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### The geography of communications

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# THE SCOTTISH GEOGRAPHICAL MAGAZINE.

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## THE GEOGRAPHY OF COMMUNICATIONS.

By Sir HENRY TYLER.

*(Read before the Society at Edinburgh in May.)*

GEOGRAPHY has been divided by various authors under different heads, such as (1) Physical, (2) Political, (3) Mathematical, having reference, respectively, (1) to the configuration of the Earth's surface, (2) to its division into countries and nations, (3) its magnitude, its motions, its problems, and its changes. But there is another section germane to the science, which has not yet received the special attention which it deserves, namely that of "Communications,"—for passengers, for commerce, and, postally or electrically, for the exchange of information.

When I was asked, some little time since, to address this Society, I naturally inquired as to the sort of subject which would be pleasing to your honourable Council; and I received in reply a request for suggestions. It then occurred to me, in thinking the matter over, that I could not do better than gather up the threads of work to which I had been constantly led during the numerous avocations of a busy life, in which I had always taken supreme interest, and which had formed the occasion of numerous official reports and visits to many countries, on duty or business, as well for instruction and pleasure. I was the more inclined to do so because I felt that although the study, in connection with the great facts of history, of routes and communications, had hitherto as a special subject been, so to speak, overlooked or neglected, yet these were in reality the basis of geographical discovery, and the foundation—the *fons et origo*—of geographical science. Without the means of communication, and without the use of those means, discovery could not be undertaken, the configuration of the Earth's surface could not be ascertained, its divisions could not be determined; and without prolonged

observations on the result of such investigations, its history, its problems, and its changes could not be recorded.

The subject, though most fascinating, is appallingly vast, extending in time over the whole of the Earth's records since the deluge, and in space over its entire surface. It cannot be satisfactorily dealt with, much less exhaustively treated, in an afternoon address; but as the Council of the Society were so good as to approve of my suggestion, I venture, in approaching the fringe of it, to lay before you a slight sketch, which I hope may be filled in and elaborated by some one with more leisure, learning, and ability, at a later date.

As the descendants of Noah multiplied on and dispersed over the surface of the old world, they naturally selected and mainly congregated in the localities best adapted for their support and pursuits; where they found favourable climates, water for transport and irrigation, food for their flocks and herds, and easy cultivation. The valleys of certain great rivers afforded these necessary conditions.

The mud-bearing Nile, and its periodical inundations, attracted them to Egypt; the Euphrates and the Tigris, and the fructifying soil from the Armenian Highlands, to Chaldæa, or Mesopotamia; the Indus and the fertilising Ganges to India; the great rivers of China, laden with yellow earth from the Tibetan plateaux, to that country. But great and constant changes occurred in the course of time, physically as well as politically. It has even been stated that six thousand years ago the Euphrates and the Tigris ran in separate channels to the sea; and that four thousand years ago "Ur of the Chaldees," the site of which is now 150 miles inland, was a flourishing sea-port.

The ancient and better known civilisations of Mizraim or Egypt, Chaldæa or Babylonia, Assyria, Elam or Persia, India and China, were the results (amidst continual change) of concentration and survival, after long struggles for supremacy amongst each other and with less perfect organisations. Another powerful empire—Khita (Heth), inhabited by the Hittites, has received the benefit of recent researches. Penta-ur's poem (the Egyptian *Iliad*) on the "Sallier Papyrus," and the sculptures on the walls of Thebes, and other records, have thrown a new light on the few references to it in the Old Testament. These Hittites, of which the better known tribes in the south of Palestine were, perhaps, remnants, occupied northern Syria and Asia Minor, south of the Black Sea and east of the Egean, and fortified their capitals at Kadesh on the Orontes, and Carchemish (Kar Chemosh), on the Euphrates. The Hittites' chariots, "each containing three men," were similar to those of Egypt; and Ramses II., that mighty Pharaoh, made a formal treaty of alliance with the Hittite king, Khita-sin, and, as an equal, received his daughter in marriage.

An interesting discovery has been made quite recently, on examination of the records in the British Museum and in the Imperial Museum at Constantinople, in connection with the battle of the Kings and the capture of Lot, with his "goods, and the women also, and the people," recorded in the 14th chapter of Genesis. This is recognised as having occurred shortly after the Elamite conquest of Chaldæa, B.C. 2285.

Amraphel, king of Shinar, is identified as Khammurapaltum, and Arioch, king of Ellasar, as Eri-Aku, whose clay tablets were found at Sankereh, the site of the ancient city of Larsa. In one deciphered letter Amraphel expresses a fear that the goddesses captured may bring trouble on those who keep them captive; and in another letter he requests that certain rebels captured may be sent to him to Babylon. It would appear that the same wave of invasion reached as far as Lower Egypt, when it was the means of establishing the dynasty of Hyksos, or shepherd kings, 2000-1490 B.C.

In these centres of population, cities of vast magnitude were formed, and were highly fortified, in some cases by numerous walls. Their names are very familiar to us, as Memphis, Babylon, Nineveh, Ecbatana, Persepolis, Tadmor (Palmyra), and others. All were more or less centres of commerce, and some dwarfed by their dimensions our modern cities; whilst, as at Troy, even five or six cities of different dates are found buried under the present sites. The powerful and ambitious potentates of those days, wielding arbitrary authority and having unlimited command of men and materials, invaded each other's territories, besieged each other's cities, carried off treasures, sacked and destroyed temples, towers, and monuments, and not unfrequently found their ruin in seeking further aggrandisement. They left behind them enduring treasures, such as the Pyramids and other massive constructions of Egypt—the buried antiquities of Asian cities—hieroglyphic and cuneiform records and inscriptions on basaltic and other rocks, on bricks, slabs, and monuments, to be deciphered by laborious and distinguished men, and handed down, in the marvellous designs of Providence, to the present later civilisations, on whom the ends of the world have come.

The directions of the lines of communication over the Earth's surface in earlier as well as in later ages have been determined mainly by (1) the exigencies of commercial intercourse, comprising the need of sustenance and the demand for luxuries; (2) the thirst for conquest, or craving after wealth and power; (3) the impulses of religion, including the resort to holy places and the propagation of creeds. These three C's—Commerce, Conquest, and Conversion—may be looked upon as the dominating motives for movement by land and sea.

Facilities for communication are afforded on water, by (a) the ocean, (b) lakes, (c) rivers, (d) canals; and on land by (a) unprepared or beaten tracks, (b) roads, (c) tramways and railways. The water routes, navigated by (a) floating rafts, with or without sails, (b) vessels propelled by oars, (c) sailing ships, (d) steam-ships, have afforded at all times more economical, and frequently more secure, modes of transport than long stretches of land across steppes, prairies, pampas, forests, and mountains.

Until the present century, and the railway era, great countries were practically joined together by water, whilst their own internal divisions were separated by the difficulties of land communication.

It was, for instance, almost impossible to cross North America from New York to San Francisco, or from Montreal to Vancouver, until the United States Railways and the Canadian Pacific Railway solved those

problems respectively, whilst the traffic and commerce between Great Britain and the American continent for similar distances were more easily carried across the Atlantic. The African continent, first circumnavigated by a Phœnician vessel under the auspices of Necho, son of Psammetichus, who succeeded to the throne of Egypt 617 B.C., affords similar examples of the difficulties of crossing it, compared with the facilities for coasting round it.

Rafts and canoes, boats and ships, of almost every conceivable form, have been employed to suit the wants of, or to utilise the materials available for, inland or ocean navigation at different times and in different countries. The canoe, scooped out of the trunk of a tree by the untutored Indian, was as inferior to the China clippers as were the ships of Tarshish to the steamers of 12,000 tons which now glide through the waves of the Atlantic at twenty-five miles an hour. Of all the vessels used for passengers and cargo, perhaps the most singular are the "balsas," which I found in a recent trip to Peru on Lake Titicaca, which is 100 miles long and 60 broad, and 12,500 feet above the sea. These "balsas" are formed entirely of the reeds and rushes growing in the lake, bound together in boat-like form, and furnished with sails of the same reed materials, with rough crooked poles for oars. They are frequently taken out of the water, when not in use, to prevent them from being too thoroughly soaked and thus losing their flotation. Some of them carry as many as sixty, but the smaller ones only two or three, people. A floating bridge over the Desaguadero river, running out of the lake, was supported on similar "balsas" before the existing rough causeway was constructed. The steamers of the Peruvian Corporation are also employed on that lake.

The great international traders and carriers of ancient times, and the earliest promoters on a grand scale of "geographical communications," are well known to have been the Phœnicians or Canaanites. They are most interesting to us as bearing a certain analogy to, and being in some respects the forerunners of, British enterprise. Phœnicia and Carthage, and, later, Holland and Great Britain, have alike demonstrated that smaller countries with convenient coasts and ports are, when backed by freedom for commerce and maritime enterprise, more compatible with commercial and colonial greatness than larger countries with greater populations. Whilst the main object of other ancient civilisations was conquest, the mainsprings of Phœnician life were ships, colonies, and commerce—for which Napoleon cried and sighed in vain. Inhabiting a narrow strip of the Syrian coast, 180 miles long by 12 miles broad, with ports at Sidon, and Tyre 24 miles south of it (both founded upwards of 2000 B.C.), as well as at Byblus, Berytus (Beyrout), and Ace (afterwards Ptolemais and now Acre), their trade-routes spread over the then known world. They had two land routes to the Euphrates and Tigris—a northerly route through Mesopotamia, Haran, and Eden; a southerly route by Sheba, Ashur, and Chilmad. The ships of Tarshish resorted to the British islands and coasts (*Cassiterides*) for tin, and to Spain for oil, wine, gold, silver, copper, lead, and quicksilver, and they exchanged in the lovely island of Ceylon the products of the East and the West. Ceylon was, no doubt, their

Eastern Tarshish, whilst the Isla de Leon (*Ταρτησσός*, Gades, or Cadiz) was their Western Tarshish. The ancient Buddhist civilisation of Ceylon, now so little known or appreciated, formed indeed the commercial centre of the Eastern world. The wonderful city of Amuradhapura was almost unrivalled for extent, palaces, and Buddhist buildings. A vast population was supported, and the island rendered fertile by tank, canal, and irrigation works on a grand scale, and the ships of the Phœnicians and of Solomon found there the produce of India, Java, and China.

In the 26th, 27th, and 28th chapters of Ezekiel a full and poetical description is given of the merchandise and the traffic of the Phœnicians by sea and land, and of their pride and riches. The prophecies by Isaiah and Ezekiel of the fall of Tyre and Sidon were amply fulfilled in the sacking of Sidon with terrible carnage, and the subsequent capture of Tyre, 590 B.C., after a thirteen years' siege by Nebuchadnezzar, when 8000 persons are said to have been massacred, 30,000 sold into slavery, and 2000 crucified. It was partially restored, and again captured, after a seven months' siege by Alexander the Great, 332 B.C., as well as by the army and fleet of Antigonus after a thirteen months' siege, 314 B.C., by Christians, 1124 A.D., and by Mohammedans, 1291.

Carthage, the most important of the Phœnician colonies, with its million of inhabitants and its city twenty miles in circumference, founded 814 B.C., became the next great commercial centre of the world. From the fifth century B.C. the Carthaginians waged great wars, first with the Greeks for Sicily, and afterwards with the Romans. Their generals, including Hannibal, nearly conquered the world; but, at length, this last remnant of Phœnician power was worn out and broken in the Punic wars, and its defeat was said to be a "gain for the world," though it had certainly contributed in an important degree to geographical discovery, and was the means of furthering settlement and civilisation in Western Europe. These Phœnician worshippers of Baal, Moloch, and Ashtarothe (*Astarte*), whose idolatry and human sacrifices the Israelites were too prone to imitate, did not bear a good character for honesty. It was said of them *Σύροι πρὸς Φόλυκας*, liberally translated as "Set a thief to catch a thief."

The Roman navies were constructed and employed rather for objects of war than for purposes of commerce. At the same time, as the Romans advanced civilisation over barbarous regions in the West, so they created a demand for the manufactures of the East; and the extreme luxury of Rome called for satisfaction from every portion of its vast Empire. The most distant ports of the East were ransacked to supply the wants of the capital, and accordingly large fleets were employed between Myos Hormos, on the Red Sea, and the island of Ceylon, or the coast of Malabar, to transport, at enormous profits, rich cargoes which were carried on the backs of camels to the Nile, and so by water to Alexandria, for Italy, whilst the Mediterranean vessels were also laden with the manufactures of Babylonia and other eastern regions.

As with water carriage so also with land transport, the facilities have varied from time to time, according to conditions and the progress of

ingenuity and invention. The earliest caravan of which we have any record was that of the Midianite merchantmen, with camels bearing spices and balm and myrrh, to which Joseph was sold by his brethren. Beginning with unbeaten, and going on to beaten tracks, the routes traversed for purposes of commerce, and by military expeditions for purposes of conquest, were not roads as we now understand the meaning of the word. The despotic rulers of the ancient civilisations would appear in a great measure to have done without them, having unlimited resources in the way of labour, but not being provided with modern tools, and only being compelled to expend mechanical labour in preparing their tracks for passing through forests, or over mountainous regions; whilst the two great arteries of the Tigris and Euphrates were the chief high-ways of communication, and the deserts were crossed in various directions by caravan tracks. There is indeed—to enable us to understand such conditions—no lack of examples of indifferent tracks or of the want of roads in this century, or even at the present day, as described by innumerable travellers, and as I have seen in recent years in travelling through South Africa, in riding through Bosnia and other parts of Europe, and in North and South America. The corduroy roads of Canada and the United States, where timber is plentiful—the asphalt of the pitch lake in Trinidad and of other regions, and various devices, according to local circumstances, have from time to time afforded means of partially overcoming the difficulties of dragging wheeled vehicles through difficult countries. In tropical countries of luxuriant vegetation, tracks or roads when made require constant maintenance, or they rapidly disappear; and the difficulties of maintenance have, no doubt, in past ages, quite as much as the difficulties of construction, been a bar to facilities of communication.

The Carthagenians are said to have been the first to construct roads with solid foundations, paved with hard material, and curved on the surface. The Romans, following their example, extended such roads throughout their Empire. They constructed 14,000 miles of road in Italy, most of which are still utilised; and they connected the capital with the extremities of their dominions in all directions, forming, amongst others, a continuous route (except the sea passages Sandwich to Boulogne, forty-two miles, and Brundisium to Dyrrachium, thirty-eight miles) from the Wall of Antoninus, connecting the Forth and the Clyde, eastward to Jerusalem, of about 3750 miles. Although the primary objects were facility of communication and rapidity of military movement to consolidate conquests, yet these grand highways subserved the not less important objects of civilisation, agriculture and commerce, besides sometimes affording facilities to robbers and highwaymen. These roads ran from city to city, regardless of obstructions or the rights of property, and the distances were accurately marked out by milestones; whilst post-houses were provided a few miles apart, with horses and all materials for imperial, and occasionally for private, services. With relays of horses a hundred miles a day were accomplished without difficulty. When the Prætorian Guards, after atrociously murdering the honest Pertinax, and literally putting the Empire up to auction, received £200 a head as its



purchase from the silly old Didius Julianus, A.D. 193, the most distant legions prepared to advance on Rome under their various commanders; and Septimus Severus, on foot, in complete armour, actually marched at the head of the columns of his Pannonian army at the rate of about twenty miles a day from the banks of the Danube to those of the Tiber, with a short halt about seventy miles from Rome, between the 13th of April and the 2nd June; this prodigious *iter* proving the goodness of the roads, the discipline of the legions, and the facility for obtaining provisions *en route* for a numerous army.

The oldest and perhaps the best known of the Roman roads was the Appian Way (Regina Viarum), laid on foundations of cemented strata, and paved with blocks of basaltic lava. It was partly formed in 313 B.C., from Rome to the Three Taverns, Appii Forum, and Capua, forty-two miles, and thence later to Tarentum (Tarento), and Brundisium (Brindisi), 242 miles. I may here say, by way of parenthesis, that after a careful inspection of the railways and ports of Italy on behalf of H.M. Government in the year 1866, I had the honour to select and recommend this port of Brindisi, with certain improvements, which were carried out, as the point of departure for our Eastern Mails, and it has since been used for that purpose. The Ostian Road led to the mouth of the Tiber. The Aurelian Road, by Genoa and the Mont Cenis, improved by Pompey the Great, formed, as the Strada Romana, the oldest route into Gallia. The Flaminian Way led to Ancona, Bologna, Venetia. There were others, too numerous to mention, and the Tiburtine Road is said still to exhibit the blocks of stone used in its construction some 2000 years ago.

Of the roads made or improved by the Romans in England, the best known (in regard to which, however, antiquaries differ) are the Vitellian Way or Watling Street, passing from Dover, near London, west of St. Albans, through Dunstable, Towcester, Weedon, Atherston, to Wroxeter, and thence to Cardigan Bay; the Ikeneld Street (after the Icen) from Berkshire to Suffolk and Tynemouth; the Fosse Way (defended by a ditch) from Cornwall by Tetbury, Coventry and Leicester, to Lincoln; the Ermin Street (after Irmin or Mercury) from St. Davids through Gloucester to Winchester and Southampton.

But wealth and luxury, tyranny and wickedness, sapped the vitals of the Roman Empire. Gibbon has described to us in stately and stirring periods the memorable series of revolutions, extending over thirteen centuries, which gradually undermined and at length destroyed that "solid fabric of human greatness."

As illustrations of the Asiatic routes, I may cite that Cyrus in proceeding against Cræsus, King of Lydia, did not take the shortest, afterwards the Via Regia (Royal Road) through Diarbekr, but the more circuitous route by way of Erzeroum, through North Cappadocia. Cyrus also marched from Sardis to Celæne, through Lycaonia, Cilicia, Thapsacus, and along the banks of the Euphrates to Cunaxa. Cræsus, on his march against Cyrus, passed through Pessinus, Ancyra, Pteria. Xenophon and his 10,000 traversed another route, through the Cilician Gates, by Iconium, and returned from Cunaxa to Chrysopolis, opposite to Byzan-

tium (Constantinople). Tadmor (Palmyra) owed its importance to its position on a well-watered oasis in the Arabian desert, about half-way between Damascus, which was connected both with Tyre and Sidon, and Thapsacus on the Euphrates. It was thus on the high route of caravans between Assyria and the West. It was destroyed by Aurelian, 272 A.D.

The well-known expeditions of Alexander the Great were perhaps the most extraordinary on record. After destroying the Theban power, and subduing other states of Greece, he prepared, 334 B.C., for his invasion of Asia, with some 30,000 men and 4000 horse, destined, in marching from victory to victory, to subsist mainly on the spoils of their enemies. He defeated 600,000 men under Darius at Issus, captured Sardis, and devoted seven months to the siege and destruction of Tyre. He then passed down the Syrian coast to Pelusium (the gate of Egypt), and there, finding his fleet, which he sent along the Nile to Memphis, he marched across the desert to meet it, and made himself master of Egypt. Returning to Phœnicia in the spring of 331 B.C., he reached Thapsacus towards the end of August; and at Arbela he won the second great battle over the hosts of Darius, which practically settled the fate of Persia. After acquiring enormous treasures at Babylon, Susa and Persepolis, he pursued Darius to his mountain palace at Ecbatana, and devoted three years to the subjugation of other provinces of the Persian Empire. In 327 he prepared to invade India. Crossing the Indus at Attock he defeated Porus, advanced to the Hydaspes (Jelum), and occupied the Punjab. He reached the Hyphasis (Beas), but his troops murmured, and compelled him to retreat again to the Hydaspes. He built a fleet, which took part of his army down the river, whilst the other part fought its way along the banks. He sent Nearchus with the fleet down to the Persian Gulf, and in 326 he marched, himself on foot, across the heated deserts, through Gedrosia (Baluchistan), sharing privations and fatigues with his soldiers. Another division of his army marched through Drangiana (Afghanistan) under Craterus, to join him in Carmania. His difficulties in the desert, and want of food and water, cost him enormous losses, but at Susa in 325 he and his army rested and feasted. At Babylon in 324 he despatched expeditions in various directions, surveyed the Euphrates, and drank deep at grand banquets, until his life terminated, after eleven days of fever, on the 28th June, 323 B.C., at the age of thirty-three. The he-goat of Daniel thus in eleven years conducted his army, whilst engaged in constant battles and sieges, over a distance of about 13,000 miles, and subdued the Persian Empire, which comprised the then known world. In the prophetic words of Daniel he "smote the ram and broke his two horns, and there was no power in the ram to stand before him, but he cast him down to the ground and stamped upon him, and there was none that could deliver the ram out of his hand."

Alexander received reinforcements from Greece at Susa and elsewhere from time to time, and employed mercenaries; and in opposing hordes of barbarians he was able to employ better armed and disciplined troops under his own impetuous leading; yet he had not the advantage of modern weapons by means of which European or other forces reckoned

by hundreds can successfully oppose in the present day so many thousands of inferior races.

Cyrus and Darius had prepared, if not paved, the way for Alexander in one respect. Appreciating the importance of rapid communication between and with the governors of far distant provinces, they had established stations with post-houses along the lines of route, between the chief cities of the Empire, so that messengers (*ἄγγαροι*) could thus gallop from post to post by night and day.

Taking a glance, in passing, at the "New World," amongst the greatest of the world's road-makers were the Incas of Peru, whose ancient civilisation and paternal form of government, extending over 500,000 square miles of territory, and 2500 miles of coast line, were destroyed by the Conquistadores under Pizarro and other ambitious, unscrupulous, and treasure-seeking Spaniards. The road from Quito to Cuzco, which was some 1500 miles long, and forty feet wide, was formed with stones ten feet square; and was planted with avenues of trees, and supplied with running water. Attaining levels of 14,000 feet and more above the sea, it passed over pathless and, at certain seasons, snow-clad sierras, through leagues of rock tunnels, and across great streams and torrents; and was carried over the ravines of the Andes by masonry built up solid from their greatest depths. The bridges across the mountain streams were from 100 to 250 feet in length, suspended at giddy heights, and constructed with the frailest of materials—cables and ropes of twisted osiers and vines stretched from bank to bank, bound together and floored with bamboo or timber. The roads across the Andes, in Central Peru from Callao and Lima, and in Southern Peru from Mollendo and Arequipa, have been superseded by railways now operated by the Peruvian Corporation—the Galera tunnel on the Central Railway being at the same height as the summit of Mont Blanc, some 15,665 feet; and the Southern Railway reaching Lake Titicaca, 100 miles long by 60 miles wide, and 12,500 feet above the sea, at Puno, after passing a summit of 14,666 feet. The steamers on the lake belonging to the Peruvian Corporation carry goods and passengers to and from Bolivia, and copper ores from the Corocoro mines along the Desaguadero river. The shallows and marshes connected with this river, as it leaves the lake, form a most interesting home for water-fowl of all descriptions; whilst over vast areas of Pampas in Peru and Bolivia, at 13,000 or 14,000 feet above the sea, are herds of llamas, alpacas, vicuñas, cattle, and sheep.

But whilst there is so much to admire in the works left by the Incas of Peru, constructed some 400 or more years ago, in the way of roads, aqueducts, temples, and fortresses, and still more to wonder at in the cyclopean and other ruins remaining from a still earlier civilisation, to which no dates can be affixed, there is also much to lament in the present condition of the country as regards roads and communications, and the prospect of developing its mineral and agricultural resources. Much capital is required for those purposes, but, as the result of misgovernment and too frequent revolutions, confidence and credit are wanting. It is to be hoped they may some day be restored. Millions of acres of magnificent land in the Amazonian regions could be brought into cultiva-

tion; and a colony has been started by the Peruvian Corporation on the banks of the Perené, 1800 or 2000 feet above the sea, where the best of coffee is already produced. But 100 miles of narrow-gauge railway is required, at a cost of £450,000, which could be chiefly worked by the unlimited water-power flowing down the slopes of the Andes, to connect the existing terminus at Oroya, *viâ* Tarma, with the Perené region, and to supersede the mountain roads and tracks, along which the wretched horses, mules, and donkeys now carry their loads of aguardiente, coffee, timber, etc., whilst a few passengers in meeting or passing them struggle with them for safety round narrow ledges on precipitous mountain sides. The well-known mines of Cerro de Pasco, as well as others, also require improved means of communication, and work in unwatering, for their future development. The well-known Huanchacha mines of Bolivia are connected by a branch with the narrow-gauge railway, 578 miles long, from Oruro to Antofagasta, which does admirable work, and along which I travelled after leaving La Paz rather more than a year ago, having made a prolonged tour through Peru in the regions to which I have above referred.

The great ambition of Peru and its rulers is to open up communication *viâ* the Perené and other rivers, including the Ucayali, and *viâ* Iquitos and Manaos on the Amazon, to the Atlantic. The distance from Callao to Para by this route I found to be 3565 statute miles, and the distance by that route from Callao to Southampton is 1000 miles greater than that *viâ* Panama. Having regard to the difficulties of navigation, and of making and keeping open roads in these tropical regions, it is evident that they must be contented in the first instance to improve their communications between the Central Railway and the Perené. These have fallen into a worse condition of late, the money taken at the garitas or toll-houses having been diverted to other purposes. Especially should this route be improved if the Panama Canal is completed, as is possible now on the revised scheme of the new company, in five or six years, if only the money required be found for it and honestly expended. The prospect of its completion seemed much more hopeful when I made a careful inspection of the works, the machinery, and the route, in company with the officers of the company in the autumn of 1895. It was then proposed to surmount the great difficulties of the Culebra cutting by the construction of ten locks, and the reduction of the depth of that cutting by 160 feet; and to overcome the other great difficulty of the Chagres river, by the construction of dams in suitable situations so as to form two great lakes, each upwards of twenty miles long, by means of which the river would be turned into a useful ally instead of a destructive enemy, and would provide water for the future use of the canal.

The completion of the railway route across the Andes, in which there is still a break between Chile and Argentina, is shortly to be undertaken, and then railway communication will be complete by that route between the Pacific and the Atlantic.

"Millions died that Cæsar might be great," and ten million human beings are estimated to have perished that Spain might acquire and ruin her American possessions.

The six centuries following upon the destruction of the Western division of the Roman Empire, 476 A.D. (1421 years ago), comprise the most melancholy period in the history of the human race. Babylonia, Egypt, and Assyria, after constant wars, became provinces of Persia. Persia was conquered by the Greeks, who in their turn made way for Roman ascendancy. Nebuchadnezzar had ruined the commercial prosperity of the Phœnicians. Alexander and Antigonus completed their destruction in Syria. The Romans destroyed Carthage and most of the remaining commerce of the Western world. The northern barbarians sacked Rome and brought to a close the glories and disgraces of the Western Empire. The mighty cities of Western Asia disappeared. The remains of the world's foreign trade between Europe, Asia, and Egypt were carried through Constantinople by Greeks and Venetians, the latter supplying the Saracen slave market in exchange for Asiatic luxuries. Though the old civilisations had been wiped out, yet the centre of commerce was still in the East. In Europe, ignorance, poverty, lawlessness, extortion, robbery, superstition, and vice prevailed. Internal as well as foreign trade dwindled and decayed. Travellers were waylaid, plundered, and sold into slavery. Agriculture was sacrificed to sport, manufactures were neglected, and absolute necessities, including clothes, were locally produced. From England slaves were exported, after the Conquest, to Ireland. The world had to depend upon Scandinavians for enterprise, on the religious bodies for exploration, on the Arabs for science and art. Only 100 years after the Hegira (622 A.D.) conquering Arabs occupied Spain, and menaced the rest of Europe. France and Germany were saved from their grasp by the seven days' combat in 732 A.D., in which 300,000 Moslems were sent to their last account in conflict with the forces of Charles Martel. The Crusades mainly occupied Europe and Syria from 1097 to 1250. Genghis Khan, the greatest and most sanguinary of conquerors, was from 1201 for twenty-six years the terror of Asia. He invaded Turkestan in 1218 with 700,000 men, stormed Bokhara and Samarcand, and is computed to have exterminated 5,000,000 human beings. Tamerlane from 1362 proceeded from conquest to conquest, and also, with 700,000 men, routed the Turkish host in 1402; and he was only prevented from conquering China by his death in 1402. In his invasion of Syria, 1400, he is reported to have reared on the ruins of Bagdad a pyramid of 90,000 heads.

In the twelfth century Europe began to recover from her degraded condition. The Hanseatic League was formed in the middle of the thirteenth century, embracing ultimately sixty-six cities and thirty-four confederates, for mutual defence against piracy and pillage. It created new centres of trade and civilisation, connected its members together by roads and canals, exercised great political influence, and conferred substantial benefits on the north of Europe for two centuries. It was the "undisputed mistress of the Baltic and the German Ocean." The greatest powers sought its alliance and feared its hostility, until, with the fifteenth century, its influence declined. It was, in fact, no longer required, and the courses of trade changed on the discovery of America in 1492, and of the sea-route to India at the end of the century.

As commerce then revived, routes of communication by sea and land were re-opened. A religious order was founded in England, which spread into several continental countries, for repairing and improving roads and bridges as part of the *trinoda necessitas*. It was considered a pious work, and meritorious towards travellers, comparable to visitations of the sick and relief of the poor, for all of which remissions of the penalties on sins were granted. In 1660 the British public began to take a real interest in their highways, and, with better prices for agricultural produce, there was general improvement. But even in the sixteenth and seventeenth centuries there were still lamentable complaints in Europe generally. There was extreme difficulty in passing along the paths and tracks that existed. The ruts were deep, the hills precipitous, six horses were insufficient for the coaches, and oxen were also employed, even on the best routes. In England, Thoresby the antiquary lost his way between Doncaster and York; and Pepys and his wife between Newbury and Reading.

Parliament was kept waiting until the prelates, earls, barons, knights of the shire, and others, could make their ways through the mud. Goods were carried on trains of pack-horses at an expense almost prohibitive. Women travelled astride on horseback as well as men. In 1685, a Viceroy on his way to Ireland was unable to proceed in his coach more rapidly than fourteen miles in five hours, between St. Asaph and Conway, and was obliged to walk on to Beaumaris, with his wife carried in a litter. But after the peace of 1748, more serious attempts were made to ameliorate the wretched condition of the roads; and after 1760 a general improvement took place. As many as 452 Acts of Parliament were passed for roads, and nineteen for canals within fourteen years. General Wade began to construct roads through the Highlands of Scotland in 1726; and you will all remember the old rhyme by which the results were celebrated—only 165 years ago:—

“If you’d seen these roads before they were made,  
You would hold up your hands and bless General Wade.”

In the fifteenth century coaches of various descriptions came into use, and in 1564 a “showy vehicle” was built for Queen Elizabeth. The first stage-coach in Scotland seems to have been started by Provost Campbell in 1678. It ran between Edinburgh and Glasgow, “*drawn by sax able horses, to leave Edinburgh ilk Monday morning, and return again (God willing) ilk Saturday night.*” Mail coaches were introduced at Bristol in 1784, and from 1785 they became general in England. The first mail coach travelled between London and Edinburgh in 1785, and the first between London and Glasgow in 1788. It took longer then to go 400 miles from London to Edinburgh than it does now to go nearly 3000 miles from Liverpool to America.

The story of the commencement of the mail-coach system is too good to omit. Mr. John Palmer, manager of the Bath Theatre, was well acquainted with the great western road, which was much frequented, not merely by people of wealth and fashion, but also by high-class pro-

fessional gentlemen. When not engaged with travellers, the highwaymen amused themselves with taking extracts from the mails. Robberies were so frequent that the officials of the Post Office came to consider them as unavoidable, and requested the public to send bills of exchange and bank notes in halves only, remarking helplessly, in one case, that "*there are no other means of preventing robberies with effect, as it has been proved that the strongest carts that could be made, lined and bound with iron, were soon broken open by a robber*"; and in another case, "*when desperate fellows had once determined on a mail robbery, the consequence would be murder in case of resistance.*" The average speed of the mails was three and a half miles per hour, but their despatch and delivery were very irregular. When Mr. Palmer suggested mail-coaches, well-horsed, adapted for good speed, each in charge of an armed guard, he received an official reply of regret that he "*should not first have been informed of the nature of the business,*" and of assurance as to the constant endeavours towards improvement "*in all situations and under all circumstances,*" which had made them "*almost as perfect as can be without exhausting the revenue arising therefrom.*" It was only on a special appeal to Mr. Pitt that Mr. Palmer's mail-coaches were brought into use, and the postal net revenue was raised from £196,513 in 1784 to £1,100,606 in 1808.

The Bianconi Car was, to use an Irishism, the stage-coach of Ireland. It was similar to an outside Irish car, but with four in place of two wheels. The story of its successful introduction is equally characteristic with that of the English mail-coach. When Bianconi (afterwards Mayor of Clonmel) first constructed his cars, they were not looked upon with favour, and he feared the loss of his money. He therefore imported an "English Protestant coach," and ran it in opposition to create excitement; and having succeeded in this respect, he arranged for a collision in which the Protestant coach smashed up the Catholic car. By this means he at once secured the popularity of his cars and his own fortune.

We can many of us remember the perfection which mail and stage coaches and the posting system reached before the construction of railways. Diligences for public and private use were at the same time the ordinary, though inferior, means of conveyance on the Continent. I well remember being taken from Cheltenham to London in a post-chaise by my father and mother in 1835, doing the 100 miles in ten hours. I travelled by canal boats drawn by horses in Ireland in 1845; and I went from Rome to Naples in a diligence in 1855 in forty hours, with five examinations of passports and two of luggage in the 120 miles, a sharp look-out being kept for banditti. In other parts of Italy we had not only horses and mules, but also oxen, and even cows with women to drive them, to assist our vehicles over the mountains.

Brigands and highwaymen have acted powerfully in restraint of communication even in modern times, not only in Turkey, Italy, and Greece, but also in England. Robin Hood and Little John flourished from 1189 to 1247. Claud du Val, regretted by many of the fair sex, died at Tyburn, 1670. McCabe was hanged at Nass twenty-one years later. I have, however, found even brigands useful, and afforded them honest employment. When I was at Athens 1868-9, making the Athens

and Piræus Railway, I found difficulty in obtaining protection for the works from those who were hostile to them until I hired six brigands, who saved me all further trouble, and were perfectly loyal, as they usually are to those who employ them. When I was later at Salonica, in 1875, in the course of an arbitration between the Turkish Government and Baron Hirsch, I heard from the well-known Consul-General Blunt and Mrs. Blunt, that whilst he was in the mountains assisting in the search for a noted brigand and murderer, Mrs. Blunt, who became anxious about his long absence, made known her desire to join him, and her wish for an escort. A most polite individual appeared, told her he knew well where her husband was, and offered for a certain sum to convey her safely to him. Mrs. Blunt accepted the offer, received careful attention from him in riding with her, and sleeping at her tent door; and, after safely reaching her husband, she paid him his stipulated reward. They found later that he was the brigand chief whom Mr. Blunt was assisting to hunt down.

In making my plans at Turin (then the capital) for inspecting the railways and ports of Italy in 1866, for the purposes already referred to, I proposed to cross Calabria, in place of going round by sea, but was told by the Italian minister, Jacini, that he could not allow me to do so, as he could not even with an escort of 100 Carabinieri protect me from the brigands. But there were brigands at the hotels as well as in the country, as I found when the landlord at Brindisi charged me for sixteen beds, and my Italian companion for eight beds, after a twenty-five hours' sojourn in his hotel. These charges were made on the grounds that the room I occupied could have been used for four beds, and an ante-room through which it was approached for four beds more, and that we ought to pay for two nights. Having settled the bill, I insisted on sleeping there for the second night for which I had been compelled to pay, and thus turned the tables on mine host, who became very angry, because he could otherwise have made more money out of a shipload of Garibaldians just landed in the port, in view of the expected war with Austria. Such attempts at imposition, which were then very common in the south of Italy, also acted in restraint of the use of communications.

A good story of an English highwayman was told me twenty years ago by Mr. Corsellis, then my landlord at Wyvenhoe Hall. His uncle, a clergyman of the same name, was a man of powerful build, and had been a notable duellist. As he was about to travel out of London, his post-boy asked what he should do if they were stopped, and received the reply, "Go on and do as I tell you." In crossing a heath on the south of London the carriage came to a stand, and a gentleman of the road looked in at the window. Seeing the occupant of the carriage lolling back, and apparently asleep, this gentleman peered in further, to make more precise observations. As he did so, Mr. Corsellis seized his head with both hands, held it fast, and cried "Drive on, drive on." The highwayman was pulled off his horse, and dragged along, with his head in the iron hands of Mr. Corsellis, and his neck on the window-sill; and when the carriage stopped again, the highwayman was dead.

My apology for dealing too much, perhaps, in detail with the



difficulties of communication in the past, and even in recent times, is the conviction that without recalling them to mind, with the aid of personal reminiscences, it is impossible for any of us in the present generation to realise the extraordinary improvements that have so rapidly taken place in the Victorian Era. During the 4500, or any other number of years that chronologists may assume to have elapsed between the deluge and the present century, mankind was unprovided with those means of communication which are now so familiar to us all, by land and by sea, by telegraph and by telephone. And now that these are the common-places of our daily existence, it is difficult to understand how the business and pleasure of the world could have been carried on in the absence of them.

Inland navigation dates from the earliest ages, as practised by Egyptians, Assyrians, Hindus, and Chinese, but it was only after the Christian Era that canals were constructed in Greece, Italy, Spain, Sweden, Russia, France, and other parts of Europe. Until locks were invented in the fourteenth century, canals were employed at a disadvantage, the vessels having been previously raised or lowered by other devices, such as ramps or mechanical lifts. The Chinese were the earliest constructors of canals on a grand scale, the Imperial Canal, 1000 miles long, having been completed in 1289. The navigation of the system of the Saint Lawrence in North America, from the head of Lake Superior to the Atlantic, 2600 miles, has been continually improved from time to time by widening and deepening the channels, and by the construction of canals to circumvent the obstructions occasioned by rapids and by the different levels of the great lakes; and it is still in course of further improvement, so as to enable larger vessels to pass through the whole length. There is now a Canadian canal by the side of the American canal which served for so many years at the Saulte Sainte Marie (falls of St. Mary), between Lake Superior and Lake Huron. The amount of traffic on the St. Clair River, which runs between Lake Huron and Lake Erie, though it is closed by ice for five or six months, has increased so much (as I have had occasion to notice during annual visits to it for nearly twenty years), as to exceed the traffic through the Suez Canal. Steamers towing sailing vessels are constantly passing through it by night, as every stranger who tries to sleep on its banks can testify, as well as by day. The Erie Canal, from Lake Erie to the Hudson River, also carries a very large traffic, especially of grain. John Law, of Edinburgh, controller of the finances in France, opened a French bank in 1716, and proposed by the profits of his Mississippi scheme to pay off the French national debt. The nominal capital was £100,000,000, but wholesale ruin resulted on its explosion in 1720. In Great Britain there are, including the Caledonian Canal, upwards of 4000 miles of canals, many of which have been of enormous use in the manufacturing districts, though they are of less importance since railways have been constructed. On the Forth and Clyde Canal steam-towing was first used in 1789. Holland is intersected by canals in all directions. The total length of water navigation in Russia is about 35,000 miles, made up of shallow systems, navigable rivers and

connecting canals. The Russians have for the last twenty years had in view the establishment of a through water-route from the Baltic to Afghanistan, to solve a question raised by Peter the Great, which mainly depends on the practicability of re-establishing the ancient channel of the Amou Darya to the Caspian Sea, by diverting it from its existing course into the Aral. This question was raised again last year as a mode of opening up the markets of India to Russian commerce. In France 3800 miles of inland navigation have been established in the past 300 years, and further expenditure to a considerable amount is contemplated. In Germany, especially, canal traffic has acquired increased importance of late years. The North Sea and Baltic Canal has not proved a commercial success, but there are 8700 miles of canalised routes affording good and cheap communication, and in many cases competing with the railways. The employment of these routes is, however, more profitable to the freighters than to the carriers, as I know to my cost, from being the not too fortunate proprietor of a large business of this description, running steamers and barges between Hamburg and Berlin. The Suez Canal, at a cost of £20,000,000, saves 3750 miles of ocean navigation. It is believed that water communication existed 600 years B.C. between the Red Sea and the Mediterranean, which later fell into disuse; so that Eastern trade went first by the Red Sea, then round the Cape of Good Hope, and now again resumes its course by the Red Sea, but may once more be changed in the event of war.

The greatest changes that have been produced in the "Geography of Communications" have resulted from the use of steam power and the construction of railways. Gradually in the seventeenth and eighteenth centuries the first crude ideas fructified, until steam-boats came into practical employment in the beginning of the nineteenth century on both sides of the Atlantic. The *Clermont* steamed from New York to Albany in 1807. The *Comet* was launched on the Clyde in 1812. The *Savannah*, with auxiliary engines, crossed from New York to Liverpool in twenty-six days in 1819. The *Great Western* steamed to New York from Bristol, and the *Sirius* from Cork, both in eighteen days, in 1838, and the former maintained its service for some years. In 1840 steamers traversed the Indian Ocean, and in 1845 the *Great Britain*, 3000 tons, built of iron, and propelled by means of a screw, commenced its career.

In the seventeenth and eighteenth centuries, also, tramways—first of wood, then of wood shod with iron, and next with edge-rails of cast iron—were employed in the North of England and the South of Scotland and other localities for the conveyance of mineral produce to ports of shipment, and for other purposes; and the first locomotive worked on the Merthyr-Tydvil railway in 1804. Locomotive power was employed on the Killingworth railway in 1814, and on the Stockton and Darlington railway passengers were carried in 1825. The Liverpool and Manchester railway was opened in 1830, the Liverpool and Birmingham in 1837, and the London and Birmingham in 1838. Other railways followed, until in 1870 £530,000,000 had been expended in their construction.

During the lifetime of many of us, therefore, and practically in the

Victorian Era, the railways and steamships by which the traffic and commerce of the world are now so efficiently conducted, and have been so enormously increased, have come into existence.

There are now, in round figures, about 466,000 miles of railway open for traffic, made up of 160,000 in Europe, 250,000 in America, 30,000 in Asia, 10,000 in Africa, and 16,000 in Australia, which may be estimated to have cost upwards of £12,000,000,000. In the United Kingdom 22,000 miles have cost £1,020,000,000. China, now at last making a serious commencement, has yet to be provided for. Russia is preparing to extend her Siberian railway through Northern China, and her Transcaucasian railway *vid* Teheran to the Indian Ocean. The Russian-Manchurian, or Chinese Eastern railway, will intersect the Chinese frontier at Staro-Tsurukaitui, and pass the towns of Chichihar, Hwang-chang and Ninguta, joining the Siberian line at Nikelskoie. Out of 1280 miles, as the total of the Manchurian railway, 946 will pass through Chinese territory. It will save 342 miles as compared with the line within the Russian border, and will pass through a better climate with more productive soil. Egypt is constructing 300 miles of railway between Wady Halfa and Abu Hamed, as another step towards completing her connection with the Soudan, and will, no doubt, when she regains possession of the Nile at Berber, construct the Suakin-Berber railway, and thus reduce the distance from Khartoum to the sea to 500 miles, as compared with 2000 miles by the Nile from Khartoum to Alexandria. This will, by placing the Red Sea in communication with thousands of miles of lake and river navigation, do more than any other railway to open out the fruitful regions of the Eastern Soudan to civilisation and commerce. Another railway will ere long be undertaken to Kano, the commercial centre of the Western Soudan, with 120,000 inhabitants; and in East Africa a line through German territory from Chiromo to Matope will connect Lake Nyassa with the sea. The railway through Rhodesia is being pushed forward to Buluwayo; but a vast amount remains to be done on the African continent as well as in other parts of the world.

Another extraordinary feature of recent times is the rapidity with which tramways, urban, suburban and others, have come into use. These are worked by horses, by steam, by cable, or by electricity. An iron tramway was opened for traffic between Croydon and Wandsworth in 1801. A horse railway was employed for passengers between New York and Haarlem in 1832. Since 1852 the tramcar has been making its way on both sides of the Atlantic, but more especially in America, which owns more miles of tramways than all the rest of the world. There is in that country more disposition to travel, the distances in the towns are greater, the roads were, and even now are, less adapted for easy travelling, and the cost of the hire of conveyances is prohibitive. On the elevated railroad in New York the trains run at one minute intervals, and the tramcars and omnibuses in that city are constantly overcrowded. Cable tramways are used in New York and Chicago; and in such cities as San Francisco and Kansas City the cars run rapidly, though the gradients on the roads are severe, and at close intervals. The towns, the cities and

many parts of the country in America are now provided with tramways, the "trolley" electrical system, with overhead wires, being that which is most in vogue. In 1860, Mr. Train, armed with American experience, sought to introduce tramways into Europe, but he found some prejudice to contend with, and there were not the same conditions to deal with as in American cities. During the last twenty years, however, tramways have spread over Europe until there are now some 10,000 miles at work, against upwards of 15,000 miles in America, as may be estimated, though there is no means of obtaining exact figures.

It is impossible to enumerate here the individual firms and companies, subsidised or unsubsidised, owning the merchant shipping of the world, or to dwell upon the details of the numbers of vessels employed, or the routes through every part of the habitable globe which they frequent. Omitting those below 100 tons, the grand total of ocean-going vessels amounts in round figures to 30,000, with an aggregate tonnage of 25,600,000. About 14,000 are steamers with 18,000,000 tons, and 16,000 are sailing vessels with 7,600,000 tons. Of the total tonnage, the United Kingdom claims 12,300,000, and its colonies upwards of 1,000,000, so that more than half the tonnage of the world belongs to the British Empire. The United States comes next, with 3200 vessels, and 2,235,000 tons, besides very large numbers of vessels for inland navigation. The Germans have 1650 vessels, and nearly 2,000,000 tons; the Norwegians 2900 vessels, and 1,670,000 tons; and the French 1160 vessels, with 1,130,000 tons. The French tonnage has slightly declined, although France has been paying bounties averaging £400,000 a year for the last ten years. The German tonnage has, on the other hand, advanced, as the result of a similar system. The French complain bitterly of the comparative uselessness of the ports round their coast on which they have lavished so much money, whilst Hamburg, Bremen, Antwerp, and Rotterdam go ahead. The enormous traffic in passengers and freight between Europe and North America has occasioned the construction of the largest and swiftest vessels for that route, until the Atlantic passage has been reduced to a few hours, more or less, above five days, in vessels of 12,000 tons, with engines of 30,000 h.p.

It is a magnificent sight to see half a dozen steamers of the first class following one another closely down New York harbour of an afternoon on their voyage to Europe; and, in travelling in them, it is interesting to find the little lever used to signal from the deck to the engine-room kept unaltered, at "full speed," for the whole of the voyage. The saloons, the music-rooms, the libraries, the smoking-rooms and their gorgeous decorations are all that could be imagined to make a voyage pleasant, and life at sea luxurious.

The route next in importance is that by the Suez Canal to the East, and to Australia, in which, as well as on the Atlantic route, other nationalities compete, with subsidised vessels. The traffic has not yet justified so high a speed, nor vessels of such magnificent proportions. But they are gradually being constructed on improved types, as well as the steamers to the Cape of Good Hope. We have already received replies to letters from London to the interior of India within a month.

And we may hope, ere long, to go regularly to the Cape—6000 miles—in a fortnight; and 12,400 miles from London to Sydney, by sea, in five weeks, and by way of Brindisi in a month.

Liverpool to Calcutta by the Cape being 11,380 miles, and Liverpool to Bombay by the same route 10,530 miles, it would seem likely that as better steamers are built to make these passages in less time and with more comfort, there may be a chance of the partial revival of the use of the long sea-routes. The Canadian Pacific route by Vancouver, and the American route by San Francisco also offer opportunities for competing with the Suez Canal route to those who have business in North America, or who do not object to the railway journey across the American continent, on their way to China, Japan, and Australia. The distances *via* Vancouver are: Liverpool to Hong-Kong 11,649 miles, and Liverpool to Sydney 12,663 miles.

The greatest amount of trade done by the United Kingdom in any one year, appears to have been in 1890, when the exports and imports together reached nearly £749,000,000, exclusive of bullion. In 1894 the total trade was £682,000,000; in 1895, £702,500,000; and in 1896, £738,000,000. In 1836 it was £125,000,000. It is satisfactory to learn that about 72 per cent. of that trade is carried in British vessels, the same proportion obtaining for the world's traffic carried in British vessels through the Red Sea. The total imports into the United Kingdom for 1895 were £416,689,658, of which £95,530,210 were from British possessions; and the total exports of the United Kingdom for the same year were £285,832,407, of which £76,072,151 were to British possessions. Such are the splendid results as regards the United Kingdom of existing means of communication by land and sea. They are due mainly to the sense of security in Great Britain for the employment of capital, which has gradually been established, and is now universally experienced by those who conduct the world's business. An American statesman lately expressed his opinion that the pound sterling is the basis of British prosperity. In any case, the gross revenue, raised more easily in the United Kingdom for the year just closed, was £112,000,000, against £52,500,000, raised with far greater pressure, in 1836; and it would be most disastrous, not only for the British Empire, but also for the world, if the confidence and credit now attaching to British commerce, and to British naval power, were in any way to be undermined.

The geographical communications of the world for the exchange of *information* comprise as regards (1) postal work: (a) letters, (b) post-cards, (c) newspapers, (d) book packets, (e) parcels; and as regards (2) telegraph work: (a) cable messages, (b) telegraph messages, (c) telephone conversations.

The United States is far ahead of other nations in its postal, but more particularly in its electrical, activity of communication. The genius of the working community in that country lends itself to restless activity, and the distances are so great that time cannot always be afforded for written questions and replies. The numbers of despatches by post of all kinds were by the latest returns 10,394,000,000 for the

United States, with a population of 64,000,000, against 2,907,000,000 for the United Kingdom, with a population of 37,750,000; 2,157,600,000 for the German Empire, with a population of 49,430,000; 1,951,000,000 for France (including Algeria), with a population of 38,350,000; and 481,600,000 for Russia in Europe, with a population of 93,000,000. These give per head of population, 162·4 for the United States; 77 for the United Kingdom; 43·6 for the German Empire; 50·8 for France and Algeria; and 5·2 for Russia in Europe. As regards the use of the telegraph, after the United States come the United Kingdom, France, Germany, in the order of activity.

Taking the United Kingdom alone, the numbers of letters have increased in ten years from 1,403,500,000 to 1,834,200,000; the numbers of post-cards in the same time from 171,300,000 to 314,500,000; the numbers of book-packages from 342,200,000 to 672,300,000; and the numbers of parcels from 32,860,000 to 60,527,000; but the numbers of newspaper packages only from 147,700,000 to 149,000,000. The numbers of letters would, of course, increase very much more if a universal penny postage were to be introduced, as they did after the penny post was established for internal purposes in 1840.

The electric telegraph was first constructed in 1838, and the first submarine telegraph in 1849. Since those dates the civilised world has been furnished with a nervous system of 5,000,000 miles of telegraph wires, the ocean has been supplied in all directions with upwards of 160,000 miles of submarine cables, and the principal nerve-centres have been provided with telephones. In American houses it is quite common to insert apparatus by means of which the opening of a door or window, or the attempt to open a fastening, causes a bell to ring in the bedroom of the proprietor, and warns him of the locality which has been interfered with.

In conclusion, the moral of the foregoing historical *précis* is very simple and very obvious, and we are now fully able to appreciate it by the light of ample experience. The world's resources can be properly developed only by freedom of, and facilities for, inter-communication; and in each particular country the same law holds good. In proportion to the cheapness and rapidity with which passengers and freight can be profitably conveyed, and information exchanged, so is prosperity attained, civilisation promoted, and knowledge increased. The larger the area, the better the result. On the other hand, selfish attempts at monopoly—crabbed regulations in restraint of freedom for traffic and transport—censorship of public or private written or telegraph communications—the imposition of high protection duties—passport annoyances, are all practical mistakes, are seriously disadvantageous, and tend, sooner or later, to recoil on those who unwisely indulge in them. Subsidised industries, bounty-fed branches of business, and other unnatural sources of temporary prosperity, only act by way of stimulus in producing artificial results, and ultimately combine against the public and private weal. In any case, the most valuable elements of education which we can imbibe ourselves and impart to our children are (1) the avoidance of every wrong principle, scientific, artistic, mechanical, industrial; (2) the

advantages of absolute freedom—of intellect—of contract—of traffic and commerce—of mind and body; (3) the supremely valuable influences of true religion, of which the essence is charity. It is impossible to summarise the progress of the present century, and especially of that part of it which forms the Victorian Era, better than by quoting the words spoken to Daniel 2430 years ago—“*But thou, O Daniel, shut up the words, and seal the book, even to the time of the end: MANY SHALL RUN TO AND FRO, AND KNOWLEDGE SHALL BE INCREASED.*”

## LORALAI.

By Major A. C. YATE, 2nd Baluchistan Battalion.

I SELECT Loralai as the heading of my paper rather because I have been living there for the last sixteen months, than because I propose to confine myself exclusively to the limits of its immediate surroundings. What may be said of Loralai may be said of very many other parts of Baluchistan; and as, during the last seventeen years, I have seen a good deal of that frontier province, I do not feel that I can so dissociate myself from the rest of it as to be able to concentrate my ideas solely on Loralai. Not that Baluchistan in its length and breadth presents no variety of life and feature; still, with this variety underlying it, there is a general uniformity in the nature of the country, the people who inhabit it, and the life they lead. Whether it be the sand-hills of the Registan, or the rugged mountains of Zhob and Makrán, each district has its stamp of barrenness. Go where you will, you find the nomad and the villager; and both alike are ready to turn from the ways of peace to plunder their neighbour or defend their own possessions.

My first visit to Loralai was in January 1889. My regiment remained there till April or May of 1891, and for some twelve months of that time I was with it. I next visited Loralai in December 1895, and was stationed there till very recently, when I moved to Chaman, the charms and drawbacks of which Captain M'Mahon very briefly summed up in his recent lecture, before the Royal Geographical Society, on “The Southern Borderlands of Afghanistan.” If I can succeed in making “Loralai” an interesting subject, I think, some day, I should like to enlarge a little on “Chaman.”

There is a sound in the name of Loralai that forbids it to be dismissed abruptly. When first heard it awakens memories of the Lürlei of the Rhine; but the name, when analysed, presents no romantic elements. It is said that the late Sir Robert Sandeman was asked, some twelve years ago, when the cantonment of Bori was about to be founded, to provide a name for it. He suggested “Loralai.” The name is felicitous and appropriate. In the first place, its sound is attractive—more than the place itself at first sight, many would say; and, secondly, it possesses a geographical and etymological fitness. “Lora” means “river-bed,” and “lai” means “tamarisk.” The river-beds of Baluchistan—and those of