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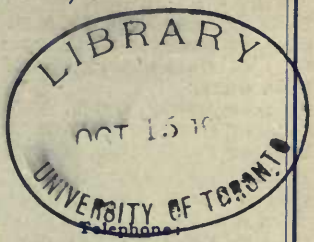

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"To provide a place of meeting for all gentlemen connected with the Colonies and British India, and others taking an interest in Colonial and Indian affairs; to establish a Reading Room and Library, in which recent and authentic intelligence upon Colonial and Indian subjects may be constantly available, and a Museum for the collection and exhibition of Colonial and Indian productions; to facilitate interchange of experiences amongst persons representing all the Dependencies of Great Britain; to afford opportunities for the reading of Papers, and for holding Discussions upon Colonial and Indian subjects generally; and to undertake scientific, literary, and statistical investigations in connection with the British Empire. But no Paper shall be read or any discussion be permitted to take place tending to give to the Institute a party character." (Rule I.)

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JOURNAL OF THE ROYAL COLONIAL INSTITUTE.

THE Journal of the Royal Colonial Institute, the first issue of which appeared on December 1, 1890, and was numbered part i., vol. xxii., is an official record of the transactions of the Institute. It is published on the first of each month from December to July inclusive, in advance of and in addition to the annual volume of Proceedings, and contains reports of Papers and discussions, elections of Fellows, donations to the Library, notices of new books presented to the Library, and official announcements of the Institute.

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OF THE

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MAY 1904.

All communications to be addressed to the Secretary, Royal Colonial Institute, Northumberland Avenue, London.

PROCEEDINGS.

SIXTH ORDINARY GENERAL MEETING.

The Sixth Ordinary General Meeting of the Session was held at the Whitehall Rooms, Hôtel Métropole, on Tuesday, April 12, 1904, when a Paper on "The Development of West Africa by Railways" was read by Fred Shelford, Esq., B.Sc. (Lond.), M.Inst.C.E.

His Grace the Duke of Marlborough, K.G., presided.

Amongst those present were the following:—

MR. W. ADAMS, MR. AND MRS. T. J. ALLDRIDGE, MESSRS. R. L. ANTROBUS, C.B., ARNOTT, COLONEL A. M. ARTHUR, MISS ARTHUR, MR. AND MRS. ASPINWALL, MR. AND MRS. M. ATTENBOROUGH, MESSRS. J. B. BAILEY, E. T. BAILEY, R. T. BAIRD, J. E. BAKER, A. E. BARRETT, MISS BARTRUM, MESSRS. J. H. BATTY, A. R. BEALE, MR. AND MRS. T. D. BEIGHTON, MR. H. F. BILLINGHURST, MR. AND MRS. J. H. BLACK, MESSRS. S. P. BRAUN, LESLIE BRAY, COLONEL D. BRUCE, R.A.M.C., F.R.S., MRS. BRUCE, MR. AND MRS. J. BUCKLAND, MESSRS. C. W. BUSK, F. BUTLER, MAJOR M. A. CAMERON, R.E., C.M.G., MR. E. CARTER, MRS. CHALMERS, MESSRS. HOLROYD CHAPLIN, H. E. S. CHAPMAN, MR. AND MRS. CUMBERLAND CLARK, MESSRS. J. A. R. CLARK, F. CLEAVER, W. CLEAVER, MISS M. COARD, MR. AND MRS. J. COATES, MISS A. C. COLVIN, MR. R. ELLIOTT COOPER, MISS COWLEY, MR. W. S. CUFF, REV. J. J. AND MRS. CURLING, MESSRS. C. CZARNIKOW, J. DANIELL, W. E. DAVIDSON, C.M.G. (GOVERNOR OF SEYCHELLES), H. DAVIES, H. A. DAVIES, H. E. DAVIES, T. H. DAVISON, MRS. C. F. DAVISON, MESSRS. J. W. DAW, J. EUGENE DAWSON, O. L. DE LISSA, W. P. DEVINE, R. W. DIBDIN, E. DOD, D. DOIG,

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The Minutes of the last Ordinary General Meeting were read and confirmed, and it was announced that since that Meeting 20 Fellows had been elected, viz. 7 Resident and 13 Non-Resident.

Resident Fellows:—

Charles Weldon Adams, Daniel Finlayson, F.L.S., Francis Douglas Fox, M.A., M.Inst.C.E., Hugh Spencer Lynn, His Grace the Duke of Marlborough, K.G., Bernard Oppenheimer, John S. Remington.

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It was also announced that Donations to the Library of books, maps, &c., had been received from the various Governments of the Colonies and India, Societies, and public bodies both in the United Kingdom and the Colonies, and from Fellows of the Institute and others.

The Chairman: I have much pleasure now in asking Mr. Shelford to address us. He is well known to many of you. Mr. Shelford is connected with the firm of Messrs. Shelford & Son, who are consulting engineers to the Crown Agents for the Colonies, a distinguished firm, who in the past have done very good work both for the Colonial Office and for others in this country. He himself has visited many of the territories concerning which he is about to speak, and indeed I believe that with regard to railway construction he has been a pioneer in having examined the country and the land where subsequently the railways have been constructed. Speaking for myself, I come here as a pupil, as one who is anxious to learn all he can from the information the lecturer is about to impart to us.

Mr. Shelford then read his paper on

THE DEVELOPMENT OF WEST AFRICA BY RAILWAYS.

The development of a country largely unexplored and still little understood, such as West Africa, in the Author's opinion comprises:—

1. The suppression of tribal revolts and intertribal warfare, and the abolition of slavery and other barbarous customs, by the introduction of an enlightened administration, *i.e.* pacification.

2. The introduction of the teachings of Christianity in place of the superstitions and cruelties of paganism, *i.e.* religion.

3. The establishment of the importation of manufactured goods in exchange for the exportation of the natural products of the country or those obtained by cultivation of the soil, *i.e.* trade.

4. The location and working of mineral ores, affording paid occupation and education for the native and the employment of capital, *i.e.* industry.

5. The instruction of the native in skilled labour, arts, science and literature, enabling him to become a useful subject of the Empire, *i.e.* education.

6. The geographical, topographical, geological, zoological, botanical, and ethnological study of the country.

These results are brought about in a greater or less degree by such means as European administration, military and exploring expeditions, the efforts of missionaries, mercantile enterprise, and mining operations, but each and all of them are assisted and expedited by the establishment of improved means of communication, such as is provided by the construction of railways.

In the Colony of Sierra Leone the native insurrection in 1898 was accompanied by the most terrible outrages upon the Europeans within the affected area, and unfortunately found the Sierra Leone Railway only recently begun and of use for only a short distance for the conveyance of troops ; but at the present time with the railway in working order from Freetown, the capital, through Songo Town (32 miles), Rotifunk (55 miles), to Mattru and Bo (135 miles), and an extension from Bo to Baiima (222 miles from Freetown) rapidly approaching completion, there can be no doubt that any further native rising in the neighbourhood of the railway is improbable, while the means of communication now afforded by the railway would lead to the prompt suppression of any revolt which did occur, since troops could reach the infected area from the seat of Government in a few hours.

Again, in the case of the Gold Coast the numerous wars against the Ashantis in 1875, 1896, and lastly in 1900, each of which has been most costly to the Mother Country in life and treasure, are unlikely to occur in future now that Kumasi is placed within sixteen days' journey from England, and a few hours' journey from the coast.

At Lagos fortunately the inhabitants of the hinterland are more advanced in the Imperial scale than at Sierra Leone and the Gold Coast, and the railway is unlikely to be called into use for the suppression of disturbances, while the connection by railway of Lagos with the great native towns of Abeokuta and Ibadan has only to serve the purpose of promoting trade between those important centres.

If the extraordinary expenditures upon wars, which the Colonies can ill afford, can be avoided altogether in the future, and at the same time commercial relations be strengthened by the construction of the West African Railways, they will be of lasting benefit to the Colonies that own them.

Inter-tribal wars, with the attendant feeling of insecurity and reduction of the population, barbarous customs—such as human sacrifices, massacres of prisoners of war or of slaves, and other inhuman practices due to the influence of " fetish "—are bound to

give way before the advance of railways and the increased facility of travel afforded to officials of the Administration.

The encouragement to trade afforded by railway construction of course requires no demonstration. It will suffice to say that the natural products of the country—such us palm oil, kernels, rubber, etc.—which have in the past been allowed to remain untapped for want of means of transport, have been now, and will be still more in future, brought within reach of the merchants on the Coast. What is desired in this respect is for the West African trader to see his way to further efforts to secure the collection and sale of these valuable products by the establishment of subsidiary stores upon the route of the railway for the exchange of native produce for European manufactures.

With regard to the cultivation of the soil, the construction of railways has opened up very large tracts of country suitable for the growth of almost every conceivable tropical product. Much has been recently heard of Imperial-grown cotton for the use of the Lancashire mills. The Author can only point to the large tracts of land in Sierra Leone and at Lagos, many of which are suitable for the cultivation of this plant, now opened up by means of the railways, and waiting for properly-directed efforts to turn them to account. It is for such objects, among others, that the Governments of the West African Colonies have undertaken the responsibilities of railway construction.

The prospecting of the country for mineral ores is, of course, facilitated by railways permitting a wider range of operations.

With regard to the actual working of mines, gold is the mineral which has first attracted attention in West Africa as elsewhere.

Gold mining is an industry which has necessarily to deal with large quantities of quartz requiring pulverisation to a high degree of fineness, and for this purpose stamps or rolls of great weight must be employed. Stamps weighing from 750 lbs. to 1,100 lbs., or even more, can only be subdivided into two or three sections, and a battery of any considerable output may require from 20 to 100 or more of such stamps.

Sectionalisation of mining machinery has sometimes been adopted under stress of circumstances where no transport facilities existed, but all mining engineers are agreed that it is essentially unsatisfactory on account of the loss of sections in transit, and the inability of sectionalised machinery to withstand the vibrations to which it is subjected.

The transport of heavy pieces of machinery, anything in fact over

one or two cwt., for any long distance, or anything over half a ton for the shortest dist nce, is a practical impossibility in a country such as the Gold Coast, where the rivers are not navigable and roads exist only in name. This is conclusively proved by the past history of gold mining on the Gold Coast. The gold miner must therefore either sectionalise his machinery with the consequent sacrifice of efficiency, or he must be provided with means of transport.

The Gold Coast Railway delivers loads of any weight at Tarkwa, one centre of the gold-mining industry, in a few hours, while it delivers at Obuassi, the headquarters of the Ashanti Goldfields Corporation, machinery such as could otherwise not be employed there.

Other mining industries than gold mining are undeveloped in West Africa. Unfortunately, so far coal has not been found, although the condition of the forest belt of West Africa seems to be very similar to that existing in Europe during the carboniferous period. Gigantic trees, innumerable smaller trees, and dense undergrowth quickly grows and falls to the ground to rot, forming a deep layer of decaying vegetation, which one can well imagine may form a carboniferous stratum in future ages. It is a question, however, whether the conditions of damp and heat and the presence of white ants and other insects may not be destroying the timber before it becomes permanently imbedded. This, however, is merely a matter of academic interest to the present age.

The education of the native in the practical arts and crafts is a most important effect of the introduction of the iron horse, although railways share this influence with mining operations and other industries. The native if left to himself will learn nothing and will aspire to nothing but the simple husbandry of his forefathers, which supplies him with his food and a small surplus of products for exchange for clothing, gun and gunpowder. But when railway construction is begun he is called upon to assist in surveying, clearing of forest upon a large scale, excavation of cuttings in earth, and blasting of cuttings in rock, building of embankments, excavation of bridge foundations, construction of masonry or concrete bridges, and erection of steelwork, erection of station buildings, workshops, quarters and telegraph, laying of permanent way and ballast, each of which, together with many other branches of the work, must educate him and advance him in the scale of civilisation.

But the railway when constructed has still to be worked, and this again demands for the native the duties of maintenance and

repair of road, bridges, stations and rolling stock, while from the ranks of the natives have to be enrolled station masters, drivers, firemen, fitters, blacksmiths, guards, porters, shunters, and pointsmen; while both during construction and during working a small army of timekeepers, bookkeepers, clerks, typewriters, and accountants has to be enlisted from the native races to avoid the expense of excessive European skilled labour.

The different native tribes show varying adaptability to the new duties demanded of them. Considering the absence of any real necessity for continuous wage-earning employment the natives have taken fairly well to the work, but there is plenty of room for improvement. There is no reason why in time the West African native should not attain the same degree of proficiency as the East or West Indian.

Improved knowledge of the geography and topography of West Africa has naturally followed as a result of the numerous surveys carried out to determine the route for each railway. Some 750 miles of surveys have been carried out in Sierra Leone alone in connection with the railway, and a large number of names of new towns and villages have been added to the map of the Colony. At Lagos also numerous surveys have been made and the topographical knowledge of the country has been improved, while upon the Gold Coast the railway runs from Sekondi to Kumasi through country previously quite unknown. The Author's own expedition between the two places in 1899 and the numerous prospecting expeditions sent out in 1900 and 1901 have, it is hoped, contributed to the geographical knowledge of this part of the Gold Coast.

The construction of railways facilitates the study of the geology and botany of a country by affording continuous though shallow sections difficult to obtain otherwise, while the use of native timber brings to light unknown trees of commercial value. Each, however, of these services requires systematic application by itself, and it is difficult for railway construction staffs to do more than take advantage of any discoveries of practical value that they may happen to make. Thus the position of a deposit of river gravels is quickly noted for use for concrete or ballast, while valuable timbers are found and employed in the construction of temporary bridges and other works.

There is no reason why the West African timbers should not be employed for sleepers, buildings, and bridges in West Africa as elsewhere, but the engineer cannot employ them upon a large scale until their identity and properties are known.

Sierra Leone Government Railway.

A description of this railway accompanied by numerous lantern slides will be given by the author, so that only a few brief particulars are required in this paper.

The railway is of 2 ft. 6 in. gauge, with rails weighing 30 lbs. per yard and steel sleepers. The maximum gradient is 1 in 60 with a minimum curvature of 5 chains. The line has been built section by section and not as one undertaking.

The route of the railway is shown upon the maps on the wall; leaving Freetown it passes through Hastings, Waterloo, Songo Town (32 miles), Rotifunk (55 miles), Mano, Mattru, Bo (135 miles) and reaches Baiima, 222 miles from Freetown. The section from Freetown to Songo Town includes 11 large viaducts. From Songo Town to Rotifunk there is one bridge of importance. The rest of the line consists of undulating country crossed by rivers of some size requiring several large bridges.

The following are the principal works upon the Sierra Leone Government Railway so far constructed:—

Works of interest	Mileage		No. of spans	Total length
	Miles	Chains		Feet
Freetown to Songo Town:				
Nichol Brook	0	78	9	281
Kissey „	4	75	6	280
Wellington Brook	7	40	7	312
Calaba „	7	77	5	158
Robiss „	8	16	4	162
Orogou Viaduct	11	65	6	386
Maroon „	12	78	7	330
Hastings „	13	50	7	294
Rokell „	16	15	3	94
Gaddon „	16	65	3	94
Lewis „	17	14	4	126
Allamangey Viaduct	18	24	5	182
Songo Town to Baiima:				
Ribbi Bridge	38	65	9	662
Bumpe „	55	40	2	63
Mongire „	61	60	2	63
Makora „	68	12	2	63
Yambutu Bridge	76	50	3	158
Bangue „	79	0	3	232
Taia „	106	43	10	589
Tabe „	118	40	4	233
Bebeye „	148	15	5	262
Sewa „	160	50	6	718
Male „	175	48	4	233

Sierra Leone Mountain Railway.

Views will also be shown of this work, which was opened on March 1, 1904. This railway is of the same gauge as the main line of the Colony, but the gradient is as steep as 1 in 22, and the curvature through the streets of Freetown necessitates curves as sharp as 2 chains radius.

The railway is built for the purpose of affording communication between the Government buildings in Freetown at the foot of the hill and the new cantonment, consisting of residences for officials and others, situated on a plateau about eleven hundred feet above the sea, where the conditions of life will be far more healthy than in the town itself. It is hoped that the facilities afforded by this mountain railway will contribute largely to the improved health of the Colony, as the new cantonment will afford most extensive views both over the Atlantic Ocean and over the interior of the country for many miles, and will be fully exposed to the healthy sea breezes.

Lagos Government Railway.

Views of this railway will be shown and a few particulars only need be included in the Paper.

The gauge of the Lagos Government Railway is 3 ft. 6 in., rails 50 lbs. per yard, gradients 1 in 50 with 10 chain curves. The line was constructed in sections and not as a whole.

The established communication between Lagos Island and the interior is now as follows: Leaving Lagos Town, with a population of some 42,000 people, one crosses the lagoon by the Carter Bridge 2,600 feet in length, and reaches the terminus of the railway, which is situated on the island of Iddo; thence the railway crosses the lagoon by the Denton Bridge 900 ft. in length, and reaches the mainland at Ebute Metta, where the workshops, quarters, engine-sheds, &c. are situated. It then runs up the fertile valley of the Ogun River, passing the village of Otta at 20 miles, and numerous other villages of varying importance till Aro is reached at 64 miles, whence a branch line, about $1\frac{3}{4}$ miles long, crosses the Ogun River and reaches Abeokuta.

Abeokuta ('the City under the Rock') is generally believed to have a population of nearly 100,000 people, and is enclosed by a wall about 15 to 20 miles in circumference. The branch line crosses the Ogun River by a bridge of three spans of 100 ft. and three spans of 60 ft. and a total length of 500 ft. The Main Line does not cross the Ogun River but continues up its right bank and crosses at Lokomeji finally reaching Ibadan 125 miles from Lagos, where the terminus at present remains.

Ibadan is a town of very considerable importance credited with a population of 180,000 people, with a considerable trade of its own.

The extension of the Lagos Railway beyond Ibadan is under consideration, and surveys have been made in anticipation of its eventual extension.

Gold Coast (Tarkwa) Railway.

During a visit in 1896 of Sir William Maxwell, then Governor of the Gold Coast Colony, to the Tarkwa district, the practical impossibility of working the gold mines of the banket formation without railway communication with the coast was demonstrated.

A survey was made in 1897 with the result that the construction of a railway from Sekondi to Tarkwa was commenced early in 1898, but, owing to objections being raised with regard to the selection of Sekondi as a port, work had to be suspended until the Secretary of State for the Colonies, in July 1898, held a conference at the Colonial Office which resulted in the confirmation of the original route recommended. Work was recommenced in August 1898, but was much impeded by the scarcity of labour, the population of the locality being sparse and not taking to the new work.

The supply of labour remained for some time quite inadequate, but the Government of the Colony expressed a wish that labourers should not be imported, as they desired that the natives of the country should be given every opportunity of learning the work. Moreover, on account of the short length of the line to Tarkwa it was impracticable to organise the importation of labour on a large scale.

The wet season of 1899 was abnormal, and very large quantities of rain fell, practically suspending the work, and many of the staff became sick, but in the dry season of 1899–1900 the work was again pushed forward as well as the inadequate supply of labour would allow.

At the beginning of 1900, in consequence of the possibility of the extension of the railway to Kumasi being undertaken, it became obvious that labour must be imported from other countries, and steps were taken to recruit it.

After a great deal of difficulty a supply of labour from Lagos was arranged for, but unfortunately the Ashanti war broke out in April 1900, putting a stop to all further importation of outside labour and taking away the natives already engaged upon the work to act as carriers for the troops.

The Ashanti war broke up the survey parties sent out to make a

preliminary survey of the Kumasi Extension, frightened the labourers on the more advanced works, and generally caused serious disorganisation.

At the conclusion of the Ashanti war work was again pushed forward, and the railway reached Tarkwa in May 1901.

The actual period occupied in the construction was from July 1898 to May 1901, or thirty-four months, during which a base with landing-jetties, quarters, workshops, running-sheds, &c., was established at Sekondi, a place formerly consisting of a few mud huts and with no accommodation whatever. This work was carried out in the face of three wet seasons, a prolonged scarcity of labour, and eventually the last Ashanti war.

Tarkwa-Kumasi Extension.

In 1899 it was decided that an examination of the country between Tarkwa and Kumasi should be made with a view of deciding whether Kumasi should be approached by railway from Accra, as proposed by Sir William Maxwell, or by an extension of the Tarkwa Railway.

In 1899 a comparison of these two routes was made by the author, and as a result of his report the Tarkwa-Kumasi Extension line, through unknown swampy and forest-clad country, was begun in June 1901, the rails reaching Obuassi December 20, 1902, and Kumasi in September last.

The time occupied in reaching Obuassi was 18 months in all, during which 86 miles of line, comprising very heavy clearing and earthworks, were constructed at an average rate of $4\frac{3}{4}$ miles per month.

Natural Difficulties of Construction.

The difficulties encountered in constructing the West African Railways have been very numerous and peculiar to the country. They may be briefly stated under the following heads:—

(a) *Climate.*—The unhealthiness of the climate of West Africa is notorious and greatly interferes with continuity of organisation in carrying out extensive works. In order to provide against the disastrous effect of climate upon the railway officials, who are specially exposed to the weather, both heat and rain at all hours of the day, an eight months' service was in all cases instituted, carrying with it four months' absence on leave from the Colony on half-pay. Proposals have been made to extend the period of service, but this has so far been deemed inadvisable.

Elaborate medical arrangements have been organised upon each railway. At Sierra Leone there has always been a medical staff maintained by the Railway Department, the Colonial Hospital being available. At Lagos the medical staff was very fully equipped. A small railway hospital was constructed, and the Colonial Hospital has been available as well. On the Gold Coast, owing to the complete isolation of the works, a large hospital has been erected at Sekondi, and another at Obuassi. The medical staff has always been kept at full strength and fully equipped with all medical appliances, instruments, and medicines.

All the railway officials have been kept fully informed by pamphlets, books, &c., of the development of the Malaria Mosquito theory since it was first discovered, and detailed instructions as to site of camps, clothes to be worn, food and drink, have been issued to every employee.

In spite of these precautions the effect of the climate upon the staff is best shown by the changes that have occurred in the position of Chief Resident Engineer, Chief Accountant, and Chief Storekeeper at Lagos, and in the position of Chief Resident Engineer at Sierra Leone and Gold Coast, a list of which is given in full detail in the Appendix.

The detailed health statistics of each railway could be given in full, but the particulars of these five appointments are perhaps sufficient to emphasise the point.

It has been found that men of superior education occupying the higher appointments upon the railways keep their health better than those in the lower grades, hence some idea may be formed, from a perusal of these lists, of the great number of changes which have taken place amongst the entire staff of each railway.

The following table showing the total numbers of European engineers and others employed on each railway may be of interest:—

——	Total Number of individual Europeans employed on each railway to end of 1903.	Total Number of Europeans sent to each railway, i.e., total number of "tours" of service to end of 1903	Remarks
Sierra Leone Government Railway	239	400	Still in progress
Lagos Government Railway . .	219	333	Completed
Gold Coast Government Railway .	388	635	Completed

The effect of these constant changes upon the continuity of administration of each railway can be readily imagined, but this cannot by any possibility be avoided in a climate such as that of West Africa.

(b) *The Wet Seasons.*—At the commencement of operations in West Africa it was expected that all active work would have to be suspended during the wet seasons, but this has not proved to be necessary. Surveys, indeed, have been completely stopped during the rains, but construction work has been carried on during the wet seasons, though of course always under great difficulties. The execution of an enormous quantity of earthwork upon the Gold Coast Railway during the wet season of 1902 was absolutely imperative in the case of a line telescopically constructed, but it is unsatisfactory from an engineering point of view.

As an illustration of the heavy rainfall in the West African Colonies, the actual fall for the year 1901 is given below, the greater part of this falling in the months of June, July, September, and October :—

Sierra Leone rainfall, 1901	175·43 in.
Lagos rainfall, 1901	112·59 in.
Gold Coast (Tarkwa) rainfall, 1901. . . .	92·55 in.

In some cases tropical showers have fallen to the amount of 4 to 5 inches at a time, and upon the Gold Coast in June 1901 no less than 30 inches (2 ft. 6 in.) of rain fell in the month, an amount equal to the average total rainfall of the United Kingdom in one year.

(c) *Quality of Labour.*—In the case of each Colony the railway works have been carried on by means of West African native labour, the actual native of the district being employed, except upon the Gold Coast Railway, where natives of other parts were imported. The West African is unaccustomed to any but his own agricultural employment, and is naturally devoid of all skill and education, and possesses little energy. In course of time, however, the natives in each Colony have been educated by the Railway Department to take up the duties of station masters, porters, platelayers, mechanics, fitters, &c.; in Sierra Leone and Lagos with considerable success, the Mendis, Timinis, Egbas, and Yorubas having a certain amount of aptitude for the work. Upon the Gold Coast the Fantis and other tribes are somewhat more slow to develop the required talent.

(d) *Scarcity of Labour.*—In Sierra Leone and Lagos this did not occur except when the military operations took away the railway labour as carriers for the troops, there having always been sufficient labour of a kind. This is due to the large populations in the neighbourhood of the railway. On the Gold Coast Railway, however, the scarcity of labour was a very serious matter, the supply falling at one time as low as about 600 men, a number perfectly inadequate for progress. The number of natives employed at various dates has been as follows :—

—	August 1899	June 1902	January 1903	January 1904
Sierra Leone Railway .	1,063	4,685	3,281	3,571
Lagos Railway . . .	10,426	Completed		
Gold Coast Railway . .	2,714	16,000	12,417	2,502
Total	14,203	20,685	15,698	6,073

(e) *Difficulties of Landing Cargo.*—Over-carriage of materials, damage to the same, and the wreck of ships carrying large consignments have added greatly to the difficulty of providing the materials in proper time and order, especially as it has only been possible to ship small quantities in each steamer in order not to congest the wharves and piers available.

At Sierra Leone the Wharf accommodation is extremely limited, though the landing facilities are otherwise good.

At Lagos it has been necessary to tranship all cargo at Forcados, some 150 miles beyond Lagos, into branch boats which can cross the Lagos Bar.

On the Gold Coast (Sekondi) all materials have had to be discharged into surf boats and lighters in the open roadstead. The lighterage is in charge of Messrs. Elder, Dempster & Co., and small consignments have been necessary to prevent delay to the steamers or congestion of the lighterage plant.

(f) *Scarcity of Ballast.*—This difficulty has perhaps been the greatest of all. At Sierra Leone ballast has been fairly plentiful, and the difficulty has not been formidable. At Lagos, however, there is a complete absence of hard stone of any kind for nearly 60 miles from the coast, and it was necessary to open the railway for this length very partially ballasted, and to allow the maintenance gangs to complete the work gradually. Upon the Gold Coast hard

rock exists, but as a rule only at a depth of 50 to 100 feet from the surface, and this has rendered the extraction of about 500,000 tons of stone required for the railway practically impossible from such quarries. It was necessary to adopt the expedient of searching for surface stones and boulders in the bush, and to bring them to the line to be broken up and distributed. This was a very laborious and costly work, but had to be carried out on account of the soft clayey nature of the soil on the Gold Coast which has rendered ballasting imperative.

Extraordinary Interference with Construction.

Besides the natural difficulties which have been encountered as outlined above, the construction of railways in West Africa has been unfortunately interrupted by disturbances amongst the natives and military operations in the case of each Colony.

Sierra Leone.

In the case of the Sierra Leone Railway a native insurrection broke out in February 1898, and had the effect of stopping the works and disorganising the staff for some time. The rebels descended upon the railway and drove into Freetown the entire staff, and dissipated the whole of the native labour, causing a condition of panic, which continued for some time during which the railway and its plant were left at the mercy of the rebels. During the whole of 1898 and until April 1899 the requirements of the native troops sent up country to quell the disturbance, and of the troops sent to the Colony as a punitive expedition, took away a very large number of the labourers engaged upon the railway to act as carriers to these expeditions. The result of this disturbance was to detain the rail-head at Songo Town, the end of the first section, although authority had been received for the next section to Rotifunk. Upon the termination of this disturbance in April 1899 the Songo Town to Rotifunk section was completed in about eight months.

Lagos.

At Lagos the disturbance was not due to the natives, but at the latter end of 1897 and the early part of 1898 the operations of the French in the Hinterland required the urgent despatch of troops up

country, and for this purpose almost all of the railway labourers, and some of its officers, were taken by the Government to act as carriers to the military expeditions. At the conclusion of the military operations work was recommenced in October 1898, and the rails advanced from 30 miles to 64 miles (Abeokuta) in seven months, or at the rate of 5 miles per month, and from Abeokuta to Ibadan, at 125 miles, in twenty months more.

Gold Coast.

On the Gold Coast the special disturbance was the Ashanti War, which broke out in April 1900, and continued until the end of that year. The effect on the labour has been referred to above, and may be briefly described as putting an end to the importation of labour into the Colony from other parts of West Africa, which after a great deal of trouble had been eventually organised. At the conclusion of the Ashanti War, rail-head advanced from 25 miles to 126 miles in twenty-two months, equal to a rate of $4\frac{1}{2}$ miles per month.

Rate of Construction.

The rate at which the West African Railways have been constructed will be shown graphically by a lantern slide, and compared with that of French and Belgian railways in West Africa.

It must be remembered that these railways have not been constructed as a whole, but tentatively, section by section, an interval frequently occurring between the completion of one section and the authorisation of the next, and in all cases the authorisation of the work by sections has prevented an organisation suitable for the rapid construction of the whole. This cautious policy has no doubt been the best for each Colony to adopt, but has naturally tended to some extent to prevent the increasing rate of progress which would have been realised if from 120 to 220 miles of railway had been undertaken at a time.

The rate of construction of railways in West Africa is hindered by want of landing facilities, sickness of staff, the absence of continuity of administration due to climate, excessive rainfall, and the physical obstruction of the dense tropical forest, rendering survey very slow and requiring heavy labour in clearing, and by the necessity for carrying on the entire work and conveying all the materials from one base.

The following table sets out the rate of progress of each railway :—

Section	Length Miles	Begun	Finished	Time in Months	Average Rate in Miles per Month
Sierra Leone Railway (2 ft. 6 in. gauge):					
Freetown — Songo Town [1] . . .	32	Mar. 1896	Dec. 1898	33	1
Songo Town—Rotifunk [2] . . .	23	June 1899	Mar. 1900	9	2·6
Rotifunk—Bo [2] .	80	Dec. 1900	Oct. 1902	22	3·6
Bo—Baiima [3] . .	87	Jan. 1903	Nov. 1904 (expected)	22 (expected)	3·9 (expected)
Total. . .	222			86	2·7 average
Lagos Railway (3 ft. 6 in. gauge):					
Lagos—Otta [4] . .	20	Mar. 1896	Sept. 1897	18	1·1
Otta—Abeokuta [5] .	44	Oct. 1897	April 1899	18	2·5
Abeokuta—Ibadan [6] .	61	May 1899	Dec. 1900	19	3·2
Total. . .	125			55	2·3 average
Gold Coast Railway (3 ft. 6. in. gauge):					
Sekondi—Tarkwa [7] .	40	Aug. 1898	May 1901	33	1·2
Tarkwa—Obuassi [8] .	86	July 1901	Dec. 1902	17	5
Obuassi—Kumasi .	44	Feb. 1903	Sept. 1903	7	6·3
Total. . .	170			57	3·0 average

[1] Includes construction of headquarters. Difficult country, eleven steel viaducts. Interrupted by native insurrection.

[2] Interrupted by native insurrection. [3] In progress.

[4] Includes construction of headquarters and bridge to mainland.

[5] Delayed by military operations. [6] Includes terminal work at Ibadan.

[7] Includes construction of headquarters and pier. Delayed by scarcity of labour and Ashanti War. Heavy rains.

[8] Rail laying reached twelve miles per month. All traffic offered carried upon railway.

The progress of the British West African Railways can be

favourably compared with the railways made in Tropical Africa by other Powers, as shown in the following table :—

RATE OF PROGRESS OF CONSTRUCTION OF RAILWAYS IN TROPICAL AFRICA BY OTHER POWERS.

Railway	Gauge	Length Miles	Begun	Finished	Time in Years	Average Rate.
FRANCE :						
French Senegal : Kayes — Niger Railway	Metre	348, of which 250 are completed	1881	Still in progress	23	11 miles per ann.
French Guinea : Konakry-Niger Railway [1]	Metre	342, of which 46 miles are completed.	June 1900	Still in progress. Reached 46 miles June 1903	3	15 miles per ann.
Dahomey Railway [2]	Metre	About 500 miles proposed, of which 55 miles are completed	May 1900	In progress	3½	16 miles per ann.
Ivory Coast .	The proposed railway has not yet been started					
GERMANY :						
Kameroons .	The proposed railway has not yet been started					
CONGO FREE STATE :						
Congo Railway [3].	2′ 6″	250	1889	1898	9	28 miles per ann.
EAST AFRICA :						
Uganda Railway [4]	Metre	584	early 1896	Temporary line, early 1902	6	97 miles per ann.
				Permanent line completed, say, middle of 1903	7½	78 miles per ann.
Beira Railway .	2′ 0″ altered to 3′ 6″	187	1892	1898	6	31 miles per ann. (2-6 miles per month)

[1] This line is open to 46 miles, and work is proceeding further ahead.

[2] Easy country, but Lama swamp at 55 miles has caused delay. Concessionaire provides materials only, and receives a subsidy of £80 per kilo, and a land grant of 1,150 square miles.

[3] Fairly open country; imported labour; 2′ 6″ gauge.

[4] Much open country; comparatively healthy.

It will be seen from the above table that the rate of construction of the British West African Railways compares not unfavourably with other railways in Tropical Africa, with the exception of the Uganda Railway, which was authorised and organised as a whole and not by tentative sections.

Cost of Construction.

In considering the cost of the construction of railways in West Africa due allowance must be made for the fact that they have been constructed through dense tropical forest in what is generally recognised as the worst climate in the world, necessitating very short terms of service, constant changes of staff in every grade, very heavy rainfall, scarcity and inferiority of unskilled labour, and the complete absence of skilled labour; landing difficulties, and the necessity of carrying on construction entirely from one base. Further allowance must be made for the native revolts and military operations which have occurred in each case.

Cost of the West African Railways

Including Permanent Bridges, Headquarters Establishment and Rolling Stock, &c., complete.

—	Gauge	Total Cos	Length Miles	Cost per Mile
		£		£
Sierra Leone :				
1st section [1] . . .	2 ft. 6 in.	193,946	32	6,060
2nd section [2] . . .	2 ft. 6 in.	97,164	23	4,224
3rd section [3] . . .	2 ft. 6 in.	319,046	80	3,988
4th section [4] . . .	2 ft. 6 in.	348,000	87	4,000
Total and average .		958,15	222	4,300

[1] Includes establishment at base and eleven steel viaducts.
[2] Impeded by native revolt. [3] Including permanent steel bridges.
[4] Estimate.

Gold Coast [1]. . . .	3 ft. 6 in.	1,753,488	170	10,300
Lagos [2]	3 ft. 6 in.	882,961	125	7,064

[1] Dense bush, scarcity of ballast, Ashanti War, much ill-health, nearly all labour imported. [2] Cost of main line to June 30, 1903.

Cost of other African Railways.

—	Gauge	Total Cost	Length Miles	Cost per Mile
		£		£
Tropical African:				
*Uganda Railway [1] . .	Metre	5,550,000	584	9,503
†Congo Railway [2] . .	2 ft. 6 in.	2,600,000	250	10,400
Temperate African:				
‡Cape of Good Hope Government Railway [3].	3 ft. 6 in.	21,842,216	2,089	10,456

[1] Still incomplete. [2] Narrow gauge. Severe gradients. Open country.
[3] To December 31, 1900.

Cost of other Colonial Railways.

‡New South Wales Government Railway [1].	4 ft. 8½ in.	38,932,781	2,845	13,684
‡Tasmanian Government Railway [2] . . .	3 ft. 6 in.	3,659,069	439	8,335
‡Queensland Government Railway [3] . . .	3 ft. 6 in.	19,526,370	2,801	6,971
‡New Zealand Government Railway [4] . .	3 ft. 6 in.	17,207,328	2,212	7,779

[1] To June 30, 1901. [3] To December 31, 1900.
[2] To December 31, 1900. [4] To March 31, 1901.

Cost of some Indian Railways of Equivalent Gauge.

		R.		R.
§Rajputama—Malwa . .	Metre	12,87,20,729	1,674	76,894
§Southern Mahratta . .	Metre	9,51,13,422	1,042	91,279
§South Indian . .	Metre	7,42,48,486	1,042	71,255
§Burma	Metre	7,56,31,200	886	85,362

* From statement in Parliament, December 1902.
† From Annales des Travaux Publics de Belgique.
‡ From Statistical Table *re* Colonial Possessions of the United Kingdom, 1900.
§ From Administration Reports on Railways in India.

There is one important point to be noticed with regard to the speed of construction and the cost of railways in West Africa—that the further they are constructed the greater is the speed of construction and the less the cost, provided they are authorised and organised as a whole and not in sections. This is due to the better climate and the more open country found further inland, the greater facilities given to the staff to organise the machinery of construction, the increasing confidence and efficiency of the native labourers, and the existence of an established base with quarters for the staff workshops, and improved landing facilities.

Summary of present Development by Railways.

To summarise what has been already accomplished in the development of West Africa by railway construction by Great Britain and other Powers it may be stated:—

That in Sierra Leone a railway 222 miles long has been nearly completed traversing the Colony from West to East, forming one of the longest continuous lengths of railway of 2 ft. 6 in. gauge in the world, and being the most cheaply constructed line on the Western side of Africa.

In Lagos a 3 ft. 6 in. gauge line, 125 miles long, has connected up the three largest towns on the West Coast of Africa—Lagos, Abeokuta and Ibadan.

On the Gold Coast a 3 ft. 6 in. line, 170 miles long, has placed Kumasi, the capital of Ashanti, within sixteen days' journey of Great Britain.

The French have connected St. Louis and Dakkar by rail and are proceeding with metre-gauge railways connecting Kayes and Koulikoro in Senegal, Konakry and Kouroussa in French Guinea, and Kotonou and Paouignan in Dahomey.

The Belgians have connected Matadi and Leopoldville with a 2 ft. 6 in. gauge line, and are proceeding with extensions.

Future Development by Railways.

With regard to the future development of West Africa by railway construction, the field is a very large one. The immense area of Western Africa would not be adequately served by one hundred times the length of railway at present constructed. All railways, however, in West Africa, with few exceptions, must at present be developmental, and must be constructed without immediate prospect of a return upon the cost of construction, since it will take time to educate the natives and develop trade to such an extent as to return interest on the capital expended.

Under these circumstances private enterprise cannot be expected to assist in constructing railways, and the duty devolves upon the Governments of the Colonies to proceed with construction as and when they see their way to do so, care being taken that each advance made shall be part of a well-considered general scheme, and that no one Colony shall be tempted by temporary exigencies to construct a line that cannot be hereafter absorbed into the general system.

Uniformity of gauge is the most elementary condition to be fulfilled, at any rate where there is a possibility of future connections, and the principle of standardisation of works of art and rolling stock within certain types should be judiciously applied.

Such carefully considered construction can be proceeded with as the resources of the Colonies permit; but when the Colonies are unable to undertake further responsibilities, the question arises as to whether the Imperial Government should not assist the Colonies by grants of money for the construction of the most urgent railways.

At the present time circumstances are perhaps unfavourable for such action, but in due time no doubt the public at home may realise the value of these West African Colonies, and be ready to subscribe to loans guaranteed by the revenues of the Colonies, or to concur in a substantial grant for developmental railways.

France has been already able to do this, and has granted a sum of 65,000,000 fr. (£2,600,000) for the completion of the Senegal line, the continuation of the Guinea and Dahomey lines, and the commencement of the Ivory Coast Railway.

The French schemes for railways in West Africa now in process of conversion, partially at any rate, into accomplished facts entirely dwarf the British constructed railways.

France is now pushing forward no less than four lines of railway with increased speed, while the British railways are drawing near completion. For instance, the Dahomey railway is being vigorously pushed forward by the French, while the adjoining Lagos railway has remained stationary for the last three years.

At the moment it is important that the Sierra Leone Railway should serve to increase the trade of the Colony, but in this the co-operation of enterprising merchants is required; and that the Gold Coast Railway should assist the gold mines to become dividend payers, and in this the assistance is required of the capitalist who eagerly subscribed money during a premature gold boom, but now, perhaps "once bitten twice shy," fails to see the opportunity for successful investment now that the railway makes mining possible. The Colony of Lagos requires the assistance of the Imperial Government to push its railway northwards to Zaria and Kano, making a trunk line of railway in a fairly central position in the Lagos-Nigeria territory, establishing military control of the whole area and developing its trade, piercing further inland than any of the French West African projects, and preventing the absorption of the trade of Nigeria by the French Colonies.

Possibly the early adoption of some half-measure, such as Sir Frederick Lugard's proposal of a line from Baro on the navigable Niger to Zaria and Kano, might assist the general scheme, but every advantage should be taken of the time elapsing before money for any such scheme becomes available to continue the study of this scheme in all its bearings, so that when construction is commenced it may be upon such a route, of such a gauge, and of such a type as may be found to be most suitable in the interests of the Protectorate.

The lantern slides shown during the evening are from the Author's photographs, supplemented by private photographs kindly lent by Messrs. H. Adcock, T. J. Alldridge, G. H. Fleming and T. G. Maidment, and by an unique set of views of Cotton Cultivation in the Sierra Leone Protectorate, by Mr. L. C. Boyle, and by views of the Lagos Railway, specially taken by Mr. F. Bedford Glasier, the General Manager.

APPENDIX

LAGOS GOVERNMENT RAILWAY.

Changes in the Position of Chief Resident Engineer.

Individual	Date		Reason for Leaving Office
	Taking Office	Leaving Office	
No. 1 .	Nov. 17, 1895	July 7, 1896	Resigned on account of ill-health
No. 2 .	July 7, 1895	Sept. 21, 1896	Acting appointment only, relieved by new Chief
No. 3 .	Sept. 21, 1896	May 23, 1897	On leave
No. 2 .	May 23, 1897	July 29, 1897	Invalided
No. 4 .	July 29, 1897	Sept. 23, 1897	Died
No. 3 .	Sept. 23, 1897	May 22, 1898	Invalided at home
No. 5 .	May 22, 1898	June 24, 1898	Died
No. 6 .	June 24, 1898	Aug. 7, 1898	On leave
No. 7 .	Aug. 7, 1898	May 16, 1899	On leave
No. 6 .	May 16, 1899	Nov. 7, 1899	On leave
No. 7 .	Nov. 7, 1899	Feb. 8, 1900	Died
No. 8 .	Feb. 8, 1900	May 7, 1900	On leave
No. 6 .	May 7, 1900	Mar. 12, 1901	Transferred to Gold Coast
No. 9 .	Mar. 12, 1901	July 5, 1901	On leave
No. 10 .	July 5, 1901	Nov. 4, 1901	On leave
No. 11 .	Nov. 4, 1901	Jan. 31, 1902	Line handed over to the Open Lines Department

Changes in the Position of Chief Accountant.

Individual	Date		Reason for Leaving Office
	Taking Office	Leaving Office	
No. 1 .	Jan. 1, 1896	Mar. 30, 1896	Died
No. 2 .	April 4, 1896	Mar. 18, 1897	On leave
No. 3 .	Mar. 18, 1897	Aug. 27, 1897	Acting appointment only, relieved by new Chief
No. 2 .	Aug. 27, 1897	Nov. 2, 1897	Died
No. 4 .	Nov. 2, 1897	Mar. 31, 1901	Transferred to Open Lines
No. 3 .	Mar. 31, 1901	June 5, 1901	Transferred to Gold Coast
No. 5 .	June 5, 1901	Jan. 31, 1902	Construction Dept. closed

Changes in the Position of Chief Storekeeper.

No. 1 .	Sept. 23, 1896	May 23, 1897	On leave
No. 2 .	May 23, 1897	Sept. 23, 1897	Acting appointment only, relieved by new Chief
No. 1 .	Sept. 23, 1897	Dec. 17, 1897	Invalided
No. 3 .	Dec. 17, 1897	May 22, 1898	On leave
No. 4 .	May 22, 1898	Oct. 3, 1898	On leave
No. 3 .	Oct. 3, 1898	May 31, 1899	Dismissed
No. 4 .	May 31, 1899	Aug. 20, 1899	On leave
No. 5 .	Aug. 20, 1899	Feb. 22, 1900	Died
No. 6 .	Feb. 22, 1900	April 22, 1900	Acting appointment only, relieved by new Chief
No. 4 .	April 22, 1900	Jan. 1, 1901	Transferred to Gold Coast
No. 7 .	Jan. 1, 1901	Feb. 1, 1901	On leave
No. 8 .	Feb. 1, 1901	May 18, 1901	Acting appointment only, relieved by new Chief
No. 6 .	May 18, 1901	Oct. 14, 1901	Transferred to Open Lines

SIERRA LEONE GOVERNMENT RAILWAY.

Changes in the Position of Chief Resident Engineer.

No. 1 .	Nov. 16, 1895	July 7, 1896	On leave
No. 2 .	July 7, 1896	Nov. 7, 1896	Acting appointment only, relieved by Chief
No. 1 .	Nov. 7, 1896	July 23, 1897	On leave
No. 3 .	July 23, 1897	Nov. 26, 1897	Acting appointment only, relieved by Chief
No. 1 .	Nov. 26, 1897	Sept. 25, 1898	On leave
No. 3 .	Sept. 25, 1898	Mar. 5, 1899	Acting appointment only, relieved by Chief
No. 1 .	Mar. 5, 1899	Mar. 3, 1900	Transferred to Gold Coast
No. 3 .	Mar. 3, 1900	July 21, 1900	On leave
No. 4 .	July 21, 1900	Jan. 21, 1901	On leave
No. 5 .	Jan. 21, 1901	Feb. 19, 1901	Acting appointment only, relieved by new Chief
No. 3 .	Feb. 19, 1901	May 9, 1901	Invalided
No. 6 .	May 9, 1901	Sept. 26, 1901	Acting appointment only, relieved by new Chief

Changes in the Position of Chief Resident Engineer.—cont.

Individual	Date		Reason for Leaving Office
	Taking Office	Leaving Office	
No. 2 .	Sept. 26, 1901	May 26, 1902	On leave
No. 6 .	May 26, 1902	Oct. 2, 1902	Acting appointment only, relieved by Chief
No. 2 .	Oct. 2, 1902	May, 1903	On leave
No. 6 .	May, 1903	Oct., 1903	Acting appointment only, relieved by Chief
No. 2 .	Oct., 1903		Still in Colony

GOLD COAST GOVERNMENT RAILWAY.

Changes in the Position of Chief Resident Engineer.

No. 1 .	Feb. 9, 1898	May 24, 1898	Special leave to attend conference *re* route
No. 2 .	May 24, 1898	Aug. 26, 1898	Acting appointment only, relieved by Chief
No. 1 .	Aug. 26, 1898	May 18, 1899	On leave
No. 2 .	May 18, 1899	Oct. 6, 1899	Acting appointment only, relieved by Chief
No. 1 .	Oct. 6, 1899	June 5, 1900	Resigned
No. 3 .	June 5, 1900	Nov. 17, 1900	Acting appointment only, relieved by new Chief
No. 4 .	Nov. 17, 1900	July 15, 1901	Resigned
No. 3 .	July 15, 1901	Sept. 6, 1901	Acting appointment only, relieved by new Chief
No. 5 .	Sept. 6, 1901	May 8, 1902	On leave
No. 6 .	May 8, 1902	Sept. 22, 1902	Acting appointment only, relieved by Chief
No. 5 .	Sept. 22, 1902	July, 1903	On leave
No. 6 .	July, 1903	Oct., 1903	Acting appointment only, relieved by Chief
No. 5 .	Oct., 1903	Mar., 1904	Line handed over to Open Lines Department

DISCUSSION.

The CHAIRMAN (His Grace the Duke of Marlborough, K.G.): I feel sure you will allow me to express on your behalf the great interest and pleasure Mr. Shelford has afforded us, both by his lecture and by the admirable illustrations he has put upon the screen. Our minds have been so much occupied with South Africa and the great problems involved in that part of the world that for the moment, perhaps, our attention has been diverted from the importance of our West African possessions. I believe, a belief

which is rather the result of conversation with those who are acquainted with West Africa, that the possibilities of our protectorates there, and of developing them in the future, are enormous, and that we may look forward to an increasing trade between them and the Mother Country, a trade which will be most profitable to ourselves and advantageous to the inhabitants of those territories. Mr. Shelford pointed out in the early part of his lecture that the fact of these railways having been built will help us to get troops more swiftly into the districts traversed, and so enable us to put down any risings which might occur. Well, they could, no doubt, be employed for that purpose, but I think they have an even more valuable purpose to serve. For the mere fact of our having constructed these railways ensures, to a certain extent, the civilisation of the natives themselves, who will be brought into closer contact with the representatives of this country, and from their relations with Englishmen whom they meet will gain confidence in our rule and learn to recognise the justice and proper treatment which we mete out to those under us. I think these influences, of themselves, will be a far greater security that in future we shall have no rising or other difficulties in connection with the natives than the mere fact that we are able to get our troops about more expeditiously. It is curious to think, after looking at the slides showing the admirable work that has been done in West Africa, that ten years ago not ten yards of railway had been laid. The whole of this construction has been carried out during the last ten years, and I think I am right in saying that an average of about fifty miles of railway has been laid every year since then—that is to say, about five hundred miles in all. Thus we have been able to construct a railway, say, from here as far as Oxford every year during the last ten years. I certainly think that reflects some credit on the energy and enterprise of the late Secretary of State for the Colonies and of those associated with him during the years he was at the Colonial Office. On this point I will say further that I have no doubt that, although the inspiration and the initiative came from him, it would have been impossible to make these railways so successfully had it not been for the hearty co-operation and the skill and science of those great firms on whose technical knowledge we are, to so large an extent, obliged to rely. Mr. Shelford touched on the cost of these railways. I dare say some of you may think that they cost a considerable amount of money. I am not really qualified to express an opinion on that point; but I was very much interested in the admirable analysis Mr. Shelford gave, not

only of the cost of these railways as compared with those of other countries, but also of the comparative rate of construction. I think we may fairly claim that we have not been behind other countries in the rate of construction, and that our own railways have not exceeded in cost those of our colonial competitors. The average rate of construction per month is, I think, a very fair average, considering the enormous difficulties that have to be encountered, the great jungles which have to be cut through, and the primitive methods which have to be employed to overcome various engineering difficulties. We have heard much about the Uganda Railway, and there are those who consider that its construction was very expensive, but the Congo Railway (which, I presume, was built by the King of the Belgians and has a narrower gauge) cost over £10,000 a mile, whereas the Uganda Railway cost about £9,500 a mile. I think, then, we may claim that the cost of our railways, although no doubt considerable, is certainly less than the cost to other countries who are trying to carry out the same pioneer work as ourselves. Mr. Shelford touched upon the importance of Nigeria and the possibilities of railway construction in that territory. Speaking not only for myself, but for those with whom I am connected, from the Secretary of State downwards at the Colonial Office, I am sure we all hope that in the future that work of railway construction which has been so successful in West Africa may be continued in a yet greater extension in Lagos, Southern Nigeria, and Northern Nigeria. It is obvious, of course, that in these matters we cannot move very swiftly. I confess, when I ponder over them, I feel that the life of a man should be at least 100 years, and that in the short space of time Under Secretaries are allowed and permitted to remain in different Government departments we cannot hope to see carried out all those great schemes which we are so anxious to see completed in the future. We must have patience, and look forward with hope that between now and some years to come sufficient funds may be forthcoming to develop a real railway system from the sea coast up into the heart and centre of Nigeria to Zaria or Kano, which will enable us to open up the country and at the same time develop the great cotton industry, which will not only be a benefit to the Colony itself but help to supply the deficiency of cotton now existing in the Lancashire market. But when these schemes will be put into practical effect it is difficult to say. I only hope that, whoever may be responsible for constructing these railways, they will bear in mind the admirable help and scientific knowledge which has been so willingly and freely given to the

Colonial Office by firms like Messrs. Shelford & Son in years gone by.

Sir WILLIAM MACGREGOR, K.C.M.G., C.B.: It is not to be expected, as you will have gathered from the lecture, that everyone will agree with Mr. Shelford in all his opinions, but we shall all agree that he has done well to bring before us in the way he has done this very interesting and important question. It is a subject on which a great deal might be said, but I shall confine my remarks to a few points which have occurred to me during the reading of the Paper. First of all as to the way we built these railways in West Africa. Mr. Shelford has put before you the various uses to which they are put. I am glad he has drawn attention to the important point that in the Colony which I have the honour to govern, at the present time, the railway is not required for the purpose of putting down disturbances. We have no internal war in Lagos. But if we have no war, we have a population which is very intent on agricultural and economical development. It is for that reason we require our railways and a further extension in the Colony. You will see from the map that a lagoon extends from Lagos owards th e east which is navigable for small craft up to the boundary of Southern Nigeria. It extends in the other direction tas far as Dahomey. That also is capable of being navigated by vessels of small draft. But for carrying trade and commerce inland we have only the railway from Lagos to Ibadan. The best land for the cultivation of cotton lies beyond the present railway. It therefore becomes for us a matter of great importance that the railway should be extended. Mr. Shelford has referred to the population of these districts. If I differ from him at all, it is that I on the whole, perhaps, entertain a higher opinion than he does of the enterprise and energy of the Yorubas. They are more energetic and enterprising than Mr. Shelford thinks, and if he had been as much among them as I have I am sure he would entertain as high an opinion of their capabilities as I do. But there is another reason for building railways in our Lagos territory. He has pointed out what our neighbours are doing—they are building railways as fast as they can. Can we afford to be behind them? I think not; for, if we are, we shall undoubtedly lose our trade and commerce. As far as I as a layman am able to judge, the railway from Lagos to Ibadan is quite sufficiently substantial to serve as a trunk line, to be extended to Kano if you like. That is a very important point. There is one question which has been much debated of late in this country; I mean the method of construction.

I see no reason why that question should not be looked fairly in the face. I have a clear and decided opinion myself that the extension of our railway from Ibadan would be much better carried out under the present departmental system than under any other plan. What is the position of a consulting engineer? He has accumulated a valuable amount of experience; he has learnt how to cope with the difficulties which present themselves—difficulties due to weather, physical obstacles, and the like—and is therefore quite at home in dealing with the whole subject; but would that be the position of any contractor? Certainly not. But since these railways were undertaken there comes in another question—the sanitary question. It is clear that the engineer and the doctor ought to run in double harness, so to say, in that part of the world. In no matter is that more important than in the building of railways. I should dread the construction of railways by a contractor in Lagos. His object would be simply to build his railway irrespective of sanitary considerations at the least cost to himself, with the result that he would leave lines of great pits, and each pit would be bound to become a centre for the propagation of malarial fever. It is most essential, I think, that sanitation should be kept in view from the commencement of the building of the railway until the end. I therefore hope the departmental system will be adhered to, for in that way we shall have all the advantage of the experience already gained and avoid prejudicing our future. When our railway is completed, including not only construction but rolling-stock, approaches, &c., the Colony will have to find about £300,000. That is a large sum of money, and the question is, Is that quite prudent? It is to be advanced partly by the Imperial Government, and partly by the Crown Agents. As regards the latter, I wish to say this. I first became the Treasurer of a Colony in 1877, and from that time to now I have seen a good deal of the financial transactions of the Crown Agents, and I wish to say frankly and openly I have been very much struck with the excellent way in which they have always been able to obtain money to advance to any of the Crown Colonies. How it is done I have never been quite able to understand, but I am clearly of opinion that they confer on the Colonies great advantages in the way they are able to advance money to them on favourable terms. Will all this pay? At the present time the Lagos line pays working expenses and something more. It has come up to all I looked for during the first few years of its existence. If the railway is extended so as to open up the best parts of the cotton country, and so as to give

us a greater length of line, with almost the same stock as at present, I have no doubt the Lagos line will pay working expenses and also, I believe, interest on capital. If so, then I say the policy of the extension of railways is not only the right one, but one which ought to be pushed on with vigour.

Sir Alfred Jones, K.C.M.G.: I think anyone who knows our trade and the position of things in West Africa must be more than ever convinced we are a nation of grumblers. I grumbled for more than twenty years because we could not get railways made, and I think I should have been grumbling now if we had not had Mr. Chamberlain at the Colonial Office. Now that they are constructed, there are those who grumble at the cost. I think the railways have been very well made, in the face of great difficulties, and for my own part I think, whatever the cost, Africa should have these railways in the interest of both Africa and of this country. I was very much pleased to hear the speech of Sir William MacGregor; no one has done more for Africa than he has done. I speak as President of the Liverpool Tropical School, and there is no doubt that that school and the London School have done much for the health not only of the British people there but of the natives; and on that point I would say that the British people can never do any good in Africa unless they make the position of the native prosperous. I tried to push the Government into the making of these railways. If I had the thing to do over again I don't think I could have made them better than they have been made. We never should have had these railways but for the active co-operation of the Crown Agents and Sir Montagu Ommanney. As to cotton-growing, I consider we ought to have begun this twenty years ago. Africa possesses enormous possibilities, but you cannot have cotton and you cannot have Lancashire secured in this respect unless you have some means of carrying the cotton from the interior. There is abundance of labour at 6*d.* a day, while in America you have to pay 4*s.* The best missionary you can send to Africa is 'the Iron Horse,' which will make the country. If the British people have not got the money they can borrow. Make the railways: don't stand still. The French are going ahead and you cannot afford to stand still. In ten years you might have cotton from Africa which would supply not only what Lancashire wants but what America wants, because the supply is cheaper from Africa than what you can get in America. I think a great deal of credit is due to Mr. Shelford. We ought to be thankful for what we have got, and try to get as much more as we can.

Capt. C. H. ELGEE: It has been a great privilege to listen to the admirable paper we have just heard read by Mr. Shelford—the more interesting to me inasmuch as I have watched the Lagos line in its course of construction for the past five years, living amongst the workers and noting their methods of procedure. One fact with which I am sure all will be in concordance is, that for the prosperous development of such territories as we possess in West Africa railways are far and above the best expanders, civilisators, developers, and, to use photographic parlance, 'fixers,' that it is possible at the present moment to devise. They are better, less costly in the long run, and more permanent in every way than military expeditions with the Maxim gun. This granted, there remains the question of the expense both in money and life of the present system of railway construction. Can either be lessened? I say most emphatically yes they can. To compare the cost of our railways with those of the French, or the cost of this line with that, is, to my mind, practically useless, for each line of construction has its own separate problems peculiar to itself and influenced to a large extent by the cost of labour and land, tunnelling and bridging. Eliminate these varying factors, and there remain the two common ones, common to all lines—viz. the cost of labour and life in their construction. If these bills could in any way be diminished, we should surely be stepping in the right direction. I hope to show you that they can. Of the urgent necessity of a continuation of our railway policy in West Africa from a national point of view there can be no doubt. But unfortunately railways cost money, and with the market upset as it was by the South African war it is not perhaps the happiest time at present to expect Imperial loans in this connection. If the war above referred to had not taken place there can be no doubt but that the Government would have been able to do far more in this direction than they have been. It is, however, no use crying over spilt milk, and these considerations of the 'lack of the needful' make it the more imperative for us to cut down the expense of construction if possible. To effect this, what I propose is as follows; and that the idea will present certain difficulties at first sight I am not vain enough to disbelieve. I would have the Colonies by themselves, with their own *personnel*, play a larger part than heretofore in the rough work of construction. The final survey of the proposed extension being completed, I would hand over to the Public Works Department of the Colony the work of preparing the rough way. The staff of this department might have to be increased for the purpose; but in this as in the method of

carrying out the work, the Governor of the Colony, and through him the Director of Public Works, would be given a free hand. The work in the rough, and of course minus bridges and other permanent structures, being completed, the expert staff would be called in to lay the rails and complete the line. I am convinced a great saving could be effected in this way. At present, construction staffs come out in their expensive numbers. They are new to the country and to the local conditions, and doubtless much money and health is lost before they become settled down. For the same reason—and this is my second proposition—I would have the entire medical supervision of all railway hands under the Government medical officers of the Colony. Mr. Shelford refers to West Africa as being admittedly the most unhealthy of places. I doubt if this will be repeated fifty years hence. Enormous changes are taking place in this direction now at the present time, and certainly, if I were a labourer, I would unhesitatingly prefer to work for eight months in the plains of West Africa rather than, for instance, those of India. The nature of railway work, which necessitates the upturning of so much soil, predisposes the officials engaged to ill-health, and this renders it doubly necessary that they should have at hand doctors thoroughly versed in local lore to attend them when stricken. The necessity so ably pointed out by Mr. Shelford of constructing all our lines which have any future chance of joining each other on the same system is too obviously clear to need comment. For instance, it would, in my humble opinion, appear the reverse of wise if Northern Nigeria were to construct a line upon any but the 3 ft. 6 in. gauge of Lagos, for that the two must one day join can scarcely be questioned. I must thank the Council of the Institute for permitting me to speak on such an extremely interesting and important subject.

Mr. T. J. Alldridge (District Commissioner, Sherbro): It is somewhat difficult to realise that the magnificent views at which we have been looking represent scenes in territories which do not enjoy the highest reputation for civilisation and for salubrity. There can be no doubt that the want of overland transport has been the means of retarding civilisation and keeping back the development of the enormous natural resources which West Africa possesses. For my own part, I propose to speak only a few words on the Colony of Sierra Leone, and more particularly on the district with which I am associated, Sherbro. The transformation which has taken place in Sierra Leone since the introduction of railways by the Government is remarkable, and to persons like myself, who have

frequently in earlier days had to go over land by hammock which is now traversed by railways, the change seems incredible. It must be patent that, although there may be vast natural resources within a district, those resources are absolutely wasted unless the natives have the means of transporting their commodities down to the coast line. You will observe that the railway at present runs as far as Bo, but there is an extension which is to carry the railway to Baiima. I am able to speak with some sort of authority because I have had some thirty-three years' experience of West Africa. Now, the country that that railway is traversing at present is one of the richest in the Colony. After the railway has got to Baiima it will be necessary, I think, that it should be brought down in a southern direction to those districts which are undoubtedly amongst the richest in indigenous productiveness within that sphere of influence, the Gaura-Tunkia and Barri countries. The map you see on the walls is dotted about with palm trees. The exports from Sherbro last year of palm kernels amounted to 14,000 tons. They are got from under the fronds of the oil palms and grow in large bunches. After they are pulled down the palm oil is expressed through the outer covering of the nut. It takes four tons of palm nuts to make one of palm kernel; it follows that the 14,000 tons these natives crack represent no less than 56,000 tons of palm nuts which have to be dealt with in that way. Yet we hear people at home say that the people are a lazy set. One of the greatest object-lessons for these people has been the railway going through the country without any visible means of propulsion. It must be evident that the time is near at hand when steam or other power must be introduced into the district, and then we shall be able to set free an enormous amount of labour now wasted over the cracking of these palm nuts, and which labour will be used in some other industries, as, for instance, the growing of cotton. We want this cotton grown. I was in Lancashire a few days ago and learned the distress there was appalling. I was taken over one of the mills and was told that the week before they had worked only twelve hours. Unless we can produce cotton in our Colonies I don't know what state of things will come about in Lancashire. Sir Alfred Jones, whose name is well known to everybody, not only in Liverpool and Manchester, but in all parts of the world, sent out large quantities of seed, some of which was sent to me, and I had it planted under the supervision of an expert from the Southern States of America. We did very well, raising beautiful cotton, and there is no doubt that as soon as we can interest the people in the growing of this

cotton we shall be able to grow very large quantities. The potentialities of that part of the West Coast with which I am associated are enormous. There is no over-estimating the value of the place. There is nothing speculative about it. I will only add that when you go away to-night I hope you will give a thought to the great work which is being done by the Government of the Colonies of West Africa and do what you can to make the places prosperous. By doing that and finding work for these native people, you will be helping to uphold the dignity of the great Empire to which you and I have the privilege and honour to belong.

Mr. H. G. Humby (consulting engineer in London to the Natal Government) wished to correct a statement made by Mr. Shelford in the course of his remarks to the effect that the Natal railways had cost £14,000 per mile. This was absolutely incorrect. Mr. Shelford might have taken from some Blue Book the capital cost of these railways, and divided the total by the mileage. If he had done so, undoubtedly these railways would appear to have cost a large sum, which in reality they had not, the reason being that the capital expenditure included the reconstruction of some 250 or 300 miles, and various other alterations that had been effected. To compare the West Coast Railways with Natal was something like comparing the Festiniog Railway with the North-Western or the Great Northern. As an old railway engineer, he appreciated all the difficulties set forth in Mr. Shelford's paper, and he thought great credit was due to the engineering staff for having overcome those difficulties in the way they had in so short a space of time.

The Chairman: I now move a vote of thanks to Mr. Shelford for his interesting Paper. We have listened with the greatest satisfaction to the many new and striking points in connection with railway construction about which he has told us, and we have greatly admired the numerous photographs, some of which, I have no doubt, were taken with a considerable amount of trouble. It has been to me a source of great gratification to be present this evening, and I am sure I am expressing the views and wishes of everybody present when I tender to Mr. Shelford our hearty thanks.

Mr. Fred Shelford: I am in the position of having laid before you some facts and figures illustrated by maps, cartoons, and lantern slides, showing the work carried on in West Africa, and in the discussion which has followed I have listened with interest to remarks from officials of high standing. I am extremely obliged to those gentlemen for the remarks they have made and the informa-

tion they have given us. The Chairman mentioned that the average amount of railway constructed during the last ten years has been at the rate of 50 miles a year. That is perfectly correct, but it covers, of course, all the halts which occurred. For various reasons it may be interesting in this respect to remark that the average speed which can usually be maintained in railway construction in West Africa is about 6 miles a month—that is, 72 miles a year. I quite agree that, to compare the cost per mile of lines in certain countries with the cost in other countries is not altogether fair, because it is necessary to consider the conditions in each case, and to compare the cost in one Colony with the cost in another, where these conditions are perhaps wholly different, is misleading. The figures seem, however, to be demanded by the public. I did not deal with the question of the method of construction in my Paper, but I may mention that in the case of the Gold Coast, when we started, we had not an exact knowledge of even the length of the line. I thought it would be 180 miles, but it proved to be 168. Nor did we know how many streams were to be crossed, or what was the character of the country. You cannot very well enter into a contract upon information of that kind. With regard to extensions, the method of construction is a matter which will, of course, be carefully gone into by the authorities concerned. Having carried out these works "departmentally," and having also had large experience of contract work, my firm has been in the position to observe one or two advantages of the departmental system of construction which I can point out. The system is that the Government itself makes the line, employing the engineering staff and purchasing the best materials. If any alteration is required, such as altering the route of the line or the position of a station, it is easily done, whereas when a contract is in force any alteration may mean a claim for "extras." Moreover, in the case of a contract, there is always the danger of the contractor, on account of unexpected difficulties, coming to the end of his resources, whereas with the departmental system this cannot occur. I have to thank Sir Alfred Jones for the help he has given from time to time. As to the Natal Railways, the figures I gave were simply the best that I could obtain, and they do not seem far wrong. The railways may have been reconstructed since the first opening; the fact remains that their present excellence entailed an expenditure of a large amount per mile. I will now ask you to give a hearty vote of thanks to the Duke of Marlborough for his kindness in presiding at this meeting.

The CHAIRMAN responded, and the proceedings terminated.

AFTERNOON MEETING.

An Afternoon Meeting was held at the Whitehall Rooms, Hôtel Métropole, on Tuesday, March 29, 1904, when Mr. E. Powys Cobb read a paper on "Federation and the Mercantile Marine."

The Right Hon. Lord Brassey, K.C.B., a Vice-President of the Institute, presided.

The Chairman, before calling upon Mr. Cobb, informed the meeting that the following resolution had been passed by the Council of the Institute:—

"The Council of the Royal Colonial Institute desire to record their deep sense of the loss the Institute has sustained through the lamented death of His Royal Highness the Duke of Cambridge, K.G., G.C.M.G., an Honorary Life Fellow of the Institute, who took part in its proceedings on several occasions, and, throughout a long, active, and patriotic career, earnestly advocated the unity and consolidation of the British Empire.

"The Council beg leave to offer to His Majesty the King the assurance of their most sincere and respectful sympathy."

Mr. Cobb then read his Paper on

FEDERATION AND THE MERCANTILE MARINE.

It is my privilege this afternoon to ask you to give your consideration to certain aspects of that all-engrossing problem, Imperial Federation. In this place of all places it is unnecessary to enlarge upon either the need for Imperial Unity, or the great and ever-growing importance of our dominions beyond the seas, so, without waste of the thirty minutes so kindly placed at my disposal, I shall proceed to the particular questions which I ask leave to lay before you.

I want, however, to say one word of explanation. It is my desire not only to state the present position and to indicate how it fails to fulfil Imperial requirements, but also to suggest methods whereby those requirements may be met, the method being in each case self-supporting. I shall find it necessary to weary you with

numerous figures, and I fear time will not allow me in every case to explain how all of them are arrived at, or my authority for them, but it will give me great pleasure to explain and substantiate any figure in the discussion which, I hope, will follow the reading of this paper.

Broadly speaking the coming of Imperial Federation is hindered by two main obstacles:—1. Questions of finance, and 2. The inability of individual units to subordinate local to Imperial ambitions.

We are told that progress along the line of Political Union is prevented by these difficulties, and along the line of Commercial Union the advance does not seem free from similar troubles. It would therefore appear wise to look well if there are not other directions in which some advance may be made towards our goal.

Imperial defence is a question of the first importance and repays careful consideration. The main factor is Sea Power. In the Colonies the Royal Navy is probably the most generally appreciated bulwark of British Sovereignty. Its ubiquity appeals to our scattered peoples, and the truth is now widely accepted that a great fleet in, let us say, the English Channel, capable of winning a decisive victory is a more efficient defence for the Empire than small local squadrons. I think it is true to say that an Imperial Navy is the proposition which would be the most acceptable to the whole Empire.

But here we are at once face to face with the financial difficulty. If the Colonies are to have a voice in the ordering of the Navy, they must contribute largely to its maintenance. The Royal Navy will cost these islands over £40,000,000 in the current year. We are short of ships, and they are costly. The Colonial Treasuries are evidently not in a position to make adequate money grants. It would seem therefore that progress in this direction also is blocked. Not so. The Navy has at the present moment another need even more urgent than additional ships, a reserve of men. The hardy colonist was a valuable factor in the South African War. The Colonial Royal Naval Reservist would be of equal or greater value to the Navy. I believe that here lies the solution of the problem—a solution both patriotic and commercial. The exigencies of the service render necessary the long-service system at present in force, if the *personnel* of the Navy is to maintain its high standard of excellency, but such a system does not allow of the accumulation of a large reserve.

The position of our naval *personnel* for the year 1903–4 is:

Active Ratings	127,100 men
Reserves	34,100 „

This meagre Reserve is made up as follows:

Coastguard	4,200 men
Long-Service Seamen and Marine Pensioners	12,500 „
Royal Fleet Reserve Seamen	1,350 „
„ „ „ Stokers	500 „
„ „ „ Marines	850 „
R.N.R. Firemen	3,900 „
„ Seamen, Qualified Class	10,800 „

This Reserve is wholly inadequate. The Royal Commission of 1859 recommended a Reserve of 38,000 when the Active Ratings totalled only 73,104. Calculated on that basis, we now need a Reserve of 66,100, but the conditions of modern naval warfare are so much more arduous and exhausting that a far larger proportion of Reserves is now necessary. Some authorities, by comparing our position with that of our rivals, suggest 123,000 to 273,000 as our Reserve requirements. For our purpose this afternoon I would suggest a conservative estimate, say 100,000 men.

Where are these men to come from? Clearly the Active Ratings cannot be indefinitely increased, or the cost of maintaining them and the heavy pension list which would inevitably follow would become unbearable. Would it not be reasonable to seek these men where they were sought and found a hundred years ago, namely—in our Mercantile Marine?

Unfortunately our Mercantile Marine is not manned to-day as it was then. The position on March 31, 1901, was as follows:—

British Seamen	134,862
Foreign „	36,526
Lascars	37,642
Total	209,030

If we subtract the 10,800 R.N. Reservists, who may for the moment be assumed to be efficient, we find a balance of 198,230 foreigners and indifferent British seamen. Surely it is here that the remedy lies. Replace these by trained British Reservists.

I regret to say the position is worse even than it appears at first sight, for the decrease of British seamen and the increase of foreigners are going on at an ever-increasing rate. Between the

ears 1891 and 1901 the net increase in *personnel* was 15,533, but n spite of this British seamen decreased by 8,005, whereas non-British seamen increased by 23,538. These figures are bad enough, ut the Registrar-General of Seamen and Shipping states that the lecrease of British was nearly twice as rapid between 1896 and 901 as between 1891 and 1896; he adds, there is "therefore no mmediate prospect of any increase in the number of British ailors." I may add there is every chance of their becoming xtinct. In order to outline a remedy, I must first indicate the auses which have led to this deplorable state of things.

The root of the evil is that the supply of recruits for the seaman atings is cut off. The recruit, the boy of decent but poor parents, rom whom the best class of able seaman was formerly derived, as no road open to him by which he may enter the Mercantile Marine. In support of these startling statements I will make two uotations. The Registrar-General of Seamen and Shipping says: 'The decrease of 11,096 British sailors . . . was foreshadowed by he census of 1896, when attention was called to the reduction in he number of young British seamen, there being 2,274 fewer ailors and boys (excluding apprentices) under the age of 20 enumerated in 1896 than there had been in 1891." He goes on to how the decrease between 1896 and 1901, and concludes, "there s therefore no immediate prospect of any increase in the number of British sailors."

My second quotation is from a paper read before the Shipmasters' Society by one of the ablest officers in the Mercantile Marine. It uns thus: "It seems strange to put it on paper, but we know that t would be easier to-day in London to get a man the command of a ship than to get a well-grown boy of blameless antecedents away o sea in a ship's forecastle. This should not be, and the sooner hese things are looked into the better." The reason for this is hat a raw boy eats as much as a man, a man's food costs half his wage, three raw boys cannot do a man's work, therefore raw boys do not pay. There are certain duties which a boy can perform more economically than a man, but these are done by premium apprentices, who recruit the quarter-deck and not the forecastle. The result is that the forecastle is recruited from the ranks of the ready-made foreigner. It is not fair to blame the owners for this. They have to earn profits in the face of keen competition and under many disabilities as compared with their subsidised foreign rivals, so they cannot be expected to further handicap themselves. In passing I wish to correct the impression that foreigners aboard our

ships are paid lower wages than British sailors. Both alike are engaged at the current rate ruling on the day of engagement.

The next great cause is lack of discipline. We all know that discipline hits the bad and not the good man. Lack of discipline has the reverse effect. Imagine how miserable must be the lot of a few decent men, obliged to live in a forecastle, never of necessity a vast place, made foul by a gang of dirty ruffians, unrestrained by wholesome discipline. The reason of this state of things is not far to seek. The officers have never learnt to obey, and therefore cannot command. I make no imputation on the officers. They are a magnificent body of men of known zeal and capacity. I attack the system under which they have reached the quarter-deck. I ask you to consider this system that you may judge of it. They have travelled one of two roads. Either they have served four years on the half-deck as premium apprentices, doing the boys' work of the ship, under officers trained in a like manner, and who are far too busy to have sufficient, if any, time to spare for educating the youngsters; or they have passed through H.M.S. *Conway* or *Worcester*, institutions which cannot be too highly praised, which give a sound education and lay the foundation of the knowledge of discipline; but after the stationary training ship come three years of premium apprenticeship under the conditions I have already tried to describe, during which their early training is knocked out of them.

Another contributory cause is unsuitable food and bad cooking. It is unfair to say that owners supply bad food. There are "hungry ships," but they are the exception. It is true, however, to say that an unvarying dietary cannot suit all climates and conditions. It will be readily understood that beef and pork may be desirable in the North Atlantic or off the Horn, but greasy pork with four inches of slushy fat to a quarter-inch of lean must be nauseating when the thermometer is at 90° Fahr. Owners might provide a dietary which would cost them less and give more satisfaction to their crews. No doubt prejudice would here step in; many an old sea dog would profess to think himself cheated if fruit, vegetables, and farinaceous foods were substituted for Board of Trade beef and pork. However, prejudice may be overcome. Bad cooking is responsible for many a hungry man and much grumbling and much waste of owners' money. The sea cook is proverbial. However, this cause of complaint is being tackled; schools of sea cooking are being started and a better state of things may be expected.

Now I turn to the remedy, and that a self-supporting one. Build ocean-going training ships, place in command first-class officers attracted by liberal pay and assisted by a staff of efficient seaman instructors, and man them with boys of good character and physique, and of poor but respectable British and Colonial parentage, who shall become the Mercantile Marine and R.N.R. seamen of the future. These boys would be drawn from the rural districts and country towns of these islands and from the Colonies, and from those stationary training ships which carry boys of the required stamp. That a sufficient supply is forthcoming has been proved by the Shipping Federation, the Navy League, and other smaller experiments.

These boys should be engaged at 16 to 16½ years of age. They should sign indentures for three years; no premium would be charged and they would be entered as R.N.R. Probationers. For the *first year* they would be fed, clothed, and trained in seamanship, gunnery, musketry, and signalling aboard the ocean-going training ships free of charge. During the last two years of their indentureship they would serve, under the supervision of the Training Ship Authorities, aboard the ships of carefully selected commercial lines, receiving pay equal to that earned by apprentices. The Training Ship Authorities would reimburse themselves for the outlay of the first year and the pay granted during the last two years by payments made to them by the companies which these young sailors serve during the last two years. I have ascertained that there would be no difficulty in finding berths for these boys, because a young sailor of 17½ years who had done a year's training at sea, would be a better article than the usual run of Ordinary Seaman, and a young sailor of 18½ years who had been two years at sea, would compare favourably with the average Able Seaman. In other words, they will supply a want.

The actual figures would work out thus:

2nd Year. The Training Ship Authorities outfit the young sailor and grant him £10 as pay. They receive from the company who engages the young sailor the pay of an O.S., £2 10*s.* per month, which totals £30 for the year. Balance in favour of the authorities £20.

3rd Year. The Training Ship Authorities grant the young sailor £20 as pay. They receive from the company who engages him the pay of an A.B., £4 per month, which totals £48 for the year. Balance in favour of the authorities £28. Total balance

available to defray the cost of the first year's training, £48. This is sufficient.

This system differs from the ordinary system of indentureship common to all trades in this one particular. The ordinary system allows the master to repay himself for his outlay upon his apprentice at the commencement of his indentureship by services rendered to him by the apprentice during the latter part of his term, *i.e.* he repays himself in kind. (There may or may not have been a premium in addition.) In this case the repayment in kind would be services rendered to the selected commercial lines. But the Training Ship Authorities are entitled to the value of these services by reason of their having borne the cost of the boy's early training. They would therefore receive the value of these services rendered to the commercial lines from those lines in cash. During the last year of his indentureship the young sailor will have qualified for and joined the R.N.R. Seaman Class. On the completion of his term, say 19¾ years of age, he would undergo three months' training aboard a warship to qualify as a full-blown R.N.R. Qualified Seaman.

We have now traced the progress of our recruit to the point where, at twenty years of age, he finds himself an A.B. and a R.N.R. Qualified Seaman, and equipped to make his way in his profession. I feel I shall be asked, How can it be insured that the young sailor shall remain at sea in British ships? Why should he not leave the sea or enter the service of a foreign country? In either of which cases the money and trouble spent on his training will have been thrown away. I think the obvious reply is, Adopt the main features of the system which has enabled the Royal Navy, formerly unpopular enough, to obtain all the recruits it wants and to keep them.

These main features are:—1. Continuous Employment and Pay. 2. Discipline. 3. Pensions, and I would add a system of barracks or clubs in every shipping centre throughout the Empire, where the men may live decently and cheaply between voyages.

I will take first Continuous Employment, Pay, and Pensions. Their merits from the seaman's point of view are plain enough. The question is, How are they to be realised? The Registrar-General of Seamen and Shipping tells us that on an average a Mercantile Marine seaman is out of employment for six or seven weeks per annum. We have to bridge this interval. R.N.R. Annual Drill will absorb twenty-eight days, which reduces the gap to two or three weeks. Now, the suggestion is that the men trained on the train-

ing ships shall remain in the service of the Training Ship Authorities, who shall receive their pay from the shipping companies in which they serve and from the R.N.R., paying them in return a fixed continuous rate. The pay current in the Mercantile Marine is good—namely, £3 10*s.* to £4 10*s.* per month aboard steamers, and £3 to £3 15*s.* aboard sailing ships, with free rations in each case. This, with the R.N.R. pay and retainer, is sufficient to enable the Training Ship Authorities to grant a fixed continuous rate of pay, which will place an annual sum in the pocket of the seaman somewhat larger than the net sum he can earn unassisted under present conditions, allowance being made for the excessive cost of the unemployed six or seven weeks spent in boarding houses or Sailors' Homes, and, in addition, leaves a balance sufficient to pay the premiums on an insurance policy which will give the seaman an old-age pension of 10*s.* a week from age fifty, and, further, to pay an annual sum to the barracks or club, which will provide him with free lodging during his annual unemployed and leave interval and his twenty-eight days R.N.R. drill, and free board during the drill. I have here the detailed calculation, showing the working of this system, which has been examined and checked by many technical men, but time will not allow of a detailed description. I need hardly say that it will give me the greatest pleasure to explain it to anyone who cares to question me.

With regard to pensions. I find that it is difficult to over-estimate the importance which the respectable working classes attach to them. The great objection which they raise to many systems now in force is that the pension is granted by the employer, and he is liable to hold out the threat of its loss should the employee endeavour to obtain a rise of pay. Under the system I am advocating this objection is obviated. The Training Ship Authorities are somewhat in the position of employment agents. All they require is that the men shall work; they make no stipulation as to the rate of pay agreed between owner and crew. I must here explain that the Training Ship Authorities' lien is only upon the first £3 per month earned by the seaman and on his R.N.R. pay and retainer. All wages in excess of £3 per month go direct into the seaman's pocket. Thus the Training Ship Authorities would leave the fluctuations of the Labour Market to take their natural course.

Turning to the subject of barracks or clubs. One of the chief drawbacks to the seafaring life is that between voyages the seaman is homeless. He has to choose between a boarding-house and a

Sailors' Home. The former is too notorious to need description. The latter, though excellently intentioned, has drawbacks and is expensive. A respectable, comfortable and economical home available between voyages would remove one of the chief objections of steady men to the sea as a profession. The barracks would receive annual contributions from the men, as already mentioned, and would be self-supporting. They should be situated in every shipping centre of the Empire, and should be extended to the chief ports of the Continent and America. They would act as depôts for assembling recruits, and for dispersing apprentices and seamen to their ships, and to them masters requiring crews would apply. They would have the further effect of keeping reservists in touch with the Admiralty and readily available in case of a national emergency in any part of the world. The importance of our distant squadrons having upon their stations a reserve of men is not easy to overrate and might save a critical situation.

In this connection I should like to make some quotations from the Report of the Naval Reserves Committee of 1902 :—

> Paragraph 206.—Experience in South Africa has shown how strong is the desire of the Colonies to assist in defeating an enemy in any part of the world, and how valuable may be their contribution in *personnel* to Imperial forces; but at present the employment of Colonials at sea in a naval war would be impossible, owing to lack of naval training. The Committee desire to see the Colonies in a position to give to the navy in time of war assistance similar to that which they have already given to the army. Paragraph 208.—The Committee think it unnecessary to suggest any limit to the force. It is presumed, however, that the whole number must depend on the Colonial resources available, and upon the maximum facilities which can be provided for sea training. Paragraph 214.—In conclusion the Committee wish to emphasise the facts— . . . . (2.) That there will be a great need of reserves at the disposal of the admirals of our squadrons operating in the waters of the Pacific, and that Colonies easily accessible to ships in those waters should be especially encouraged to establish naval reserves.

There is one other point to deal with—namely, discipline. A great advance will be made in this direction by recruiting boys of respectable parentage and by training them thoroughly aboard ocean-going training ships; but, to render the advance lasting, officers who know how to maintain discipline are needed. My suggestion is that the ocean training ships should carry cadets drawn from H.M.S. *Conway* and *Worcester* and from the Colonies. In the case of the former they would serve three years, and in the case of the latter four

years, before being eligible for a second mate's certificate. During this period they would receive such a grounding in their duties as Mercantile Marine and R.N.R. officers that they would carry the tradition of discipline through their whole lives.

Unquestionably it is the knowledge of the years to be spent on the half-deck which prevents parents from sending their sons into the Mercantile Marine. It is not right that this should be so. In these days of keen competition it is difficult to find openings for boys. The Mercantile Marine offers an attractive and honourable career, and it is a national loss that the unnecessary roughness of the earlier phases should deter men of the class who would do it the most credit from entering it. I believe such a system as I suggest would commend itself to parents, both in England and in the Colonies, to owners who have a growing need of highly trained officers, and to the authorities of H.M.S. *Conway* and *Worcester* who have long wished to bridge the gap between the stationary ship and the quarter-deck. And by providing trained R.N.R. officers the Imperial gain would be great. The fees charged for the cadets would correspond with those of the stationary ships and the premiums of the best companies.

I cannot leave this part of my subject without referring to the efforts which have been made in this direction by others, notably by our Chairman aboard the *Hesperus* and *Harbinger*, and by Mr. Walter Runciman, M.P., aboard the ships of his line. The fact that these far-sighted and patriotic gentlemen should have turned their attention to this matter is sufficient proof that reform is necessary.

If further evidence is needed, the leading foreign nations supply it. The United States have ocean training ships for the Mercantile Marine supported by public funds. Germany has ocean training ships for officers and men supported by owners and Government grants. Belgium is copying the German system. France has a huge scheme of subsidies which converts her sailing ships into a fleet of sea-going training ships. Our Allies, the Japanese, have fifteen nautical training colleges, the largest supported by the Government, with two sailing training ships attached and another of 2,000 tons building. The Mistress of the Sea alone lags behind.

I would now ask you to turn your attention to that other hindrance to Federation—the inability of units to subordinate local to Imperial ambitions. I venture to think that this inability arises, generally speaking, from lack of knowledge of the Empire as

a whole and the needs and circumstances of its distant portions. It is true that in these days of telegraphs, newspapers, and endless books, a large amount of information may be acquired from an armchair, but I am not afraid to assert that no armchair critic will ever truly gauge the sentiments of a distant colony. Our Empire includes so great a diversity of races and geographical conditions that the legislator who would govern wisely, and the trader who would trade successfully, must be men of large sympathies and wide experience. That this is not always so at present is but too plainly shown by some of the debates in Parliament and by the failure of our trade to develop in some directions.

The surest means of counteracting this ignorance and of gaining wide knowledge is to study local conditions and requirements on the spot. This entails travelling. Happily, to-day travelling is easy, but it has two serious disadvantages—it is expensive, and unless the observation of the traveller is intelligently guided, he may return as ignorant as he started. The suggestion I have to offer guards against both these evils. It is this. Let the ocean training ships carry as student passengers the sons of the well-to-do business and leisured classes both of England and the Colonies for a nine months' voyage round the world. The students would be under the care of masters drawn from the universities, whose duty it would be to instruct them in the trade, history, and distinctive features of the country they were about to visit, and, while ashore, to direct their powers of observation to the conditions surrounding them.

The voyage, commencing about the middle of August in each year, would end about the middle of the following April. The course taken would include every place of principal interest in the Empire and some in the United States, with sufficient time allowed for extensive journeys inland. There is little doubt the Colonial authorities would cordially welcome the students and make every effort to render their stay thoroughly instructive, both by giving special facilities for travel and by lending the services of local lecturers. The cost of such a voyage, owing to the vessel being a training ship, would be considerably less than that of a year at Eton or Harrow. Here again I have the detailed itinerary and estimate before me, but time does not allow of my enlarging upon it. The presence of the masters would prevent the students from wasting their opportunities, which would be so likely to happen if a young man were sent round the world by himself aboard the ordinary mail steamer.

I cannot imagine a more profitable method by which a young

man could spend nine months, whether he be intended for business, for politics, for some of the Government Services, notably the Diplomatic or Civil Services, or for many another walk of life, among which may be included that of "an ornament of society." And should the boy be delicate the sea air would probably be the making of him. Such a voyage would give an insight into the trade of the world; would afford opportunities of studying character; and would enlarge the mind and deepen patriotism. And, since the students would be drawn from all parts of the Empire, it would assist the growth of friendships among the fellow-passengers, which should be even more valuable than those formed at school. Probably the best age at which to send a boy on the voyage would be when he leaves the public school. He then would not be too old to resent a certain amount of discipline, and yet old enough to understand all he would see. Should he be intended for the university, he should matriculate before sailing. It would probably be an advantage to him to enter into residence nine months later, because, as a general rule, boys go to the university too young, and travelling would have knocked a great deal of nonsense and conceit out of him. This idea has already been put into practice by the alert Americans. The authorities of a Rhode Island school have built an exceedingly costly ship, called the *Young America*, as a "floating school." Her "main purpose is to prepare students for college and for business, and, by seeing the world, at the same time widen the education by actual contact with other peoples and other climes." Her complement is to be 200 student-passengers. The course is to cover 100,000 miles and to last four years. The fee charged is "about £250 a year."

In conclusion, I would ask you to look at the idea, which I have endeavoured to outline to you, as a whole. A service of Imperial training ships, each bearing around the Empire a complement which is the Empire in miniature—the sons of the masses who, as Mercantile Marine and R.N.R. seamen, shall in peace promote her trade and in war defend her shores; the sons of the middle classes who, as Mercantile Marine and R.N.R. officers, shall command her ships; and the sons of the business and leisured classes, who shall be her merchant princes and her legislators. Every class learning to know each other and their Empire, and all striving for one end—the glory of their beloved country. Should this idea appeal to you, and I trust it may, I would earnestly beg of you that you will allow your approval to develop into action.

DISCUSSION.

The CHAIRMAN (the Right Hon. Lord Brassey, K.C.B.) spoke of the extreme importance of the subject with which Mr. Cobb had dealt. It was a subject that had received the attention not only of men like the eminent naval officers present that afternoon but of the Board of Admiralty itself. He could not of late years recall any Board that had done so much as the present with reference to the Naval Reserves. There had recently been two most important inquiries—one by the able Committee appointed by the Admiralty, and the other by a body appointed by the Board of Trade. These Committees had made most valuable recommendations. The Admiralty had quite lately taken practical steps to enrol the Naval Reserve Force in Newfoundland, and steps were being taken for the enrolment and instruction of a large force in Australia. The present Board had decided once more to enrol a force of Naval Volunteers. It was very hastily decided to disband that force, with which he himself was connected some thirty years ago. There had been a patriotic response to the call, and he had no doubt that in a few months we should have many thousands of men under instruction and competent for the duties which would be assigned to them on the mobilisation of the Navy. The *Navy List* now had many pages filled with the names of officers of the Royal Naval Reserve. It was on them we relied to do their part in case of a national emergency, yet nothing whatever had been done for the early instruction of those officers. Reference had been made to the *Hesperus* and the *Harbinger*, training ships with which he was formerly connected. After a good many years' experience he found the charges so onerous that he was not able to continue to sail those ships as vessels of instruction for those designed to be officers in the Mercantile Marine. The payments made covered the cost of training, but the ships were getting out of date and were not sufficiently large carriers to compete with the more modern vessels of the Mercantile Marine. As trading ships they were making serious losses voyage by voyage. It was, however, quite certain that with ships up to date and able to carry large cargoes, with comparatively small assistance from the Admiralty an education could be given which would be quite satisfactory and would fully qualify those young gentlemen to take their places as Reserve officers of the Navy. The Admiralty did make provision for training in gunnery at the later stage, but he held that for those officers of the Mercantile Marine to whom we looked for the Navy there

should be provision made not only for instruction in gunnery and other professional matters, but for sufficient instruction and education from the beginning of their service at sea.

Lord BRASSEY having to leave to fulfil another engagement, the chair was taken by Admiral Sir N. BOWDEN-SMITH, K.C.B.

Admiral the Hon. Sir E. FREMANTLE, G.C.B., C.M.G., was sorry Lord Brassey had not been able to carry his remarks further, and say what he thought of the very interesting scheme that had been propounded by Mr. Cobb. It was usual to speak of the Royal Navy as the best link of Empire, and that was undoubtedly true. It was true also that the red ensign, which was carried all over the world, was a great link of Empire and was appreciated as such. Of course, the quality of the Mercantile Marine was a very important matter. He himself felt some sympathy, at all events, with the Australian Colonies in their desire to have an entirely white service on the contract mail steamers. These Colonies might carry the matter rather far, and to some extent ignore Imperial requirements, but the idea was a good and a sound one. The idea was that, if we were to have merchant ships flying the British flag they should be manned by British crews. In that sentiment he thought they would nearly all agree. It was an extravagance, he thought, to keep on with our long-service men beyond a certain limit. He would not abolish long service altogether, but the short service which he advocated was really the long service in the French Navy. Talking of reserves, many naval officers said: "We don't depend on the Mercantile Marine now; the time is past for that." He altogether differed from that view. He held that no sea power could exist without a large Mercantile Marine, and that the real basis of our reserves must now, as ever, rest upon it. It was said you could not take men from the Mercantile Marine in case of war—that they would all be required; but he held, on the contrary, that, as history proved, the Mercantile Marine would have to make some sacrifices in case of war and spare the Navy some of its men. The scheme advocated by Mr. Cobb was undoubtedly an attractive one and aimed in the right direction. It was absolutely necessary that something should be done. It might be done by private effort, or by private effort combined with Government assistance, but he thought the time had gone by for one man to attempt to do it. If the shipowners had at heart the real security and well-being of their ships, they would encourage some such system as that which had been proposed. As to the details, he was inclined to make some slight criticism. The ships would have to be very large and there-

fore very expensive. There was nothing, of course, of such importance as continuous service. He was afraid there might be a certain amount of difficulty after a certain stage in continuing in this employment, but he agreed that one great inducement would be a pension, and if Mr. Cobb could manage to work in a pension scheme with his proposal he might succeed. It was a scheme which he hoped would be taken up, not only by shipowners, but by others interested in this question. The importance of endeavouring to make the Mercantile Marine more British than at present could hardly be over-rated. He had heard that there were merchant ships sailing under the British flag with nothing British about them except the flag. This was a state of things that was most undesirable, and in fact tended to disintegration. He trusted, therefore, that this scheme, or something of a similar nature, might be found acceptable; if not, that something at any rate would be done to make the merchant service far more British than at present.

Sir Frederick Young, K.C.M.G., said that he was glad that this important subject had been brought before the attention of the public, through the instrumentality of the Institute. He was connected with a family of shipowners of the olden time—a time when the Navigation Laws were in force and when one part of those laws was that every shipowner was bound to carry, according to the tonnage of his vessel, a certain number of apprentices. When those laws were repealed, whatever else might be said about them, we had undoubtedly lost a valuable nursery for the Royal Navy as well as the Mercantile Marine. Since that time we had found a difficulty in the way of manning our vessels in the way we desired. The plan put forward by Mr. Cobb demanded sympathetic consideration and support on the part of the public. Whatever might be our political opinions, on this subject at least we should all try to "think Imperially." He was glad to see that Mr. Cobb included in the title of his Paper the word "federation." As a veteran pioneer and staunch advocate of that great question, he was delighted to see how in so many ways the idea was coming to the front in the present day. A few months ago, at a meeting of the Royal Colonial Institute over which he presided, the son of our noble Chairman read a very interesting Paper, entitled "Steps to Imperial Federation." To-day, Mr. Cobb most appropriately linked the title of his Paper on the Mercantile Marine with Federation, while only on Friday last at Salisbury, Lord Percy, the Under-Secretary of State for India, ended his speech with these remarkable words: "Whatever the result of the elections, the Unionist party

would never lay aside its weapons until it had secured liberty for British trade and until it had taken the cause of Imperial Federation out of the region of dreams and made it a solid, practical, and enduring reality."

Mr. J. CATHCART-WASON, M.P., considered that Mr. Cobb had worked out his subject thoroughly, and he trusted that the project would attain the success which it deserved. He was one who thought that our Navy was our first, our second, and our last line of defence, and everything which could be done to strengthen it should be done. What the Volunteers were to the Army, the Mercantile Marine should be to the Navy. The day would come, he hoped, when we should seriously consider our position with regard to the employment of seamen other than British on our ships, especially those ships subsidised for the purpose of carrying the mails. He sympathised strongly with Australia from that point of view. He sympathised also with the lofty idea of Imperial federation. It was a matter which, he thought, hardly wanted arguing out on public platforms. It was in our blood. He did not think the Government had done well in the matter of the agreement with Australia. What we wanted was one strong and united Navy, and we only weakened ourselves by having differences of service, and above all differences of pay. Mr. Cobb had suggested an admirable means of getting rid of many difficulties, and he thought his proposal of school-ships of travel round the world a most admirable one.

Mr. F. H. DANGAR joined with the previous speakers in appreciation of Mr. Cobb's Paper and thanked him for bringing the important subject dealt with to the front, and although he was only a small shipowner the question of having British seamen in our merchant ships had long been uppermost with him, and his instructions to his captains when engaging their crews were to have none but British seamen. Unfortunately this could not always be done, as he understood that the regulations of the Shipping Office did not allow captains to pick their men. He had no fault to find with the foreigners, as they as a rule were good seamen, and his captains always spoke highly in their favour. As to training boys as sailors, he had given the matter some attention during the last fifteen years and had a good many during that period, some of whom were now officers in the Navy, while others held responsible positions in merchant ships and steamers. Mr. Cobb had referred in his Paper to what Lord Brassey had done in this connection with the *Hesperus* and the *Harbinger*, and Lord Brassey himself had given us the

reasons why the good work which these ships were carrying on had eventually to be abandoned. He might mention that, with some other gentlemen, he had contemplated building a ship with special accommodation for forty boys, who would be trained as sailors, but as the prospects of getting even a nominal return on the capital to be invested were so remote the project had to be given up. He quite approved of the idea of our having ocean training ships and steamers and to supply our needs both for the Navy and Merchant Service the Government, he thought, might well consider the policy of taking the matter in hand.

Mr. D. J. KENNELLY, K.C., who mentioned that he sailed as a paid apprentice fifty-nine years ago, and that he came to the port of London in 1846 with, he believed, the first Free Trade cargo of wheat under the new law, argued in favour of the restoration of the old system of apprenticeship, aided by the Government, as a means of improving the quality of the Mercantile Marine and at the same time excluding the foreigners who at present are found in such numbers in it. He was inclined to think the latter part of the Paper was a little Utopian. Its real value lay in the manner in which Mr. Cobb had opened their eyes to the necessity of filling up the Mercantile Marine with British-grown sailors.

Admiral Sir N. BOWDEN-SMITH, K.C.B., said: It was his pleasant duty to move a vote of thanks to Mr. Powys Cobb, and if in bringing the discussion to a close his remarks might not appear altogether favourable to the Paper, he hoped Mr. Cobb would understand that he fully appreciated the patriotism which prompted him or any other man to submit a scheme for the improvement of the *personnel* of our Mercantile Marine, or for providing a more efficient Naval Reserve. His fears were that the financial results as proposed in his plan would not be realised, and that sufficient allowance had not been made for deterioration or casualties and sickness or unforeseen accidents to the staff and crew of the vessel. There was nothing in the scheme which provided for stokers or firemen, which were an every-day necessity for both the Navy and Mercantile Marine. We had in the Navy a good nucleus of gunners, for, in addition to our well-trained seamen, the Marines, red as well as blue, were now well trained in gunnery, and had done well in recent prize firing. If hard pressed also at any time in a naval war we might hope to get some of the Garrison Artillery on board our ships; but stokers will be always wanted, and in war time the cry would ever be for more engine-room ratings. When Mr. Cobb spoke (on page 385) of the difficulty of getting poor boys of good cha-

racter on board merchant ships, he hoped he was not unmindful of the good work being done by the various training ships round our coasts, whose sole object it was to train poor boys of good character for a sea life, and that free of all charge. He was not speaking of reformatory or industrial school ships, but vessels like the *Warspite* and *Arethusa*, which took only boys of good character. At present there were on board the *Warspite* 200 boys, and an additional hundred could be taken at once, without increase to the staff, if funds permitted. He admitted that there was some difficulty in getting those boys shipped after they were trained; but we do get yearly a considerable number of boys afloat, and they earn (in the Mercantile Marine) from 20*s.* to 30*s.* a month on their first voyages. In Mr. Cobb's scheme the boys, as apprentices, were to earn nothing the first year (very properly), £10 to be paid them by the Association the second year, and £20 the third year; but what would the parents say to this? We know that amongst the working classes of the poorer kind it is a struggle for existence, and the parents look to their children to commence earning something towards the family pot as soon as possible after their school is finished, and he was afraid the terms mentioned would not tend to make them encourage their boys to go to sea. Comparing his scheme with the Navy, the lads of the Association were to commence their continual service at the age of twenty, and to have a pension of £26 per annum at the age of fifty. In the Navy, our lads commenced their continual service at the age of eighteen, and were entitled to a pension at forty of from £24 to £45 per annum, so that he feared the Training Ship Association scheme would not prove sufficiently attractive. Allusion had been made by one or two of the speakers to the Lascars on board some of our ships and the Australian objection to them. In his opinion, it would be a monstrous injustice to throw these men over after they had served us faithfully for the past fifty years; besides which, it was very doubtful if we could replace them with English seamen and firemen. To his certain knowledge these Lascars were well conducted, sober, trustworthy men, and, as they were our fellow-subjects from British India, let us try to replace the 36,000 white foreign seamen in the merchant service with Britishers before we turn out the 37,000 Indians who are also sons of the Empire. The question of barracks and clubs was a very large one, and might wait till the training scheme developed. Mr. Cobb spoke rather disparagingly of "Sailors' Homes," but he could assure him that those that were at present in existence for the Navy were doing admirable

work, and were much appreciated by the men. In providing a training system and pension scheme for the Mercantile Marine, we might well take a leaf out of Germany's book. Those two splendid companies, the "Hamburg-American" and "Nord Deutscher Lloyd," appeared to be very well managed, and were gaining popularity with the English travelling public. When a man got into the North German Lloyd he knew that (barring misconduct) he was provided for for life, and would receive a pension when old age overtook him. That Company had a training ship, the *Duchesse Sophia Maria*, of 2,600 tons, for their young officers and engineers. The service was so popular that it was said there were six candidates for every vacancy, and the Company was going to start a second vessel. It was commonly believed that these German companies were largely subsidised by the State, but from the latest information he was able to obtain this was not the case. They had contracts for carrying mails, but apparently not so great as ours for a similar proportion of work. He begged to move a vote of thanks to Mr. Cobb for his Paper.

In reply Mr. Cobb assured Admiral Sir N. Bowden-Smith that unforeseen contingencies were amply provided for by the balance of 18 per cent. which was available after providing full interest on capital invested, and for depreciation and insurance. If healthy well-grown and disciplined young sailors were supplied in large numbers, many would be attracted to the fireman and stoker ratings by the higher pay offered in the Mercantile Marine to those ratings. This was a better method than attempting to train boys in a stokehole, which would ruin their health. He was far from forgetting the excellent work which ships like the *Warspite* were doing. His system was designed to overcome the difficulty, admitted by Sir N. Bowden-Smith, which was experienced in getting their boys to sea. The terms of indentureship for poor boys compared favourably with the generally existing practice. Parents expected their sons to contribute to the family pot, because they had to feed and clothe them. To relieve parents of this necessity was more than the equivalent of their boys' possible earnings. The minimum pension earned by an A.B. under the proposed system was £38 per annum, and higher ratings could earn more. However, he deprecated any comparison with the Navy, because there could not be any competition with that service. The Navy could not accept anything like all the useful recruits who offered themselves, nor, on the other hand, could it enlist all the men who were wanted for war purposes, so there would always be

needed by the Government a large number of men such as it was proposed to train. Lord Brassey had told them that the *Hesperus* and *Harbinger* had failed to pay, not as training-ships, but as cargo-carriers. This danger was avoided in the present scheme. He noticed a tendency to confuse the training of officers with that of seamen. Seamen were the pressing need. He desired to bear testimony to the encouragement the Admiralty were giving to the enrolment of Reserves, but that would not produce Reserves unless there were suitable British sailors to be encouraged. The present position was that the Reserves were wholly inadequate, and British seamen were fast disappearing.

NOTICES OF NEW BOOKS RELATING TO THE COLONIES.

(By James R. Boosé, Librarian R.C.I.)

Ferguson, John (C.M.G.).—*Ceylon in* 1903. 8vo. Pp. vii–154, clxxxvi. Colombo: A. M. & J. Ferguson.

Ceylon is fortunate in possessing so able an advocate of its various attractions and capabilities as Mr. John Ferguson, whose works are always full of interesting details and practical advice to intending settlers or casual visitors. The work under notice is the sixth edition of a popular illustrated handbook, which is replete with information upon a great variety of topics of value to all who have dealings with the Island whether from a business or any other point of view. The early history of this gem of the Indian Ocean is full of interesting romance, whilst probably no land can tell so much of its past history, not merely in songs and legends, but in records which have been verified by monuments, inscriptions and coins, some of the structures in and around the ancient capitals of the Sinhalese being more than two thousand years old, and only second to those of Egypt in vastness of extent and architectural interest. Mr. Ferguson points out the various changes in the administration of the Island, including the Portuguese occupation, the Dutch period, and finally its transfer to England. So great was the value attached to Ceylon as the "Key of India" owing to the grand harbour of Trincomalee, as well as to its supposed fabulous wealth in precious stones, and valuable produce, that at the general peace Britain gave up Java to the Dutch and retained the little Island, although inferior in area, population and natural resources. A most interesting portion of the work deals with the condition of Ceylon in the early part of this century, as compared with its condition at the present time; one of the most striking instances of advancement being the development of internal communication, such as the construction of roads, the bridging of rivers, and the development of a railway system, which, in the Author's opinion, has done more to level caste and destroy superstition than all the force of missionaries and schoolmasters, much as these latter have aided in the good work. After referring to the native and manufacturing interests of Ceylon,

Mr. Ferguson turns to the great planting industry which began with coffee and has been succeeded by tea, cacao, cardamoms, cinchona, rubber, &c., to which the past development and prosperity of the Island are due, and on which its future position as a leading Colony must still chiefly depend. He refers at some length to the terrible loss incurred by the planters owing to the leaf fungus pest which had the effect of reducing the cultivation of coffee from 275,000 acres in 1878 to not much more than 5,000 acres in 1903. The present prospects for capitalists in Ceylon are set forth, together with an account of the attractions for travellers and visitors who can, in about three weeks from London, find themselves in a land presenting objects of interest to the botanist and zoologist, the antiquary or the man of science, the orientalist, or even the politician and the sociologist. Mr. Ferguson has embodied in his work all the information necessary for a tour through the Island, which is set before the reader in a style which is both entertaining and practically useful. He gives a lengthy account of the administration of the government from 1896–1903 by Sir West Ridgeway, in which the progress of the Island during that period is set forth. Mr. Ferguson's account of Ceylon is singularly free from typographical errors, but it is strange to find so experienced a writer describing the Island at the present time as the most important of *Her* Majesty's Crown Colonies. The appendix includes lectures delivered by the Author before various societies, together with some useful information for reference purposes. The work is well indexed, and contains numerous illustrations and a large map of the Island.

"**Indicus.**"—*Labour and other Questions in South Africa, being mainly Considerations on the Rational and Profitable Treatment of the Coloured Races living there.* 12mo. Pp. xii–146. London: T. Fisher Unwin. 1903. (Price 3*s.* 6*d.*)

On looking through the pages of this book one is at a loss to know whether "Indicus" is really serious as regards many of the statements contained in it. Reading it carefully, one is reminded of a notable historian who travelled extensively, and wrote a book detailing his experiences, the information supplied having been obtained in the course of conversation with various persons who had certain purposes to serve. "Indicus" tells us that his tour in South Africa was undertaken for purely commercial reasons, he having large business interests in India, and that the pages of the work are mainly a record of facts observed, and of conversations with persons of diverse races and various political views. On almost every page of the book the Author tells us what "my friend says," what "my informant says," what "a Cape commercial man says." Then we get the opinions of a burgher who was formerly in the service of the Transvaal Government, but who moved to Cape Colony, on account of his health, a year or two before the war; of a German doctor who was for seven years in the Transvaal; of a lady who lives in Johannesburg;

of a Dutch doctor, an unhappy-looking man who speaks English; of a Russian subject, though Colonial born, who had been in practice in Johannesburg; and of other representatives of various nationalities, who are quoted as authorities upon the future of South Africa, and more especially upon the treatment of the coloured races of the country. "Indicus" tells us that the Zulus in particular strongly object to the constant changes in the office of Minister for Native Affairs in Natal, and that no effort is made to cultivate any kind of fruit in that Colony, as it is too much trouble for the whites, and the more industrious races are not allowed to come in and do it for them. This statement it is difficult to understand, for he goes on to say that the Colony has already more Indian residents than white people. The opinions formed by "Indicus" during his brief visit to South Africa, which are based upon his observations and conversations, are contained in the closing chapter of the book. His conclusions will not probably meet with the approval of many of the best informed authorities on South Africa, but they nevertheless must command the attention of those who have the welfare of the country at heart. He states, for instance, that Cape Colony and Natal have grown extremely rich on the late war, and that another war, which is already in process of being written up, will, if it comes off, doubtless give Natal a spurt again, just as the Zulu War did in 1878. Such statements, based upon casual hearsay, cannot be treated seriously, more especially as the authority for making them is conspicuous by its absence. Again, "Indicus" states that the loyalty (of which, by the way, he says there is none in Lower Canada) of even the British Colonists in South Africa is mainly a keen appreciation of benefits received, combined with a fervent hope for more in the future at the cost of the British taxpayer. He speaks of the inveigling of Chinese or Indians into fenced compounds on five years indentures on terms that will be wholly misunderstood by the victims before they reach South Africa. Here again "Indicus" is at fault with the facts of the case, as the labourer is not indentured for five years, but for three, and is granted certain distinct advantages not possessed by the coolie sent to other parts of the Empire. It is unnecessary to further enlarge upon the views set forth in this work, which deals with questions of paramount importance to South Africa at the present time.

Foot, Lionel R., and Jones, T. F. E.—*The Gold Coast and the Fantis: a Complete Compendium for Miners, Traders, and Students of Native Life.* 8vo. Pp. 56. London: Gold Coast Globe Publishing Co. 1904.

In this short account of the Fantis, the Authors have gathered together some interesting notes regarding the manners, customs, thoughts and feelings, occupations and pastimes of one of the numerous tribes that inhabit the Gold Coast Colony. They further give a brief description of the mining industry of the Colony, and embody some useful hints regard-

ing the working of the Concessions Ordinances, and the difficulties with which the prospector has to contend. The many curious native customs referred to are interesting to those who know nothing of the manners of the native of West Africa, who, it is advocated, should take a higher place in the administration of the country and the commercial and agricultural development of its resources.

Morris, Henry.—*Life of Charles Grant, sometime Member of Parliament for Inverness-shire and Director of the East India Company.* 8vo. Pp. xviii–404. London: John Murray. 1904. (Price 12*s.*)

This is a well-written biography of one of the greatest and best known directors of the East India Company, who was connected with it during a period that extended over the most important epoch in the making of British India. He proceeded to India in the year 1767, and on his arrival obtained a position through the instrumentality of Mr. Becher, a member of Council at Calcutta and afterwards Political Resident at the Court of the Nawab of Bengal. He remained in Bengal about two years and a half, during what may be described as part of the worst period in the early administration of the East India Company, which had not then taken the complete management of the country into their own hands. In addition to other misfortunes an appalling famine devastated the land in 1769–70, and in conjunction with Mr. Becher, Grant took a prominent part in alleviating the sufferings of the famine-stricken people. Returning to England in 1771, he obtained the appointment of a writer in the Company's service, and again proceeded to India in 1773, and very soon gained the position of Secretary to the Board of Trade, an appointment which placed him in the inner circle of Calcutta society, and his letters written at this period are of peculiar interest, as they not only contain an excellent account of Calcutta in the olden times, but give side-lights on passing political events and represent the impressions then being made on Calcutta society. In 1780 Grant was appointed Commercial Resident at Malda, which appointment was entirely mercantile and consisted in looking after the interests of the East India Company in their investments and in superintending the manufacture of cloth and silk for this purpose. From Malda he frequently made journeys into the district, and his correspondence at this period gives petty incidents and details of life in rural Bengal a century and a quarter ago, which are very similar to correspondence in up-country stations in India at the present time, especially in places remote from a railway. Grant's relations with Lord Cornwallis, and his appreciation of that nobleman's character and policy, especially with reference to affairs in the revenue and commercial history of Bengal, form an interesting portion of the work. His notable integrity gained him the respect of the Governor-General, who in 1787 made him fourth member of the Board of Trade at Calcutta, a position he retained during the remainder

of his residence in India, which altogether extended over a period of eighteen years. On returning to England Grant entered Parliament in 1802, and two years later was chosen Deputy-Chairman of the Court of Directors of the East India Company, and Chairman in 1805—a position which gave him an opportunity for exercising his naturally masterful character, which was described by Sir John Kaye in the strong phrase: "He was not a Director, but the Direction of the Company." He was three times re-elected chairman, and, representing the Court of Directors in Parliament, he took a prominent part in all questions relating to the Company's privileges. By no means the least interesting portion of the book is that dealing with the relations between the Company and the policy pursued by Lord Wellesley, which was to consolidate and extend British supremacy over the whole of India by means of defensive and subsidiary alliances with the various native Courts, and thus to render the Indian Government the supreme arbiter in every quarrel and dispute. Grant strongly disapproved this warlike policy of the Governor-General, and opposed it in the debates in Parliament on the Mahratta War, the Government of Oude, and the affairs of the Carnatic. It is impossible to deal with every incident in the career of this remarkable man, but his endeavour to further the progress of Christianity and education in India should be mentioned. To him Bengal and Northern India owe the commencement of Protestant missions, whilst he originated the scheme of education for the young civil servants of the Company, which resulted in the establishment of the East India College at Haileybury, from which there issued a body of men who made the Indian Civil Service one of the purest and noblest services that has ever existed in any part of the world. The life of Charles Grant naturally includes much of the history of the age in which he lived, as well as an account of the part played by those who shared with him the heat and burden of the day, and therefore this biography contains a record of the services of many of his contemporaries who were engaged in the administration of India under the rule of the East India Company. The work has been compiled by Mr. Henry Morris, late of the Madras Civil Service, who has carefully condensed the mass of material placed at his disposal, and has produced a book which will take a high place amongst the biographical works dealing with the lives of the founders of our Indian Empire.

The Atoll of Funafuti: Borings into a Coral Reef and the Results, being the Report of the Coral Reef Committee of the Royal Society. 4to. Pp. xiv–428, with Atlas of Maps. London: Harrison & Sons. 1904.

The assistance rendered by the Royal Society to the expeditions despatched to the Pacific Ocean for the purpose of investigating by means of a boring the depth and structure of a coral reef entitles the Society

to the heartfelt gratitude of all lovers of natural science. As far back as 1893 the subject was brought before the notice of the public at a meeting of the British Association, when Professor Sollas opened a discussion on "Coral Reefs, Fossil and Recent." Its result was to strengthen the conviction that the origin and history of a coral reef must remain uncertain until the experiment so earnestly desired by the late Charles Darwin had been made and cores brought up for examination from a boring which had been carried down to a depth of at least six hundred feet. A committee having been appointed, the Island of Funafuti, one of the Ellice group, was selected for the investigations, and an expedition organised with Professor Sollas as leader. The results of his work are set forth in Section I., from which it appears that he failed to attain a greater depth than a hundred feet. The experience gained in this attempt proved England was too distant as a base for the undertaking and this opinion was unofficially communicated to the scientific men of New South Wales, the government of that State having assisted the undertaking by the free loan of a diamond-boring apparatus. In 1897 a second expedition was organised in New South Wales by Professor T. W. Edgeworth David and received substantial support from the Royal Society of London, and from Miss Eadith Walker of Sydney, who generously subscribed £500 towards its cost. The results of this attempt are embodied in Section IV. of the work under notice, and show that a depth of 698 feet was attained, and that in the following year a third boring reached to a depth of 1,114 feet. The whole of the material obtained from the bores in the lagoon at Funafuti was forwarded to Professor Judd of the Royal College of Science, as was the remainder of the Funafuti core, together with other zoological collections, and the results of his investigations are embodied in a general Report (Section X.), to which is appended a valuable Report by Dr. G. J. Hinde upon the nature and distribution of the organisms which have contributed to the building up of the atoll. In summarising the work of the three expeditions, Professor Edgeworth David states that "it may appear to some that the results attained are not commensurate with the sacrifices made, and such a view seems not unreasonable at first sight, but it must be remembered that in this, as in many other pieces of scientific work, the bread that is cast upon the waters may be found only after many days. We have at all events succeeded in carrying out the wish of Darwin for a core from a depth of 500 to 600 feet in a coral atoll in the Pacific Ocean. We trust that the results of the study of the ample material from our 1,114 feet bore . . . may enable zoologists and geologists to lay more surely the foundations of our knowledge of the origin and growth of coral atolls, and so make our work of some use to science." The editorial work has been ably performed by Professor T. G. Bonney, who has contributed a well-digested preface to the series of Reports. A collection of maps and plates admirably executed adds to the value of the work, which is of great scientific interest, as well as an important addition to natural science.

Geography of South and East Africa, by C. P. Lucas, C.B.; *being Part II. of Vol. IV. of a Historical Geography of the British Colonies, Revised to* 1903, *and with Chapters on the Transvaal and Orange River Colony added*, by Hugh Edward Egerton M.A. 12mo. Pp. 169. Oxford: Clarendon Press. London: Henry Frowde. 1904. (Price 3*s.* 6*d.*)

The many changes that have occurred in the administration of the Colonies of South and East Africa have necessitated the issue of a revised edition of Part ii. of Vol. iv. of Mr. C. P. Lucas's work, "A Historical Geography of the British Colonies." The work of revision has been performed by Mr. Hugh E. Egerton, who has brought the various sections up to date, and has added two new chapters dealing with the Transvaal and the Orange River Colony. The main features of the previous edition have been closely adhered to, and the reader is enabled to gain a knowledge of the chief events in the history of the Colonies dealt with. If any fault can be found with this interesting work, it is that one or two of the sections are somewhat out of proportion as regards the matter dealt with. For instance, whilst the information upon British East Africa occupies some forty-one pages, the history of the Cape Colony is told in thirty-seven pages. This, however, is a small matter in a work of such general excellence, and does not in any way detract from the general utility of the book. Several maps are distributed throughout the text.

The Imperial Guide to India. 12mo. Pp. xi–244. London: Simpkin, Marshall, Hamilton, Kent & Co. 1903. (Price 6*s.*)

This is a handy guide for the tourist to the Far East, who will be enabled to obtain from its pages much useful information regarding the various routes as well as descriptions of the towns of India, Ceylon and Burma, and the chief attractions offered in each instance to the visitor. The information appears to have been obtained from reliable sources and to be sufficient for the purpose indicated. The traveller is enabled to obtain a brief idea of the history of each country, and the names of the principal hotels, clubs, banks, &c., in the chief towns. Hints are also supplied as to fares for boat hire, conveyance of baggage, clothing, sport, and other items of service to the tourist. The compiler further refers in a general way to the history, architecture, and surroundings of the many interesting localities to be found in India and Ceylon. The work is a most useful one and contains a large number of maps and illustrations.

The Imperial Trades Directory of South Africa, 1904. Roy. 8vo. Pp. 816. London: 15 Tudor Street. Cape Town: 77 Long Street. (Price 10*s.* 6*d.*)

The object of this work is to provide a compendium of information for all interested in South African affairs, with special provision for the

merchant, trader and exporter. The composition of the country as a whole, the characteristics of the various States, and the details of trade are dealt with under their various headings. The Directory is of service to those residing in South Africa as well as in the United Kingdom, as information is supplied for both. There is a directory of the chief traders in South Africa, as well as the principal exporters to South Africa. Other features comprise a list of banks and bankers, the customs tariff, a gazetteer of South Africa, harbour and dock rates and dues, the imports and exports of South Africa, the railways of South Africa, together with goods rates and regulations and other equally useful information regarding the commercial side of life in South Africa. The work supplies a recognised want and appears to have been carefully compiled and admirably arranged.

Wakefield, E. S.—*Thomas Wakefield, Missionary and Geographical Pioneer in East Equatorial Africa.* 12mo. Pp. 285. London: Religious Tract Society. 1904. (Price 3*s.* 6*d.*)

The life of the Rev. Thomas Wakefield is so identified with the settlement and development of Eastern Africa that we cannot but feel grateful to those who have been instrumental in publishing this interesting account of his long residence in that part of the Empire. Leaving England as long ago as the year 1861, Mr. Wakefield devoted twenty-seven years of his life to missionary work in a country inhabited by savage, treacherous, and warlike tribes, who had left even along the coast sad traces of their savage spirit and barbaric valour. The Galla country, with which he was more especially identified, was at the period of his first visit a *terra incognita* to all except the aborigines and their predatory enemies, such as the Masai, the Wakamba, and the Somali, and the arrangements for making a journey thither were beset with difficulties, more especially from the influence of the widely-spread reports of the savage habits of the Gallas and the fear inspired by their evil name. In the book under notice we obtain a graphic account of the work performed by Mr. Wakefield and his party, as well as of the habits and daily life of the natives and the dangers and difficulties which the missionary in such a country has to contend with. In addition to his missionary labours, Mr. Wakefield was a man of many interests, and lost no opportunity of acquiring knowledge for his own satisfaction, and, as it afterwards transpired, for the enrichment of several branches of science. He not only contributed to our knowledge of the botany of Eastern Africa and its ornithology, but took advantage of his long residence on the East Coast to engage in researches on the then mysterious geography of the remote interior. He possessed the true instinct of a geographer, and was invited by the Royal Geographical Society to undertake the work of exploration in that part of Africa, but declined on the ground that the mission with which he was connected could not safely be left without the oversight of

an experienced European. He nevertheless contributed not a little by his own journeys to an improved knowledge of the East African Coast lands, and he will be remembered by geographers for his almost unique contributions to geography, by the method of careful inquiry among the members of native caravans, which enabled him to forestall to some extent the results of actual exploration. The work is full of interesting details, gathered together from the stores of information accumulated during Mr. Wakefield's long residence in Eastern Africa, and is illustrated by Mr. W. H. Bone of Sydney, New South Wales, who contributes several sketches of the Gallas and their country.

Chatterton, Alfred.—*Agricultural and Industrial Problems in India.* 12mo. Pp. iv–174. Madras: G. A. Natesan & Co. 1903. (Price 4*s*.)

This work consists of a series of papers and articles contributed by Mr. Chatterton at various times to periodicals, &c., regarding agricultural and industrial problems in India. He appears to have closely studied the questions with which he deals, and to have gathered together a large amount of information concerning various native industries in connection with the introduction of labour-saving appliances. As regards agricultural problems, Mr. Chatterton has devoted considerable attention to irrigation, a subject of the utmost importance to India and one which has engaged the attention of the Government of that country for many years past. At the same time, he upholds that the proper storage of water has been neglected in the past, and that it is likely to become the great Indian engineering problem, and that attention must be paid to that portion of the rainfall which is absorbed by the earth and disappears from sight, to find its way by deep and tortuous passages to the sea. He compares the primitive methods of sinking artesian wells in vogue among the ryots, which prevent them going more than a few feet below the hot-weather level of the water, with the advantages possessed by the oil-engine and pump, which would enable greater depths to be attained and the supply of water to be enormously increased at very much reduced cost. He further gives his views upon the important questions of water-lifts, well-irrigation, the cost of power, the value of windmills in India, and agricultural education. He strongly advocates the establishment of properly-constituted rural industrial schools in suitable localities, where they will serve both as demonstration farms for the benefit of the adult ryot community and as schools in which their children can be trained in the best practices of modern agriculture. Such education would, in his opinion, mark the dawn of a new era in Indian agriculture, in which Nature would be assisted by science, and the land yield fruit abundantly in response to the intelligent demands which are made upon it. In dealing with the industrial problems of India Mr. Chatterton has selected the following subjects:—Tanning in the Madras Presidency,

Hand-weaving, Manual Training, Industrial Education, and District Board Industrial Schools, and in each case sets forth his views in a plain-spoken manner upon the means to be adopted for giving the children of India the education that will best fit them for their work in the future.

Brown, A. Samler, and G. Gordon.—*The Guide to South Africa, for the Use of Tourists, Sportsmen, Invalids, and Settlers.* 12mo. Pp. lxviii–474. London: Sampson Low, Marston & Co. 1904. (Price 2*s.* 6*d.*)

Now that a more settled condition of things has been obtained in South Africa, the compilers of this excellent Guide have been enabled to embody authentic information, more especially regarding the new Colonies, which, for various reasons, was unobtainable for insertion in the previous issue. The work has gained so high a reputation as a reliable handbook—and its previous editions have been referred to in these pages on several occasions—that it is unnecessary to deal at any length with the contents of the current issue. It contains in a condensed and easily accessible form a mass of information necessary to "tourists, sportsmen, invalids, and settlers," a series of special articles supplying in sufficient detail the information required by each class. A very complete gazetteer of the whole of South Africa is a useful feature of the work, more especially as each town or village is referred to at sufficient length to prove of service to the ordinary inquirer. Information is embodied upon the various industries of the country, and the statistical tables have been revised and brought up to date. A series of maps of the various divisions of South Africa adds to the value of the work as a guide and book of reference.

Henslow, Rev. Professor G. (M.A.).—*South African Flowering Plants, for the Use of Beginners, Students, and Teachers.* 12mo. Pp. ix–300. London: Longmans, Green, & Co. 1903. (Price 5*s.*)

Ever since the time of its first settlement, the Cape has been a constant source of pleasure and delight to the botanist and the gardener. It was some time ago stated by Mr. Harry Bolus, in writing upon the flora of South Africa, that though Cape plants have somewhat gone out of fashion of late years, it is still probably true that no single country in the world has contributed so largely to European conservatories and gardens as the Cape of Good Hope. In the book of Professor Henslow we obtain an excellent idea of the number of plants in South Africa, and of their structure, as well as many useful hints as to the study of plant life both by the student and the teacher. The information supplied is set forth in so clear and non-scientific a manner as to prove of service to all who take an interest in the growth of flowers. Professor Henslow has, in fact,

written a work that will whet the appetite of the ordinary traveller in a strange country to become more intimately acquainted with the botanica specimens which present themselves to his view. He directs attention to the plant and its parts, the stems and foliage of plants, and the structure of flowers and their habits in association with their surrounding conditions. He tells us how plants change, why one plant is hairy or woolly, whilst others are quite smooth, and how it has come about that there are so many different sorts of sizes, shapes, colours, scents, &c. In basing his work upon the flora of South Africa, Professor Henslow shows a wonderful knowledge of the various species of flowering plants of that portion of the earth's surface which ranks amongst the richest of regions from the botanical point of view. He has compiled a work which should be closely studied by residents of South Africa as well as by botanical students generally.

DONATIONS TO THE LIBRARY.

Government of British Guiana.—Administration Reports, 1902–3.

Government of Ceylon.—Ceylon Civil List, 1904.

Government of Cyprus.—Law Reports, Vol. v., 1899–1901.

Government of Hong Kong.—Sessional Papers, 1903.

Government of India.—Annual Progress Report of the Archæological Survey Circle, United Provinces, 1902–3. Acts passed by the Governor-General of India in Council, 1903. Report on the Administration of the Andaman and Nicobar Islands and the Penal Settlement of Port Blair, 1902–3. Imperial Library: Catalogue of Books in the Reading Room, 1903. Finance and Revenue Accounts, 1902–3.

Government of Jamaica.—Handbook of Jamaica, 1904.

Government of Lagos.—Blue Book, 1902.

Government of New South Wales.—Statutes, 1903.

Government of the Orange River Colony.—Statute Law of the Orange River Colony, translated by C. L. Botha, 1901. Ordinances, 1902. Proclamations issued in the Orange River Colony from the date of Annexation to the Promulgation of the Constitution on June 23, 1902. Administration of Justice Ordinance and Rules of the High Court of the Orange River Colony, 1903. Debates of the Legislative Council, 1903. Report of the Commission of Inquiry into the Leasing of Government Farms in the late Orange Free State, 1902. Report of the Commission appointed to inquire into the Law relating to Mining and Prospecting for Diamonds and Precious Stones, 1903.

Government of Seychelles.—Blue Book, 1902.

Government of Trinidad.—Minutes of the Proceedings of the Legislative Council and Council Papers, July–December, 1903.

The Lords Commissioners of the Admiralty.—Admiralty Charts (J. D. Potter, Agent). No. 3419, Australia—North Coast, Torres Strait,

Goode Island, Anchorages. No. 3404, Canada—Lake Superior, Coppermine Point to Cape Gargantua. No. 3387, North America—West Coast, Vancouver Island and British Columbia, Johnstone Strait. Nos. 3402 and 3403, South Pacific, Solomon Islands—Ysabel Island (Bugotu Island). No. 3399, South Pacific, Solomon Islands—Anchorages in Ysabel Island. No. 2658, South Pacific, Solomon Islands, Florida Island—South Coast, Cavutu and Tulagi Harbours. No. 3385, China, East Coast, Hong Kong Island, Aberdeen Harbour.

Department of Trade and Commerce, Canada.—Canadian Industrial Blue Book; the Manufacturers' List Buyers' Guide of Canada, 1904.

Government Statist, Victoria.—Victorian Year Book, 1902.

India Office.—Report on the Administration of the Punjab and its Dependencies, 1903-4. Administration Report of the Baluchistan Agency, 1902-3.

Pharmacy Board of Victoria.—Report for 1903.

Wellington Harbour Board, New Zealand.—Annual Report, 1903.

American Geographical Society.—Bulletin, January 1904.

Canadian Manufacturers' Association.—Canadian Trade Index, 1903.

Canterbury College, New Zealand.—Calendar, 1904.

NOTICES TO FELLOWS.

ARRANGEMENTS FOR THE SESSION.

1904.

May 10.	Ordinary Meeting at the Whitehall Rooms, at 8 P.M. "West African Negroland." Lady Lugard. The Right Hon. Earl Grey will preside.
May 31.	Afternoon Meeting at the Whitehall Rooms, at 4.30 P.M. "Women and the Colonies." Mrs. Archibald R. Colquhoun.
June 7.	Ordinary Meeting at the Whitehall Rooms, at 8 P.M.
June 22.	Annual Conversazione.

Occasional Meetings will also be held in the Library of the Institute at 4.30 P.M., when Papers occupying about half an hour will be read; and, in order to avert undue expense, the reports published in the "Journal" and "Proceedings" will not exceed three pages. A notice of the date and subject of each Afternoon Meeting will be exhibited in the Hall of the Institute, and inserted in the "Journal" whenever practicable; but separate post-cards will not be printed, as in the case of Evening Meetings.

ANNUAL CONVERSAZIONE.

The Annual Conversazione will be held at the Natural History Museum, Cromwell Road, on Wednesday, June 22. Full particulars will be announced by special circular to Fellows.

INSTITUTE JOURNALS REQUIRED.

Should any Fellows have spare copies of the Institute Journal for December, 1903, they will greatly oblige by forwarding them to the Secretary.

NEWSPAPERS FOR SALE.

Newspapers for sale at half-price, including postage :—

	United Kingdom £ s. d.	Abroad £ s. d.
Engineer . .	0 15 8 per annum	. . 2 0 0 per annum

HOURS OF OPENING INSTITUTE.

The Institute is open to Fellows from 10 A.M. to 8 P.M. on week-days, with the exception of the usual public holidays. *During August and September it will close at* 6 P.M., as the majority of Members are then out of town, and the annual cleaning and repairs are most conveniently done during those months.

PHOTOGRAPHS OF COLONIAL TOWNS, SCENERY, &c.

As it is desired to form a collection of photographs of the chief towns and scenery of the various Colonies for reference purposes, donations are invited from Fellows and others.

TELEGRAPHIC ADDRESS.

In reply to inquiries, Fellows are informed that the words "Recital, London" have been registered as the abbreviated address of the Royal Colonial Institute in the United Kingdom and over the whole of the Eastern Telegraph and Eastern Extension Telegraph Companies' lines. Telegrams for any individual Fellow should be addressed to such Fellow by name, "c/o Recital, London."

COLONIAL NEWSPAPERS AT THE BRITISH MUSEUM.

Any Fellow of the Royal Colonial Institute who wishes to consult the back files of Colonial Newspapers which are regularly presented by the Institute to the British Museum should apply in the first instance at the office of the Principal Librarian of the Museum, where he may obtain an order for the Newspaper Room on presentation of his card. Should he require a ticket for any length of time, he can obtain, at the Principal Librarian's office, a more permanent form of admission on producing a letter of recommendation from the Secretary of this Institute.

Reprint from "The Standard," *February* 22 *and* 25, 1904.

THE VITALITY OF SEEDS.

To the Editor of The Standard.

Sir,—With reference to the recent correspondence which has been appearing in *The Standard* on "The Vitality of Seeds," I feel sure the following will be of interest to your readers. During last year a collection of vegetable and flower seeds, specially packed in a sealed tin box, came into my possession at Dawson, Yukon Territory. The box and its contents, which had been given to a missionary in 1895, had been left unopened by him on leaving the Klondike in 1900, and for years these Seeds lay amongst a lot of rubbish subjected to a Winter temperature ranging as low as 68 deg. Fahrenheit below zero, followed by as much as 90 deg. Fahrenheit each Summer.

Planted by me in 1903, these seeds grew perfectly well, a circumstance which not only throws light on the vitality controversy, but testifies to the fact, not generally, I believe, realised by people in this country, that Dawson, situated as it is in a portion of Canada almost within the Arctic Circle, is yet not entirely a barren waste from a horticultural point of view.

I am, Sir, your obedient Servant,
C. C. CHATAWAY.

Cambridge, February 19.

To the Editor of The Standard.

Sir,—Will you allow me to supplement Mr. Chataway's letter appearing in *The Standard* of yesterday's date? It seems important that it should be understood that the seeds he mentions as having lain exposed from 1895 to 1903 to temperatures ranging between 68 deg. Farenheit below zero each Winter to 90 deg. Fahrenheit each Summer, and which he found to germinate freely last year on opening the tin box containing them, only endured those vicissitudes in consequence of special treatment.

Some five-and-twenty years since I read a Report, written early in the Nineteenth Century, from an Indian Government official, calling attention to the fact that he had had seeds raised by his gardener in his English country home for his use in India; that while some of these seeds had proved excellent, others were absolutely worthless. On enquiry he found that in one case the pods containing the seeds had been hung up in the chimney corner of the kitchen of the English mansion for some time and the seeds placed while warm in bottles and sealed. The seeds that had failed, although dried in a similar way, had not been bottled for a considerable time afterwards. This hint was sufficient to start me on a long series of experiments, having for their object the safe elimination of the excess of moisture which all seeds contain as harvested in the English climate, however dry they appear when handled. This moisture has been a cause of very great trouble when English seeds, packed in hermetically sealed boxes, passed through the tropics, where the heat in the ship's hold caused the seeds to sweat and become mouldy.

Naturally, I found there was a very great diversity in the amount of such moisture contained in the different varieties of seeds, and that, while some seeds could safely lose an amount of moisture equal to ten per cent. of their weight, others could not part with more than five per cent. without injury; consequently, the degree of dry heat to which seeds could be safely exposed, and the proper duration of such exposure before packing, varied very much, while some seeds required much more gradual desiccation than others. But before the experiments were completed, knowledge on these details was acquired, with the result that there seems hardly any limit to the period during which the germination of seeds may be conserved if they are properly prepared by drying in a suitable high temperature and hermetically sealed in that temperature.

For many years past, seeds thus packed by my firm have been successfully used in all climates, and the box Mr. Chataway mentions was one of those which every agent of the Church Missionary Society, the London Missionary Society, and the Baptist Missionary Society receives annually, containing seeds for his personal use in Mission gardens from the Tropics to the Arctic Circle.

I am, Sir, your obedient servant,
MARTIN J. SUTTON.

Reading, February 23.

Spottiswoode & Co. Ltd., Printers, New-street Square, London.