This article was downloaded by: [Newcastle University]
On: 18 December 2014, At: 01:38
Publisher: Routledge
Informa Ltd Registered in England and Wales Registered Number: 1072954
Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK

Scottish Geographical Magazine

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rsgj19>

The relations between commerce and geography

Hugh Robert Mill D.Sc. F.R.S.E.

Published online: 30 Jan 2008.

To cite this article: Hugh Robert Mill D.Sc. F.R.S.E. (1887) The relations between commerce and geography, *Scottish Geographical Magazine*, 3:12, 626-638, DOI: [10.1080/14702548708553883](https://doi.org/10.1080/14702548708553883)

To link to this article: <http://dx.doi.org/10.1080/14702548708553883>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

THE RELATIONS BETWEEN COMMERCE AND GEOGRAPHY.

BY HUGH ROBERT MILL, D.Sc., F.R.S.E.

*(Introductory Lecture to the Class of Industrial and Commercial Geography
in the Heriot-Watt College.)*

THE latter part of the nineteenth century differs from all preceding epochs, by the high differentiation of its activities, exhibited as division of labour in industry and as specialism in science. The two spheres, although polar in their objects, are yet most intimately related at every point. Every department of industry is reforming its methods, endeavouring to work with less waste and to more purpose. To effect this there must be an intelligent comprehension of the end in view, perfect knowledge of the material worked upon, and power over the means employed. It is the part of science to ascertain all the essential facts, not primarily for the benefit of the industrialist, but for the advancement of human knowledge; and it is the duty of science to place freely at the disposal of those who are ready to apply it all the information that has been accumulated. Hence it comes that each of the more important departments of industry, in producing, manufacturing, and transporting material, is intimately associated with some special branch of science, the two mutually supporting and extending each other. The various branches of science and of industry interlace in continually subdividing ramifications.

The British public is now awake to the importance of this fact—most other nations awakened to it a generation ago—and technical instruction is being forwarded with the zeal of one who has been a sluggard and who rides apace. The importance of a workman being acquainted with the scientific basis of his handicraft cannot be over-estimated, he not only does his work better, but he may—even in this age of highly developed processes—help to improve the applications of science, to discover new facts which advance the powers of research, and in no long time prove fruitful in fresh applications. Everywhere the rule of thumb is giving way; the balance, the burette, and the thermometer regulate manufacturing processes; but this has not happened until the necessity for it appeared. Priestley's experiments on fixed air were stopped a century ago, because the brewer who had allowed him to make observations on his vats thought that the experiments spoiled the beer. Pasteur's more complete following up of similar researches revolutionised brewing and made it a branch of science. The specialists in industry, as in science, press ever deeper into their ever-narrowing grooves, until to ordinary men they sink from sight like the cañon rivers of a high table-land. The philosopher surveys from an eminence the network of ravines in which scientific specialists are at work. He traces

their movements, generalises, combines, and organises the whole, yet he does not profess—or he does but profess—to be profoundly learned in each department. That pertains to the specialist; the generalising philosopher is content with an accurate and wide knowledge of the essential elementary principles, and the outstanding facts. In much the same way the merchant overlooks the labyrinth of industry, and, without complete knowledge of all the processes, he generalises and directs them. He may not know the precise change in the spectrum that warns the steelmaker to turn off the air-blast, and empty the converter; but he must have a general knowledge of the process of steel-making if he deals in metals. He may not know how the master of his ship fixes position at sea, nor how the Mercator differs from the great circle course on each ocean-route, but he should certainly know enough about navigation to estimate the probable length of a voyage. He may not know much about anthropology or philology, but he must know something of the manners, the customs, and the languages of the people with whom he trades. Such examples might be multiplied to infinity. No one will question that commerce is as important as industry, collection and distribution as necessary as production; but while the energies of the most powerful minds have been devoted to the improvement of processes, and the technical education of workmen, little has been attempted to systematise the principles of commerce, or instruct merchants and their clerks in that wider but accurate general knowledge which is of primary importance to them. It is perhaps supposed that the education of “any schoolboy” enables him to become a man of business by simply acting under the guidance of those already engaged in commercial work. But it is becoming plainer every day that not only is a knowledge of modern languages, of arithmetic, and of nominal geography necessary, but some acquaintance with political economy, history, and physiography as well.

It is the part of Industrial and Commercial Geography to supply in one department—and that perhaps not the most important—the want that is so patent; and at the outset it is well to explain how much is included under this name. It is not easy to define in few words a subject that is so far-reaching and so general, and the formulation of which has as yet scarcely been attempted.

Geography is the science which treats widely of the earth as the home of man, taking account of all the varieties of configuration of the land and water surface, of the natural and political divisions, and all the conditions resulting from these. Commercial and Industrial Geography only includes so much of the general scheme as has a direct bearing on the distribution of the products of value to mankind, and the means of rendering them available. Commerce is a channel, fed by the widespread springs draining areas of production, flowing into the great trade centres, and re-issuing in numberless streams to the regions of consumption. In its primitive form it is simply the process of exchanging surplus commodities for others of a different kind, and forms

a natural and necessary accompaniment to division of labour. The real cause determining all the complicated modern developments of the commercial world is that commodities are so abundant, or that they can be made so abundant, in some places as to be unnecessary, or at least superfluous, while in other places they are necessary or of value. Hence, at the outset, two great and distinct branches of science are required to throw light upon the relations of commerce, Physiography to show why products occur naturally in one place and not in another, and Economics to define value and equivalence of exchange. The two are of equal importance. The Society of Arts' Syllabus of Commercial Education gives this definition:—

"Commercial Geography treats especially of the principal places in which trade originates, and of the varieties of produce characteristic of each; of distances, routes, and ordinary modes of transit or conveyance to important markets; of different currencies, weights, and measures, with English equivalents. In its widest range it comprises such portions of natural history and of the applied sciences as are necessary for the correct classification and commercial appreciation of raw produce of every kind." Dr. Yeats, practically the only English writer on the subject, says: "Commercial Geography differs from political in giving precedence to the distribution and the utilisation of raw materials or of goods. It aims at showing a merchant where and when what he wants can best be had, whether corn or cotton, timber or wool; and also where that which he offers is most likely to be introduced to advantage. It helps the ship-owner to see what produce is accumulating, and where freights may fairly be expected."¹

Mr. Kenric Murray, in his recently published book,² restricts the scope of Commercial Geography to "the study of the economic distribution of commercial products in undeveloped countries."

The position of manufacturing centres with reference to areas of production is a fact of the first importance, and the conditions leading to the proximity of these or to their separation are deserving of consideration. The relation of commerce to geography has been most intimate in the history of exploration, and by studying this we may both obtain a clear understanding of the principles of commerce, and realise the gradual process through which the fabulous and the monstrous were dispossessed from the geographical mind, and clear, accurate conceptions substituted. There are two great modifying influences which affect Commercial Geography unequally—the physical and the political conditions of various countries. The physical is always the greater power, although occasionally for a short time the political element has had the predominating influence. These are hardly sufficiently brought out in the definitions we have cited above.

¹ *Recent and Existing Commerce*: London, 1887, p. vii.

² *Commercial Geography*, London (not dated), published 1887, p. 1.

There are numberless ways of drawing near and breaking in upon every special department of knowledge, much more upon any general field such as this. The first to suggest itself is the natural or historical method, tracing growth and development; another is the actual, statistical or geographical, taking up each region in detail, and studying its exports and imports; a third is to consider the raw products of commerce individually, and trace their distribution in various countries, their production, manufacture, and the special commerce to which each gives rise; and there is the complete method of ascertaining the underlying principles of production, transport and consumption, with the conditions modifying these, then deducing conclusions in a theoretical manner, and modifying them by comparison and actual observation. It may not be possible, in a short course of lectures, to follow any one of these methods in its entirety; or to pay equal attention to all the subjects which should be treated. It may help to give an idea of the general relations of Geography and Commerce if we at first consider them historically.

Two motives which lead to exploration of unknown regions have from all antiquity been the same—the desire for gain and the love of power. The former drew caravans of merchants, with their wares for exchange, across pathless deserts; tempted them down unknown rivers; even led them out, creeping from point to point, along the shores of the vague and terrible sea. This led also to the raids by land and sea of those who had no commodity save personal courage to offer in return for the coveted goods, who consequently adopted the old and simple plan of taking whatever could not be kept from them. The separation between legitimate commerce and plunder was slender in early ages; now it is supposed to be very substantial. The lust for power led armies into regions and through dangers that no other influence was strong enough to make men dare. Even in our own day, the war-ships of the great nations may be seen hovering round the few unappropriated islands of the sea, jealously watching each other for the first chance of swooping down upon the prey. No wonder, then, that there was some hard fighting, when continents stretched in unknown vastness before Alexander, and when new worlds in the west and east opened up to the view of the monarchs and adventurers of Spain and Portugal. Two other agencies there are, of more recent date and nobler purpose, to which much, if not most, of our modern completeness of view over and through the oceans and continents may be traced—missionary zeal in spreading religious truth, and scientific intrepidity in daring all dangers for the sole sake of knowledge.

It is with one division of the first and most far-reaching influence that we are to deal at present. Commerce has never flagged, never scrupled to take advantage of the other methods, and the history of commercial exploration is one of sustained interest from the dawn of civilisation till now.

In early times many things retarded geographical knowledge. There

was no means of determining position except by a rough measurement of distance traversed, there were no regular records kept of the journeyings of the caravans and galleys; and neither the disputations of the Middle Ages nor the more sober methods of modern research can now determine the sites of Ophir and Tarshish, whence King Solomon's navies brought him "great store of almug trees and precious stones," "gold and silver, ivory, and apes and peacocks." There is reason to believe that at an early age the Phœnicians traded to India, partly by caravan on land, partly by a route which, if they really used it, reflects much credit on their power of appreciating and utilising natural advantages. It is said, they made up caravans at Tyre or Sidon, travelled eastward to the Euphrates, sailed down that river to the Persian Gulf, and along the coast to India; then, taking advantage of the north-east monsoon, they crossed the Indian Ocean to the shores of Upper Egypt, where a short land journey enabled them once more to take ship on the Nile, descending which, they were enabled to return by sea to their port of departure. Phœnicia was long the great maritime nation of the East; its commerce, meeting with the competition of the new and stronger Hellenic civilisation, was gradually compelled to go further afield, beyond the pillars of Hercules. Spain was not the goal of the Phœnicians; they pushed northwards, crossing the Bay of Biscay, and, mining tin in Britain—possibly even digging amber on the shores of the Baltic—brought back these products of the North to mix in the markets of Tyre with the gems and precious metals of India. The supremacy of Phœnicia gave place to that of its colony Carthage, which held its own against the Greek trade of Corinth until the Romans subjugated both. Throughout the Roman period, and after the decline of the empire, the Mediterranean remained the seat of trade, and Venice and Genoa rose in power. In the Middle Ages a rival route from India passed through Khiva and Novgorod to the Baltic, whence the Northmen—more celebrated for their more congenial expeditions of piracy and plunder—distributed it through northern Europe. The discovery of America by the Northmen in the ninth century was an incident without any influence on trade or on politics, and soon forgotten; but a momentous time was at hand. Europe was awakening from its mediæval sleep. A number of northern towns, banding themselves together in the Hanseatic league, advanced commerce by pursuing it systematically, protecting themselves by fighting when necessary—and in that age of insecurity that was often the case. The leading naval powers were still on the Mediterranean; but Holland, with the Zuyder Zee now opened to the ocean, was preparing to take its place in the maritime world.

In the first quarter of the fifteenth century, the Mediterranean was in very truth the centre of the known earth: to the west lay the awful Atlantic, barred even along the African coast by superstitious fears; to the north, the west coast of Europe and the Baltic were thoroughly

known, and Iceland was occasionally visited by the Venetians. To the east were the luxuries and riches of India, but the path to them led past the pirate-haunted coasts of North Africa, and overland through Egypt to the Red Sea. The difficulties in the way were so great that few men visited India from the west. Cathay was a traditional region in the extreme east, of which little was known. India was the dream of the merchant, and to reach India by a direct sea voyage was the great commercial problem of the day. Prince Henry of Portugal, a man whose name we should delight to honour, spent his life in furthering the exploration of the West Coast of Africa, and, in spite of much opposition, laid on the waters the foundations of that fairy palace of wealth and power which made the Iberian nations the envy and wonder of the world for a hundred years. In 1486, twenty-six years after the Prince's death, Diaz reached the Cape of Good Hope, but feared to go further. Ten years later Portugal was enriched by Vasco da Gama's first voyage to India round the Cape, and from that time geographical discovery in the East went on hand in hand with trading and plundering. The state of the Mediterranean, always dangerous, became so unsafe in consequence of the successes of the Turks in Europe, that trade practically deserted it, and Venice lost her ancient power.

In the interval between the exploration of Diaz and Vasco, Columbus in 1492, and perhaps Martin Beheim before him, had crossed the wide Atlantic. Columbus was certain, from his own observations at the Azores, and from a study of such maps as were in existence, that India could be reached by sailing west. The world was then supposed to be much smaller than it is, and the exaggerated breadth given at that time to India and Cathay made the sea voyage appear comparatively short. Even at the time of his death Columbus believed that a way would be found through the Caribbean Sea to India; such a way is now being made.

The American continents were rapidly delineated by successive expeditions nominally fitted out for trade and exploration, really for plunder. Precious metals and new products of all kinds poured into Europe; the valuable plants of Asia were carried to the New World, and thrived with unexampled luxuriance. The Pacific was discovered, the world circumnavigated, and for all this magnificent unveiling the greed of gain in the twin powers of commercial and piratical enterprise is to be thanked. The Mediterranean was no longer the centre of the world. The Atlantic became the highway of the nations. To suit its new conditions navigation rapidly improved, larger vessels were built, the sextant was invented, charts were constructed, seaports were deepened, and the western coast of Europe soon became the focus of the world's activity, the outlet and inlet of all important commercial products.

The opening of the sea route to India was only second in importance to the discovery of America, and not until the great powers, early in the present century, crushed out Algerine piracy, and later, when the energy

of Lesseps pierced the isthmus of Suez, did the eastern trade partly return to its old channels. Australia was discovered and colonised, and the colonies in South Africa alone ensure that the routes to the east by the long passage will never be discontinued. Maritime discovery is now practically at an end except in the Polar seas, where commercial motives are not at present strong enough to tempt adventurers. There was a time when Polar exploration was looked upon as the key to India, and for nearly 300 years ship after ship, manned by sailors whose daring has never been surpassed, and whose endurance has only been exceeded by scientific explorers, pushed northwards, sailing into every channel of the ice, working always westwards in the hope of discovering a north-west passage to the Pacific. Although such a sea road has been known for more than seventy years, no commercial use can be made of it, on account of the dangers and uncertainties of navigation in the ice. The inutility of another favourite scheme—the discovery of a north-east passage—was fully realised by the Dutch Government, when Nordenskiöld, in 1882, demanded and was refused the premium of £2000, offered by the Netherlands in 1596 to whoever should find a north-east route to India. Still the accessibility to commerce of the North Siberian ports during even a small part of the year is a matter of some importance, and places the north-east passage on a different footing from its less practical north-west rival. The decline in the value of whale-fishing has taken much from the geographical work formerly done by whalers in the north; and as yet no sufficient inducement has been found for merchants to explore the frozen south.

The immense value to science of a knowledge of the Antarctic regions, and the difficulty of moving those who are able to undertake research in such difficult conditions has led the scientific societies of Australia to enlist the aid of commerce. Rewards have been offered on certain conditions to vessels which bring home a cargo of any commodity from a position south of 60°. Analogy with the northern trade, and the known conditions of the south, would suggest that some new areas of production might ultimately be opened. It may appear chimerical to go to the Antarctic seas for ivory; but there is no reason why the frozen mammoths of a long past age may not be waiting sealed up in ice for the adventurous mariner to disentomb: there is a strong probability of a profitable whale and seal fishing being established.

Within the last thirty years one of the most interesting contributions of commerce to scientific Geography has been the knowledge it has given us of the state of the bed of the ocean. We pass over, as too obvious to require comment, the enormous development of navigation since steam-power was applied to merchant ships; now it is with the other marvel of the century that we have to deal—the submarine telegraph cable. At first when cables were laid only in shallow water, or between great continents, difficulties arising from the form of the sea-bottom were hardly felt. A line of soundings at long intervals across the Atlantic sufficed for

all practical purposes ; but when the results of this experience were applied along the west coast of Africa, and towards the approaches to oceanic islands such as Bermuda, snapped cables repeatedly taught the necessity of more numerous soundings. The problem of bringing the precious wires from their horizontal position at the depth of two miles or so, up the side of submarine mountains, rugged and even precipitous in places, had to be met and solved. The close surveying necessitated in this way showed that some parts of the ocean abounded in submarine mountains rising up from vast depths with an abruptness that was never before suspected.

At present the effort of commerce is less to discover new fields of production of raw materials than to open up new markets for manufactures, and most attention is consequently being directed to the interior of the great and thickly peopled continents of the old world. India and Cathay were the merchant's dream of the past, and they are in great measure his hope for the future. The wide and continuous coast-line under British rule, from the Indus to Singapore, gives this country enormous advantages as regards marine traffic in the east. But even with an improved system of inland navigation and increased freedom for trading in China, the greater part of that country must remain inaccessible from the sea. After being eclipsed for ages, the overland routes through Asia must regain importance if full advantage is to be taken of the capacity for commerce in the vast areas of dense population in China. Such is the opinion of those best qualified to judge on this matter, and it is obvious to all that, if this be the case, the rivalry on the sea, in which Britain has long held unquestioned pre-eminence, must give place to a rivalry on land, in which the ultimate success of other powers may very easily be secured. The railway-route surveyed by Hallett, through Siam from Moulmein¹ to the borders of Chinese territory in Yunnan, would certainly secure advantages to British commerce such as no other pathway could offer, and the efforts of Mr. Colquhoun, now lecturing on the subject in this country, ought to place the proposed enterprise in a favourable light before practical men. The railways of Russia are slowly creeping further east. They stretch across the vast sandy deserts of the Transcaspian district to Samarcand in the south, and we cannot expect that the great northern plain of Asia will long be neglected in this respect.

Inland carriage cannot as yet be accomplished on a scale comparable to that effected by shipping. Canals are slow at the best—in winter they freeze in the north, in summer they dry up in the south ; rivers have similar drawbacks, and railways require engineering works on such an extensive scale as to be undertaken only where traffic is assured. If the late Professor Fleeming Jenkin's scheme of Telfherage were to become a commercial success, pioneer lines could be laid out as easily as an overland telegraph, and electric carriage on land would soon vie with steam

¹ *Scot. Geog. Mag.* vol. ii. p. 78 *et seq.*

transport at sea. The geographical exploration of great continents is a slow process, and much yet remains to be known regarding the interior of all the large land masses of the globe. In the New World this exploration is made comparatively easy, for the conditions of rapidly extending population make it possible first to lay out a railway line, and then to form cities along the route to maintain it by their traffic. The Pacific railways of the United States and of Canada are enterprises which have done a great deal to place our geographical knowledge of America on a definite basis. Commercial exploration in Africa is continually driving inland new lines of traffic to tap the stores of the interior, and to open channels through which European manufactures may be poured into the heart of the continent. Germany is the great power in this region, and British trade, unless it too is supplemented by far-seeing and experienced explorers—commercial travellers in the highest sense—will soon be comparatively inconsiderable except in the colonies, and at a few points on the coast.

We see how in the past, expanding commerce has beaten upon the confines of the world, until these, opening out, revealed new regions across the waves. We see how exploration and calculation gave true knowledge of the form and size of the globe, and showed the shortest route from one point on the surface to another; how conditions of climate made some of these a permanent impossibility; how political transitions interposed temporary barriers across others; and how the redistribution of the centres of trade followed naturally on the re-arrangement of the channels of commerce. Finally we see that the problem of sea-carriage—to the ancient world insuperable—has been fully solved, and that the rate of progress in the immediate future must depend on improvements in inland transport by rivers, canals, and railways; all being of course worked in connection with the existing ocean routes, or with those that may result when all the isthmuses that can be severed are cut by canals. Trade has now many centres, and its influence connects all parts of the world in a network so close that it is unlikely that the future will see any such great changes as the past has witnessed. One centre may rise or fall in comparison with another, but commerce will hardly be forcibly diverted in permanency from its present channels. The same principles lead us to see how special industries are localised in particular places. Towns arise in strict obedience to easily traced laws, and when it happens that manufactures are carried on at a distance alike from the source of the raw material, and the destination of the products, these principles furnish a sufficient reason, or show that the reason no longer exists, and that the practice should be changed.

To illustrate another method of approaching the subject of Industrial and Commercial Geography, and to indicate how numerous are the conditions which have to be taken into account, I may take up one trade material, and follow the main points in its history to the present day. Classical authors in the time of Alexander the Great refer to sugar as a

kind of vegetable honey found in reeds growing in Asia : "sweet cane" is mentioned by Jeremiah and Isaiah as coming from a far country ; but there is no proof that this sweet cane was sugar. In the time of the Crusades, the capture of camels loaded with manufactured sugar occasionally gladdened the camps of the Christians, and at that time Arab physicians had long used it as a medicine. The original habitat of the sugar-cane seems to be the region between Bengal and Cochin-China. The cane was introduced by the Arabs into all the Mediterranean countries on which they secured a footing ; and thus Morocco, Sicily, and Spain were planted early in the Middle Ages. The limit of cultivation was about 40° N. lat. ; further north the climate was too severe, and the plant did not live. Venice became the great emporium for sugar in the Middle Ages, and in 1319 it is recorded that 100,000 lbs. were shipped thence to London. The Spaniards planted the cane in Madeira in 1420, and as soon as the West Indies were discovered they carried it there, San Domingo receiving the first instalment in 1494. The soil and climate were so favourable to the growth of the Asiatic grass that early in the sixteenth century most of the islands and a great portion of tropical America waved with its feathery plumes, and sugar-making on a scale of rough extravagance became the staple industry. During the eighteenth century sugar, from being an occasional luxury, became a necessity in civilised life. The fashion of tea-drinking, which formed such a feature of the age, consumed the greatest quantity ; and the rate of increase in its use may be gauged from the fact that in 1700 the imports into Great Britain were 10,000 tons, and in 1800 as much as 150,000. In 1885 the imports had risen to the enormous amount of 1,100,000 tons, and their value in 1886 was £16,000,000, a falling-off from three years before, when it was £25,000,000. These statistics appear to show a progressive development, but the vicissitudes of the sugar-trade were, and are, very remarkable. In the first place, slave labour was required to cultivate the West Indian plantations ; the national conscience in Britain became roused to the enormity of this infringement of the rights of man, and, when at length in 1833 slavery was abolished, the condition of the West Indian estates became very critical. The old wasteful processes produced raw sugar of the coarsest description, which was shipped to Europe, and refined before coming into the market for consumption. The soil, originally so fertile, gradually became exhausted, and to add to the thronging difficulties, a new and formidable rival appeared in Europe. In the revival of chemistry, which preceded the French Revolution, every natural product was analysed, and sugar was found in the juice of many plants. In 1747 Marggraf detected it in great abundance in the beet and other fleshy roots, and in 1801 a factory for manufacturing beet-sugar was opened near Breslau. The sugar (*saccharose*) is chemically identical with that of the cane, a variety differing entirely from grape-sugar or glucose, into which it can be turned by chemical means, but from which it cannot readily be obtained. In 1806 Napoleon instituted a blockade under the Continental

System, prohibiting trade with Britain from any Continental port ; and in 1807 the British Government replied by the Orders in Council prohibiting trade with any port occupied by the French. This state of matters continued until 1814, paralysing commerce, but leading to enormous development of Continental manufactures ; and the beet became the great source of sugar in France and Germany. Although after the peace of 1815 its use declined, it was revived in Germany in 1830 ; and, after slow progress to 1840, beet farming increased in importance and productiveness by enormous strides. Selective cultivation increased its sugar-bearing qualities ; its culture was regulated with scientific exactness to the smallest detail, and constancy of composition and character ensued. At present the cultivation of sugar-cane is being carried on with renewed vigour in its eastern home, India. Java, and the East Indian Islands generally, produce large quantities. It has taken firm hold in Africa and Australia ; in fact, in Queensland sugar is now an export second in value only to wool. Were it not for this increase in the southern hemisphere, the days of the historical sugar-cane would be numbered. Not only did the beet sugar manufactured in 1884-85 amount to 2,546,000 tons, as against 2,260,000 of cane, but it was proved by experiments in the same year that beets for sugar-making formed a more paying crop than wheat in some of the richest agricultural districts of England. By certain improved processes of manufacture sugar is being prepared from the sorghum cane, and from maize in America, and the former has been successfully cultivated in Hungary. The manufacture is not yet an assured commercial success, but any advance in the price of sugar would make it so, as the plant has an enormous geographical range. For many purposes, including adulteration, glucose, which is prepared in great quantities in Germany from starch, is found to be of equal value with saccharose or cane-sugar, and very much cheaper. The attention of science has long been directed to the synthesis of saccharose, and in 1885 two German chemists announced that they had effected this by passing an electric current through a mixture of starch, sulphuric acid, and water ; but I have been unable to ascertain whether the process is a commercial success. A new source of anxiety for the sugar-grower has arisen in the last few years in Remsen's *saccharine*, a substance obtained from coal-tar, as different from sugar as two substances can well be,¹ but possessing the property of intense sweetness without any nutritive value. It is made on a large scale by Fahlberg in Germany, and, so far as sweetness is concerned, it is nearly as cheap as beet-sugar—*i.e.* the price is about 300 times greater, and the substance nearly 300 times sweeter. It is hardly likely, however, that this chemical compound, benzoylorthosulphonic imide, will for a long time to come successfully compete with the natural product to which we are accustomed.

A glance even so brief as this shows us how the substance sugar has

¹ Dr. Yeats, in his *Natural History of the Raw Materials of Commerce*, confounds saccharine with saccharose, and consequently is led to a very sanguine view as to its success as a marketable product.

changed in its geographical relations. At first it was drawn solely from a tropical plant, necessitating conditions of labour from which the conscience of the nations—not of the planters—ultimately revolted; then for a time by the chances of war it was extracted from the vegetables of the temperate zone; exhausted soils and diminished labour in the west drove the reviving cultivation of the cane to the eastern tropics north and south of the Equator; but Northern and Central Europe have become the main source of supply, and possibly in the future processes will triumph which can produce it with equal facility in all parts of the earth from purely inorganic materials.

Such changes emphatically teach the importance to the merchant of scientific foresight and historical retrospect, and the consideration of those conditions which, either naturally or when improved by art, can produce a desired commodity. Every change has been towards increased certainty and uniformity of supply. In the great markets goods can be imported from Germany much more easily than from South America; the manufacture can be regulated better, and the balance of supply and demand more easily adjusted. The tendency in all manufactures is to relinquish distant fields for near ones, and as far as possible to substitute artificial for natural sources of supply. Already madder has been almost driven from cultivation by the preparation of its identical colouring-matter, alizarine, from coal-tar; indigo is similarly threatened, and so many chemists have so long been labouring at the synthesis of quinine that that product must soon be produced artificially, and cinchona-planting follow the way of madder-farming. It is on viewing such tendencies that I see the importance of combining Technology to a certain extent with Commercial Geography. Many generations will probably pass away before the laboratory and the chemical-works entirely supplant the farm and the plantation in producing such things as sugar, alcohol, tea, drugs, and dye-stuffs; and in the meantime the conditions of natural culture for these in all regions must be studied more and more attentively, and the methods of production made more and more complete and economical, so as to compete as long as possible with synthesis. For this purpose a knowledge of the physical conditions of the earth is absolutely essential; and it is even more necessary in enabling a cultivator to recognise new products of value, and to judge when the time has come for placing all land under the grand necessities that we can see no prospect of ever producing artificially. Grain, flesh, wool, silk, cotton, timber, must continue to be raised indirectly from the earth through the agencies of vegetation and animal life, although it is quite possible that glass, slag, and asbestos may some day become a formidable rival to the textile fabrics in producing clothing, and wood be as unnecessary in the construction of our houses as it is in building our ships.

Another purpose is to be served by the study of Applied Physiography. The absolute certainty is forced on one that in nature nothing can be obtained except for its exact equivalent, that no short cuts can be of any

permanent benefit, and that any temporary advantage is only gained at the expense of a far more widespread loss. The mixing of goods with inferior material without mentioning it; speculation in commodities that have no real existence; in general, the conception of trade as a sphere outside of morals, lead to brilliant fortunes sometimes, but in the long-run they work incalculable woe. No knowledge, even the most complete, of "the earth beneath, and the waters under the earth," is of permanent value to humanity, unless it is applied with wisdom, and according to the principles of justice. To send to Africa, for the sake of a slightly larger profit, a cargo of adulterated intoxicating liquor instead of a load of manufactured cotton, is not only morally a crime—it is commercially a blunder; perhaps even a greater blunder than the transport of the first load of Negro slaves to the West Indies, and ultimately to be fraught with as heavy a penalty. Mr. Somers, in his admirable sketch of Commerce in the *Encyclopædia Britannica*, clearly summarises the modern condition of things: "Easy transport of goods by land and sea, prompt intelligence from every point of the compass, general prevalence of mercantile law and safety, have all been accomplished; and the world is opened to trade. But intellectual grasp of principles and details, and the moral integrity which is the root of all commercial success, have to be severely tested in this vaster sphere."

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY.

THE Annual Business Meeting of the Society was held in the Merchants' Hall, Edinburgh, on 21st November at 4.30 p.m. The Right Honourable Sir Thomas Clark, Bart., Vice-President, presided. Mr. A. Silva White, Secretary, submitted the Report of Council for the past session, which, on the motion of Principal Grant Ogilvie, seconded by Sheriff Mackay, was adopted by the Society. On the conclusion of the Report, Mr. William C. Smith, Advocate, made the suggestion that, in addition to the public meetings of the Society, others of a more domestic character might be held, at which there could be some discussion among members of the Society on great questions of Geography. This suggestion was received with approval. Dr. George Smith moved the first Resolution, which was as follows:—

RESOLUTION I.

- (1.) "That the President and Vice-Presidents be re-elected, with the addition of the following Vice-Presidents:—The Right Honourable the Earl of Camperdown; the Right Honourable the Earl of Hopetoun.
- (2.) "That the Honorary Secretaries, Treasurers, and Map-Curator be re-elected; and that Mr. David Petrie be elected Honorary Librarian in place of Mr. William C. Smith, resigned.