the Conservative interest, up to the date of his appointment to the Viceroyalty of India.

In 1891 he was appointed Under-Secretary of State for India in succession to Sir John Gorst, and during the remainder of Lord Salisbury's Administration he was afforded the opportunity of becoming familiar with the details of the India Office, then presided over by Viscount Cross. He had already commenced to travel widely, and his visits to Central Asia, Persia, Afghanistan, the Pamirs, Siam, and Indo-China, resulted in the publication of several books on the political problems of the Far East. He made a special study of Indian frontier problems, and was the first Viceroy of India since Lord Lawrence to realize the responsibilities of Asiatic rule prior to his appointment. Like a great many other statesmen, Mr. Curzon, as he then was, looked upon Russia as always a possible enemy, and a Power with which Great Britain might yet have to fight over Afghanistan or Persia. Twice in the century had Cabul been made the cock-pit of British disaster, and Mr. Curzon was of opinion that it might yet come to be regarded as the citadel of British salvation. Lord Curzon's distraction, during his Parliamentary career, was a close and conscientious study of the geography of Asia in its political and commercial, as well as its geographical aspects. India, to him, always appeared to be the pivot and centre—not the

geographical but the political and imperial centre—of the British Empire. His travels in Asia for the purpose of acquiring information at first hand were all carried out within the limit of time in which he held a seat in the House of Commons, and they resulted in the publication of three important works, *i.e.*, "Russia in Central Asia," published in 1889; "Persia and the Persian Question," 1892; and "Problems of the Far East," 1894. In 1895 he received the Gold Medal of the Royal Geographical Society. Although he had travelled extensively, and had been recognised in the House of Commons as one of the coming men, it was not until he was appointed Under-Secretary of State for Foreign Affairs, in 1895, under the Salisbury Administration, that Lord Curzon held a very prominent position in the Home Government. In his position at the Foreign Office he showed qualities of eloquence, debating power, and of argument which have hardly been surpassed in the career of any man of his standing.

In 1895 Lord Curzon married Mary, a daughter of the late Mr. L. Z. Leiter, a well-known millionaire of Chicago, who for some years previous to her marriage had lived at Washington where, as an intimate friend of the wife of the then President of the United States, Grover Cleveland, she had become a most important factor in the social life of the City. The marriage took place in April, 1895, and the newly-made wife quickly identified herself with her husband's work, displayed a marked interest in his literary labours, and stimulated his ambition by the exercise of a healthy and inspiring influence. Her beautiful home in London was fast becoming a rendezvous for the leaders of the Conservative party, when her husband was appointed Viceroy and Governor-General of India, and shortly afterwards raised to the Peerage, with the title of Lord Curzon of Kedleston.

Lord Curzon assumed control of the Indian Administration in January, 1899. He came to India imbued with the idea that in the great experiments being carried out in this country lay the true test of dominion, the real touchstone of our Imperial greatness. He was firmly of the opinion that courage and sympathy were the chief qualities needed in dealing with Indian problems, and that it was better to have ideals and fail to reach them, than never to have ideals at all. He came to India as a rising politician who had supplemented wide and solid studies of Asiatic politics by extensive travel. His high credentials of statecraft, his interesting, and, from a political point of view, slightly romantic career, his youth, and above all, his oft-expressed love for India, and sympathy with her people and their aspirations, all combined to give Lord Curzon's welcome to India an enthusiastic cordiality which had been absent in the case

of many of his predecessors. During the years that he was Viceroy, Lord Curzon investigated with unabated zeal and energy the endless questions that present themselves to the responsible ruler of 300,000,000 people. He put new life and vigour into the great machine of Government and with a firm belief in himself, and in the mighty empire which he governed, he discerned the dangers and difficulties of India's position, as they exist within and without her frontiers. Lord Curzon never extenuated the difficulties which confronted the Government in India, but he always showed himself confident that with forethought and decision they may be overcome. No British statesman in our day has realized the nature of the transformation that has been wrought in the changing politics of Asia in their recent years, or has appreciated more fully the effects it is calculated to produce upon the internal and external position of India. And a notable feature of Lord Curzon's Administration has been the vigour with which he grappled with and attempted to settle outstanding questions which weaker Viceroys had allowed to remain open. Like other great men, Lord Curzon has had his detractors, but when his work in India passes into history, and is reviewed on that basis, his personal idiosyncrasies will be subordinated to his firmness, his energy, and the thoroughness with which he has raised the already high standard of Indian administration, and the singleness of purpose and independence of mind that have given him so notable a place in the long line of Governors-General. The chief features of that administration are fully dealt with in the pages devoted to historical survey.

In the military controversy, which resulted in Lord Curzon's resignation of the Viceroyalty of India, his Lordship's views had on his side the whole of the Civil Services in India, the unanimous weight of non-official English opinion in this country, an overpowering preponderance of Indian opinion and the support of the majority of the Indian Army. His Lordship made it clear, in his parting speech at the Byculla Club, Bombay, that his action was not due to a personal quarrel or that it was based on personal grounds. "I resigned," he explained, "for a great principle, or rather for two great principles, firstly, the hitherto uncontested, the essential and, in the long run, the indestructible, subordination of Military to Civil authority in the administration of all well-conducted states, and, secondly, the payment of due and becoming regard to Indian authority;" adding significantly, "the principles have not vanished though they have momentarily disappeared. They will re-appear and that before very long." Lord Curzon left India on the 18th November 1905, having attempted and accomplished much during his seven years of good and conscientious work.

General HORATIO HERBERT, VISCOUNT KITCHENER of Khartoum, G.C.B., O.M., G.C.M.G., R.E., Commander-in-Chief in India.

GENERAL HORATIO HERBERT, VISCOUNT KITCHENER OF KHARTOUM, G.C.B., O.M., G.C.M.G., R.E., Commander-in-Chief in India, Commandant of the Corps of Royal Engineers, is the eldest son of the late Lieutenant-Colonel H. H. Kitchener, 13th Dragoons, of Cossington, Leicestershire, and was born at Crotter House, Ballylongford, Co. Kerry, Ireland, on the 24th June 1850.

As has been the case with the two last Commanders-in-Chief of the British Army, Lord Kitchener has reached the highest eminence in the Military service of the King without that assistance of birth or connections which is generally supposed to be a ready stepping-stone to place and preferment; and the record of their achievement goes to show that genius and merit command the highest posts of the Imperial Army.

After the usual course of candidates for the scientific arms at the Royal Military Academy, Woolwich, young Kitchener received his commission as a Lieutenant of Royal Engineers on January 4th, 1871.

Just prior to this, however, he had shown his practical sympathy with the French nation, by serving as a volunteer in their forces during the disastrous campaign of 1870-71: an incident of his career which did not fail of political significance at the time of the Fashoda episode. Early in his service Lieutenant Kitchener took up work in the Middle East, which laid the foundation of his wide knowledge of Oriental characteristics; this included the survey of Western Palestine, a mission to Cyprus, and the Vice-Consulship of Erzeroum, all of which were within the first ten years of his service. Arabi Pasha's revolt drew his services to the field, which, in later years, won him the greatest distinction; and it is characteristic of his versatility

as a military leader that, for some two years after the collapse of the rebellion, the "Sapper" Captain served as an officer of Egyptian Cavalry. In Lord Wolseley's Nile Expedition of 1884-85, for the relief of another gallant Sapper, General Gordon, Brevet-Major Kitchener served as Deputy Assistant Adjutant-General and Quartermaster-General, and at the close of the operations he was awarded the Brevet of Lieutenant-Colonel. After the withdrawal from the Upper Nile Valley, his services were transferred to the Red Sea littoral as Governor of Suakim from 1886 to 1888.

In the fighting round Suakim in 1888, Colonel Kitchener took a prominent part, and commanded an Egyptian Brigade at the action of Gemaizah, and again in the fighting (including the action of Toski) on the Soudan Frontier. In the year 1888 he obtained the Brevet of Colonel, and was appointed Adjutant-General of the Egyptian Army. In 1890 he was appointed Sirdar of the Egyptian Army, and set himself to the completion of the military organization which proved so brilliantly successful in the campaigns of 1896 to 1898, which entirely crushed Mahdism in the Soudan Provinces. These operations commenced with the Dongola Expedition of 1896, in which, as in the later campaign, the British and Egyptian forces co-operated under Colonel Kitchener's command. At the close of this service he was promoted Major-General and made K. C. B., (having received the Companionship in 1888,) and given the first class of the Osmanieh. The next step in the re-conquest of the Soudan was the operations in 1897 which resulted in the capture of Abu Hamed. The final blow was delivered in 1898, when the mixed forces of British and Egyptians under General Kitchener's command re-occupied Khartoum after the crushing victory of Omdurman. For this last

General HORATIO HERBERT, Viscount KITCHENER
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General HORATIO HERBERT, VISCOUNT KITCHENER of Khartoum,
G.C.B., O.M., G.C.M.G., R.E., Commander-in-Chief in India.

great achievement, General Kitchener received the thanks of both Houses of Parliament, was raised to the peerage with the dignity of a Baron, was voted a grant of £30,000, and received the G. C. B. The outstanding feature of Lord Kitchener's Egyptian campaigns was the thoroughness and completeness of the organization working from a distant base, the whole achieved at a bare minimum of expenditure.

While Lord Kitchener was still in the Soudan engaged in the task of political reconstruction on the debris of the rule of fanaticism, the war in South Africa broke out, and Lord Kitchener was called from these duties to the post of Chief of the Staff to Lord Roberts. The first heavy blow that the Boers received, the capture of General Cronje at Paardeburg on Majuba Day, February 7th, 1900, was in a high degree owing to the energy with which Lord Kitchener threw forward the available forces on Cronje's retreat from the lines of Magersfontein. Throughout the subse-

quent fighting in the first phase of the war, Lord Kitchener, as the first assistant to the Commander-in-Chief, took a great part in the operations. The concluding phase of Guerilla warfare imposed an even greater strain on him as Commander-in-Chief, and it was finally owing to the inauguration by Lord Kitchener of the blockhouse line system for breaking the country up into sections, with the accompanying "drives," that the long-drawn struggle was at last brought to a close. The course of the peace negotiations at Vereeniging brought out prominently Lord Kitchener's skill as a diplomatist, which went far to soften the bitterness of defeat to the Boers. For these brilliant services, he was promoted Lieutenant-General and General, received a Viscounty, a grant of £50,000, and the thanks of Parliament.

In November 1902, Lord Kitchener took up the appointment of Commander-in-Chief in India, and his administration has been characterized by wide reforms of the Indian Army system.





The Hon'ble Sir ANDREW HENDERSON LEITH FRASER, M.A., LL.D., K.C.S.I.,
Lieutenant-Governor of Bengal.



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M.A., LL.D., K.C.S.I., Lieutenant-Governor of Bengal.

THE HONOURABLE SIR ANDREW HENDERSON LEITH FRASER, M.A., LL.D., K.C.S.I., was appointed Lieutenant-Governor of Bengal in 1903, after a service in India extending over thirty-two years. During that period he gained a very wide experience of Indian conditions and made his reputation as an administrator.

He was born in Bombay in 1848, his father, the Rev. Dr. A. G. Fraser, acting at that time as a clergyman in the Presidency. He was educated at the Edinburgh Academy. He afterwards went to the Edinburgh University, taking his degree of Master of Arts in 1868. The next year he passed for the Indian Civil Service, and, after two years' probation, incumbent under the old rules, he came out to India in 1871.

The Central Provinces have been the chief scene of Sir Andrew Fraser's labours until his advent to Bengal; and his history is bound up with the progress of those Provinces. As Excise Commissioner, Deputy Commissioner, Secretary, Commissioner and Chief Commissioner of the Central Provinces he succeeded in gaining entirely the sympathy and affection of all classes and winning a wide reputation as a brilliant officer and a firm administrator. In 1893 he was selected by the Government to serve on the Hemp Drugs Commission and, while on that Commission, he traversed the whole of India.

He held the office of Secretary to the Government of India in the Home Department in 1898 and 1899, and he relinquished this appointment at the close of the latter year to succeed Sir Denzil Ibbetson as Chief Commissioner of the Central Provinces. For a long time it had been evident that the Indian Police system was faulty, and Lord Curzon, with his customary energy, decided on appointing a Commission to investigate thoroughly the conditions of the service throughout India.

When Sir Andrew Fraser was selected as Chairman of the Commission, it was universally recognized that its work would be conscientiously and thoroughly done. The labours of the Commission were heavy; evidence had to be taken in every part of India; and it needed the utmost tact and patience to arrive at the truth. The work of the Commission has been embodied in a report that is likely to mark a new era in the Police Service of India. Already many reforms have been founded on its suggestions; and gradually the whole policy of the Police Administration will be shaped from its conclusions. His work as Chairman of this most important Commission considerably enhanced Sir Andrew Fraser's high reputation. While the Commission was still sitting he was appointed Lieutenant-Governor of Bengal. He completed his work on the Commission, however, and then took three months' leave of absence to recruit his health, which had felt the strain of continued effort.

Bengal has always been known as a Province that demands the heaviest labour and self-sacrifice from its Governors. Indeed, the Province had grown to such an extent and the problem of its government become so complicated that the Government of India carried out a scheme for the redistribution of territory with the purpose of bringing the limits of Bengal within reasonable and workable bounds. When it is considered that the population of

Bengal is nearly eighty millions, it will be seen that the Government was forced into taking some action. The whole question gave rise to a considerable controversy, and "the partition of Bengal" led to hot protest and discussion. It was not merely a matter of altering borders but one of transferring sections of people from one administration to another.

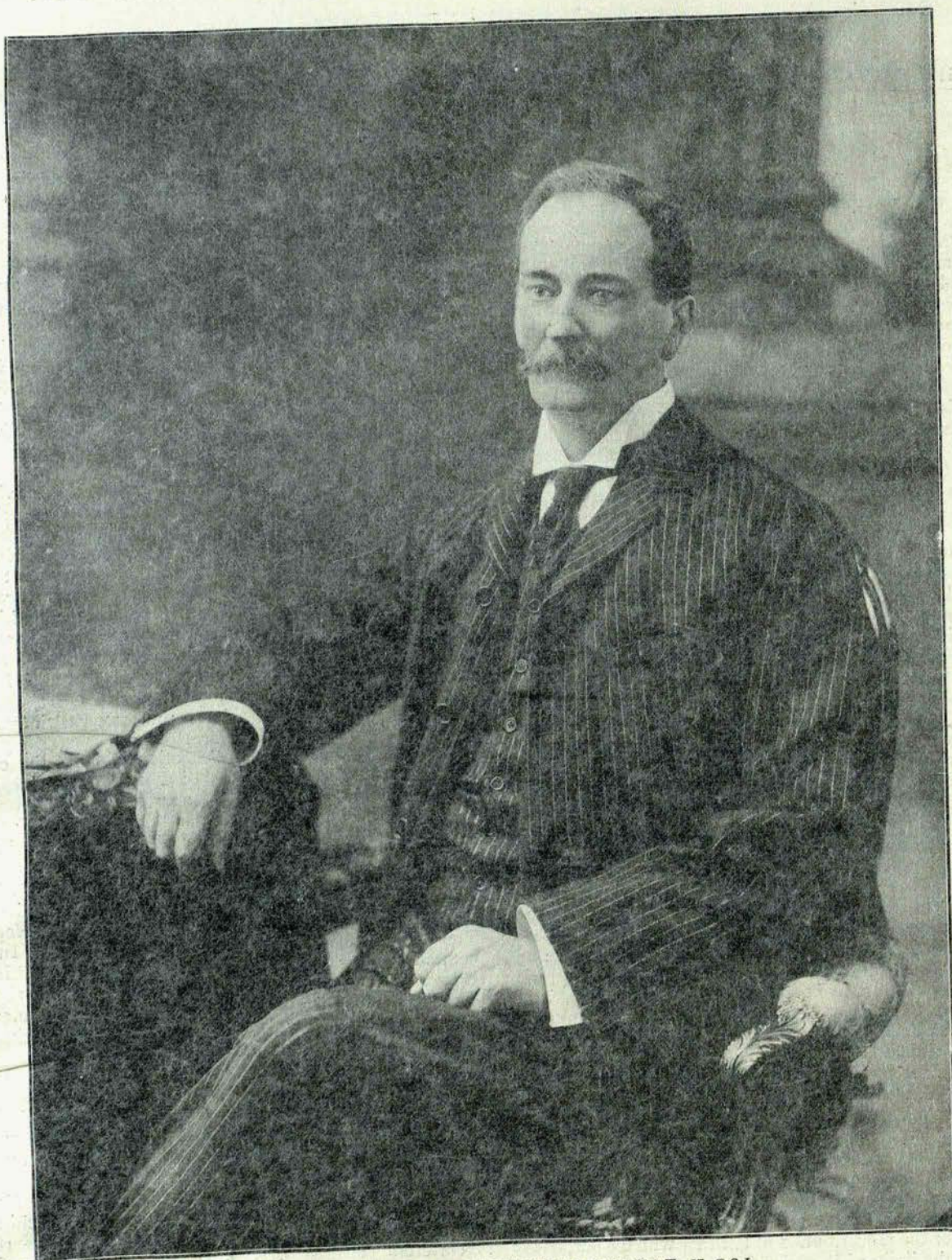
The question of sentiment entered largely into the matter, and as Indians are peculiarly sensitive to local interests, it can be understood that the practical nature of the proposals were obscured by all manner of side issues that were not contemplated. Sir Andrew Fraser, during the first year of his office, was brought face to face with this important question, involving as it does many issues. The whole argument of the Government of India for the transference of Dacca and Mymensingh and the general redistribution of territory has been fully set out in a letter published in the *Gazette of India* at the close of 1903.

Sir Andrew Fraser has shown considerable activity as Lieutenant-Governor of Bengal. He has made a series of tours throughout the Province, bringing himself into association with local interests with ready sympathy. He has taken his place at the head of the Government with characteristic thoroughness and performed his many exacting official duties with untiring zeal. He has shown himself ready to lend his aid to any worthy movement, and the many speeches that he has made show a wide and statesmanlike grasp of the affairs of Bengal and the Indian Empire. He has been happy in presiding at the St. Andrew's Dinner, and has shown the most vital interest in the religious life of the Province.

His father, who had the distinction of being the oldest Anglican clergyman in India, died in 1904. Almost up to the last day, this grand old man of ninety-one worked with splendid vigour at Nagpore and Calcutta. The utmost sympathy was felt throughout Bengal for Sir Andrew Fraser in his great personal loss.

The big question of Education naturally attracted the attention of the Lieutenant-Governor. He initiated the idea of establishing a large college at Ranchi, Chota Nagpur. This notable scheme has won the sympathy of the Indian community, for whose benefit it was framed. Primary Education is also being systematized. The Drink question, especially among the native community, became an increasingly serious one. Sir Andrew Fraser showed his sympathy with the reformers, who were working to check the habit before it gained too strong a hold on the people. Local Self-Government, Police reform, and the relation of Landlord and Tenant also occupy much of his attention. Nothing but admiration is heard for Sir Andrew Fraser's energy and ability and the pains that he has taken to identify himself with the interests of the people.

He was created K.C.S.I. in 1903. Sir Andrew Fraser married, first in 1872, Agnes, daughter of R. Archibald, Devondale, Tillicoultry, who died in 1877; and in 1883, Henrietta, daughter of Col. H. I. Lugard, Indian Staff Corps. Lady Fraser has always warmly supported her husband in his important duties.



The Hon'ble Sir CHARLES MONTGOMERY RIVAZ, K.C.S.I.,
Lieutenant-Governor of the Punjab.