Papers on India, No. 7.

AGRICULTURAL REFORM

IN

INDIA.

BY

A. O. HUME C. B.,

LATE SECRETARY TO THE GOVERNMENT OF INDIA IN THE DEPARTMENT OF REVENUE, AGRICULTURE, AND COMMERCE.

WITH

AN INTRODUCTION

AND

DEDICATORY LETTER

TO

THE RIGHT HONBLE LORD CURZON OF KEDLESTON,

BY

JOHN MURDOCH, LL. D.

A PLEA FOR A WELL-ORGANISED DEPARTMENT OF AGRICULTURE.

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A PLEA FOR A WELL-ORGANISED SEPARATE AGRICULTURAL DEPARTMENT.

INDIAN RYOTS.

"There is, perhaps, no more pathetic situation in the whole range of human history than to watch these dull, patient masses stumbling in their traditional way along a path which can lead only to suffering, most of them careless of the future, marrying and giving in marriage, fresh generations ever encroaching on the narrow margin which separates them from destitution. Anxious statesmen peer into the mists which shroud the future, and wonder what the end of all this may be."

W. Crooke.

THE CHRISTIAN LITERATURE SOCIETY FOR INDIA:
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To

The Right Honourable

LORD CURZON OF KEDLESTON,

Viceroy and Governor-General of India.

My Lord,

The object of the following pages is to draw attention, if possible, to the principal industry of India, and the condition of those depending upon it for support.

Sir H. S. Cunningham estimates that 90 per cent. of the rural and 80 per cent. of the total population of India is closely connected with the land.* This would give the vast aggregate of 230 millions whose interests are bound up with agriculture.

Mr. W. Crooke thus touchingly describes the condition of Indian ryots:

"There is, perhaps, no more pathetic situation in the whole range of human history than to watch these dull, patient masses stumbling in their traditional way along a path which can lead only to suffering, most of them careless of the future, marrying and giving in marriage, fresh generations ever encroaching on the narrow margin which separates them from destitution. Anxious statesmen peer into the mists which shroud the future, and wonder what the end of all this may be."†

From these ryots the Government of India draws the largest land revenue in the world, amounting in 1895-6 to Rx. 26,200,955.

Under the above circumstances, one would naturally expect that the improvement of agriculture would have received the most earnest attention of the Government of India. Something, it is true, has been done; but, on the whole, the neglect has been most deplorable.

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* *British India and its Rulers*, p. 8.
† *North-Western Provinces of India*, pp. 173, 174.

Lord Mayo, writing in 1869 to Lord Napier of Ettrick, says :—

"Agriculture, on which every one here depends, is almost entirely neglected by the Government."*

In 1898, nearly thirty years later, the Hon. F. A. Nicholson, at the Budget debate in the Viceroy's Council Chamber, charged the Government of India with having "starved" agriculture. Mr. Nicholson estimated the expenditure of the Department of Land Records and Agriculture as follows :—

Land Records	... 97 lakhs.	= Rx.	970,000
Agriculture ...	... 5 „	= „	50,000
	102 lakhs.	Rx.	1,020,000

He also thus described the agricultural expenditure: "It is only throwing away money to spend a few thousands here and there and now and then."

Instead of "starving" agriculture, gratitude to the toiling ryots, humanity to the "forty millions who go through life on insufficient food,"† and, even self-interest, should have prompted Government to make every effort for its improvement.

The only effectual Remedy.—This is to establish a well-organised, separate Agricultural Department as suggested by Lord Mayo in 1869:

"The time is come when we ought to start something like an Agricultural Department in the Government of India, with branches in the Presidencies and the Lieutenant Governorships."‡

The object of this publication is to emphasise the need of such a Department.

Ways and Means.—Lack of funds has been the invariable excuse of the Indian Government when asked to do more for agriculture. An old proverb says, "Where there's a will, there's a way." Government could spend

* Hunter's *Life of the Earl of Mayo*, Vol. II. p. 320.
† Hunter's *England's Work in India*, p. 89.
‡ Hunter's *Life of the Earl of Mayo*, Vol. II. p. 319.

millions on a "scientific frontier", although it "starved" agriculture.

The Famine Policy of Government has been, in some respects, a failure. It has been largely the unintelligent charity of the middle ages. As mentioned in the Introduction, it has been

A gigantic effort to FEED Paupers,

Instead of

A gigantic effort to PREVENT Pauperism.

The Famine Commission of 1878, not only advised that imperial and provincial establishments of agriculture should be established, but expressed the opinion that the expenditure was "fairly chargeable against the Famine Surplus Fund."

What India now most needs is a revision of her Famine Policy. The entire cost of Railways and Irrigation Works should be met from the general revenue. The Famine Fund might be appropriated as follows:

	Lakhs.
Reserve to meet Famine Expenditure	75
Agricultural Department	25
Agricultural Education	25
Manufactures and Technical Education	25
Total...	150

Proportionate allotments would be made to the Provincial Governments.

It is true that 25 lakhs would go but a small way towards agricultural education; but it might supplement an educational cess, such as has been established in the North-West Provinces, and which might be extended.

England has its President of the Board of Trade; so should India have its Director of Manufactures.

As the Famine Fund is considered a fixed charge upon the revenue, the Departments depending on it for support would be placed on a permanent basis.

According to Mr. Nicholson, during the last thirty years there have been connected with Agriculture "numerous Conferences, Committees, Reports, and Resolutions," with the result that the Department is characterised as *nominis umbra!* Such procrastination is worthy of Spain.

Your Lordship's administration has commenced under favourable circumstances. Before you lay down office, I trust measures will have been inaugurated which will be a blessing to generations yet unborn.

I conclude with another quotation from Lord Mayo:

"Every day the want of a Department for agriculture and trade is more keenly felt, and I believe that the establishment of a separate Department of the Government for this object would be one of the most useful measures which could at present be taken into consideration."

Hunter's *Life of Earl Mayo*, Vol. II. p. 320.

I have the honor to be,
My Lord,
Your Lordship's most Obedient Servant,
JOHN MURDOCH.

MADRAS, *September 20th*, 1899.

INTRODUCTION.

INDIA'S GREAT PROBLEM:

THE FOOD SUPPLY.

Increase in Population.—Of all the "white man's burdens," perhaps, the heaviest is India. The population, at successive decades, has been as follows:—

1861	..	196,884,002*
1871-2	..	240,931,521
1881	..	253,793,514
1891	..	287,223,431

The increase is partly due to more correct enumeration and the addition of Upper Burma. The effect of the former is clearly seen in the case of Bengal:

1861	..	41,650,522
1871-2	..	62,867,467
1881	..	66,750,520
1891	..	71,346,987

The population certainly did not increase by 21 millions between 1861 and 1872.

The increase in the whole of India between 1872 and 1881 amounted to 15,465,128. During that interval South India was visited by the terrible famine of 1876-7. The excess of deaths amounted to 5¼ millions; the number of births was probably reduced by 2 millions, causing a total reduction in the population of about 7 millions.† Mysore lost one-fourth of its inhabitants ‡

During the decade ending 1891, the population increased by 33,429,917. Deducting 2,946,933 for Upper Burma, the increase is 30,482,984—a yearly average of 3 millions. Lord George Hamilton was considerably under the truth when, in his Budget speech of 1898, he said, "that each year brings an addition of two millions mouths in India for whom food has to be found." *Three* millions is the more correct figure.

Present Food supply Insufficient.—The Ninth Resolution of the Eighth Congress contains the following:

"Resolved—That this Congress emphatically re-affirms Resolution III of the Congress of 1891, and having regard to the fact that fully fifty millions of the population, a number yearly increasing, are dragging out

* *Statistical Abstracts.* † Hunter's *Gazeteer*, Vol. VI. p. 544.
‡ Hunter's *Gazetteer*, Vol. X. p. 106.

a miserable existence on the verge of starvation, and that in every decade several millions actually perish by starvation."

The chief support of this statement is probably the following extract from Sir W. Hunter:

"Two-fifths of the people of British India enjoy a prosperity unknown under native rule, other two-fifths earn a fair but diminishing subsistence; but the remaining fifth, or 40 millions, go through life on insufficient food. It is these underfed 40 millions who form the problem of over-population in India."*

While the admission of Sir W. Hunter is often quoted, his explanation is suppressed. He says:—

"Such writers tell you that the people of India are very poor, therefore they conclude the Government is to blame. I also tell you that the people of India are very poor, because the population has increased at such a rate as to outstrip, in some parts, the food-producing powers of the land; because every square mile of Bengal has now to support three times as many families as it had to support a hundred years ago; because every square mile of British India, deducting the outlying provinces of Burmah and Assam, has to feed nearly three times as many mouths as another square mile of the Native States." p. 127.

"The poverty of certain parts of India is the direct and inevitable result of the over-population of those parts of India. The mass of the husbandmen are living in defiance of economic laws. A people of small cultivators cannot be prosperous if they marry irrespective of the means of subsistence, and allow their numbers to outstrip the food-producing powers of the soil. Now that the sword is no longer permitted to do its old work, they must submit to prudential restraints on marriage or they must suffer hunger. Such restraints have been imperative upon races of small cultivators since the days when Plato wrote his *Republic*." pp. 135, 136.

It is allowed, however, that the Government of India must share the blame as well as the social habits of the people.

Increasing Pressure of Population.—It is the common belief of the Hindus that a man who has no son to make offerings for him after death falls into the hell called *put*. According to Manu (ix. 138), the Self-existent called a son *putra*, because he delivers from *put*. The masses therefore marry as a religious duty, irrespective of the means of subsistence. Muhammadans marry on the strength of the proverb, "He who sends mouths will send meat."

The following remarks on this subject are abridged from Sir H. S. Maine:—

"India seems likely to experience, more than any society of men, that peculiar trial which follows good government. . . . In no country, will there be probably a severer pressure of population on food. India is the only part of the world in which every single male of the population

* *England's Work in India*, pp. 79, 80.

is married as soon as it is possible for him to be married. The superstitions of the vast majority will not allow animals to be bred or killed for food. Nor will the population emigrate.

"Such causes of increase in the population and limitation in the supply of food have existed from time immemorial in India. But, till the present century, there were competing causes which impeded their operation. Far the most powerful of these were war, pestilence, and famine. These ancient checks on the growth of the population are losing their maleficent power, and with their disappearance population will fast increase its volume, forcing on the attention of the rulers of India a number of grave problems which have been very imperfectly faced of late years by the economists and statesmen of the West."*

The Pressure aggravated by the Famine Policy of Government.—The National Congress Resolution, previously quoted in part, says, "every decade several millions actually perish by starvation."

In answer to the question, "Who slew all these?" the Congress boldly and unhesitatingly attributes it to the "unsatisfactory administration" of the Indian Government, and earnestly appeals to the people of Great Britain and Ireland to save them and "that speedily," from the terrible effects of its rule.

It has been mentioned that during the famine of 1876-7, Mysore lost one-fourth of its population. Grain was poured into Bangalore by the Madras railway, but it could not be conveyed to the starving population. When famine prevails over a wide area, oxen and carts become almost useless. The oxen require water and fodder which cannot be supplied in famine districts. On the other hand, a railway train carries its own supply of water and fuel, while it conveys as much as a thousand oxen at ten times the speed. Thus railways are one of the best means of mitigating the severity of famines. In 1876 railways were not sufficiently advanced in Mysore to distribute the grain. Lord Elgin's administration has the unique glory of being the first during the long roll of Indian history, when a severe, wide-spread famine did not receive its dreadful holocaust of millions of lives. It is true that this result was achieved only through many years of wise foresight and patient toil. "Other men laboured;" and Lord Elgin "entered into their labours."

Lord Northbrook's administration dealt successfully with the Behar famine in 1873-74, at an expenditure of six millions. Though severe, it was limited in area and of short duration. It led, however, to two valuable results. A Famine Code for the guidance of officers was commenced, which has been improved by the experience gained from each successive famine. In a Resolution, dated 23rd April 1874, Lord Northbrook said:—

"Whatever means we may take to obviate or mitigate them, it

* *The Reign of Queen Victoria*, Vol. I. pp. 518—521.

must under present circumstances be looked upon as inevitable that famines will, from time to time, occur."

The institution of a Famine Fund was therefore recommended. This Fund was not uselessly hoarded in the Treasury; but employed for reducing debt and other useful purposes; while it could be drawn against when actually required.

It has been Lord Elgin's privilege to lay the copestone of the building. Henceforth no Congress will be able to assert that

"*Every decade several millions actually perished by famine.*"

But while lives have thus been saved, it must be allowed that the Government Famine policy has increased by millions the underfed landless proletariat. From the increased population, the cultivated area no longer suffices to allow a plot of ground for every peasant, and great numbers now earn a poor and precarious subsistence as hired labourers. In ordinary seasons they can get employment and manage to live; but if the rains fail, the ryots cannot give them work, and, unless it is provided for them, they must starve.

During the famine of 1876-7 the pressure of the population on the soil was reduced by death or diminished births by seven millions; lives were saved during 1896-97, but the landless proletariat was proportionately increased.

The true Famine Policy.—"To save life," may be regarded as the motto of the present Famine policy. The *supply* of food has been increased by irrigation works, and railways afford facilities for its *distribution*. While the mortality has been comparatively small, the system pursued is largely the old unintelligent charity of simply giving alms to beggars. It may be *mainly* described as

A gigantic effort to FEED Paupers.

When the writer, in a letter to the Secretary of the recent Famine Commission, expressed a hope that it might be useful in *preventing* future famines, he was told that such an inquiry was beyond the scope of the Commission.

The true famine policy should be

A gigantic effort to PREVENT Pauperism.

Two great Means of increasing the Food Supply.—These are, briefly, IMPROVED AGRICULTURE and DEVELOPED MANUFACTURES. The latter is not only a great source of wealth, but it also relieves the pressure on the land, and can go on uninterruptedly amid famines. It is proposed to notice it in a separate Paper. Attention here will be confined to the former.

Duty to provide an increased Food Supply.—Sir W. Hunter says:—

"The principle of *laissez faire* can, in fact, be safely applied only to self-governing nations. The English in India are now called upon, either to stand by and witness the pitiless overcrowding of masses of hungry human beings, or to aid the people in increasing the food-supply to meet their wants."*

THE LAND REVENUE OF INDIA.

From time immemorial, this has been the mainstay of Indian finance. The land is considered the property of the State, though it may alienate portions of it either in life-rent or perpetuity. The land tax is the equivalent of rent in the West. It has gradually risen as follows:

1876-77	.. ..	Rx. 19,493,251
1886-87	.. ..	„ 23,055,724
1895-96	... ..	„ 26,200,955

The annexation of Upper Burma accounts partly for the increase.

The Government of India has by far the largest land revenue in the world. It is the proprietor of a magnificent estate of 964,993 square miles or 617,595,520 acres. Complete returns do not exist for the whole, but the Statistical Atlas for India gives 220 million acres as cultivated, 47 millions as covered with forests, and 116 millions as unculturable. By the Permanent Settlement, described by a noted European political economist as "*One of the most unfortunate but best intentioned schemes that ever ruined a country,*" Government gave, in perpetual lease on most unfavourable terms, many millions of its richest lands; but, with few exceptions, the remainder is held on leases not exceeding a term of thirty years.

THE GOVERNMENT OF INDIA AND AGRICULTURE.

Under this head only a few salient points are noticed. At no period has agriculture been entirely neglected by the Government of India. Its early efforts were chiefly directed to the improvement of cotton. In 1788, thirty-one years after the battle of Plassey, the distribution of cotton seed of a superior quality was commenced. In 1813 the services of an American were obtained. About 1839 ten Americans, experienced in the management of cotton plantations, were engaged, and experimental farms were established.† There were many failures, but, on the whole, good was done.

* *England's Work in India*, p. 130.
† Kaye's *Administration of the East India Company*, pp. 689,690.

The great tea industry was initiated by Government. In 1834, under Lord William Bentinck, a committee was appointed 'for the purpose of submitting a plan for the introduction of tea culture into India.' In the following year plants and seed were brought from China, and widely distributed through the country.*

In 1860 Mr. Clements Markham was sent to South America to introduce the cinchona plant. A prize was offered for the best machine for preparing rhea fibre.

The *Calcutta Botanic Garden* was established in 1787. It has been under a succession of able and zealous men, who have done much to make known the botany of India as well as to aid in the introduction of useful plants.

Lord Mayo's Scheme.

Lord Mayo's proposed Agricultural Department.—"Lord Mayo," says Mr. Hume, "was probably the only Governor-General who has farmed for a livelihood and made a living out of it. When he came of age (he was then Mr. Bourke), his father (whose elder brother was still living) could not afford to make him any allowance, but rented to him one of his farms to make what he could out of it. This Lord Mayo farmed himself. ('Many a day,' he used to say, 'have I stood the livelong day in the market selling my beasts,') and made enough out of it to enable him to attend Parliament regularly from after Easter to the end of the Session." He felt that improved agriculture was the greatest need for the "material" progress of India, and drew up a most comprehensive and well-devised scheme for the agricultural development of the country.

The primary object of this Introduction is to bring before the public Mr. A. O. Hume's Paper on *Agricultural Reform in India*. In addition, it is well to quote some of Lord Mayo's own views on the subject as given in Sir W. Hunter's *Life*.

"His conceptions of the duties of such a department sprang primarily from the necessity which the Indian Government felt for a more accurate knowledge regarding the agriculture and the commerce of the country. Manchester was demanding a larger supply of cotton, with a longer staple, and some sort of security that the bales exported did not consist largely of broken bricks. The tea planting on the North-Eastern frontier had grown into a great interest, with many wants to be satisfied, and a most difficult labour problem to get adjusted. Jute and oil-seeds were yearly engrossing more of the soil of Bengal, and the population requiring food-grains was at the same time rapidly multiplying. Proposals were constantly being made to Government for improving the

* Hunter's *Gazetteer of India*, Vol. VI. p. 504.
† *Agricultural Reform*, see page 13.

native breeds of cattle, for introducing better sorts of seed, better processes of agriculture, better implements of tillage, and more lucrative crops."

"In short, the increase of the population, the vast outlets for Indian products to Europe, and the accumulation of wealth, had raised the problem of how far, and in what forms, would the application of capital to land be profitable in Bengal. 'I really think,' wrote Lord Mayo in a private letter to Lord Napier of Ettrick, in 1869,* 'that the time is come when we ought to start something like an agricultural department in the Government of India, with branches in the Presidencies and the Lieutenant-Governorships. Agriculture, on which every man here depends, is almost entirely neglected by the Government. I have seen enough already in my wanderings to know that there is an enormous field, not exactly for the reform, but for the investigation of husbandry in India.' 'Every day,' runs a letter to another friend later in the year, 'the want of a Department for agricultural trade is more keenly felt, and I believe that the establishment of a separate Department of the Government for this object would be one of the most useful measures which could at present be taken into consideration.' At the same time the Earl of Mayo determined in his own mind, the limits within which such a Department could profitably act. One of the innumerable proposals of the improved pump and steam plough order had been for the State to commend an 'ammoniac manure' to the Indian husbandman. 'I do not know,' wrote Lord Mayo, 'what is precisely meant by "ammonia manure." In another of his viceregal notes he puts the case thus: 'In connection with agriculture we must be careful of two things. First, we must not ostentatiously tell native husbandmen to do things which they have been doing for centuries. Second, we must not tell them to do things which they can't do, and have no means of doing. In either case they will laugh at us, and they will learn to disregard really useful advice when it is given'.

"He did not infer, however, that nothing could be done. 'For generations to come,' runs one of his official Despatches, 'the progress of India in wealth and civilisation must be directly dependent on her progress in agriculture. Agricultural products must long continue the most important part of her exports; and the future development of India commerce will mainly depend upon the improvement in the quantity and quality of existing agricultural staples, or on the introduction of new products, which shall serve as materials for manufacture and for use in the industrial arts. The efforts of the Government of India and of English enterprise have, doubtless, been very beneficial. Thus, important

* A year after his arrival in India.

progress has been made in regard to cotton. Large sums of money were spent in former years in attempts to improve its cultivation, but with little result, owing to the mistaken system under which they were made. It has become manifest that 'its improvement,' by the introduction of exotic seed, can only be secured by careful and prolonged experimental cultivation. Renewed attention has been more recently given to this subject with much better effect. The success of our tea, coffee, and cinchona plantations, shows what has been and may be done in introducing into India new and valuable products. Jute which not long ago was hardly used, has become an article of first-rate commercial importance. The world derives from India nearly the whole of its supply of indigo!—a staple which was promoted by the Company's example in the last century, as the Calcutta manuscript records abundantly attest. 'We have within the last few months taken special measures for improving and facilitating the preparation of rhea fibre.'

After describing the Government as the chief landlord in India, he adds:

"The Government has always, at least by its legislation, recognised this duty. The system of giving advances of public money, called *takávi*, has prevailed more or less since 1793 up to the present time. The security is complete; the land is responsible for the repayment. This system is identical with that which has been carried out in England and Ireland by means of the Land Improvement Acts. We are satisfied that the principle may receive a wider development than has hitherto been given to it.

"Advances of money should be usually made for those descriptions of work only which can be designed and efficiently carried out under the direction of the local proprietors. They should not be made for great works requiring, in their design or construction, engineering skill of a high order, or the employment of large bodies of labourers. Such works must necessarily be undertaken by the Government through the Department of Public works. The works for which advances might properly be made would ordinarily fall into some one of the following classes:—(1) Wells and other works for the storage, supply, or distribution of water for agricultural purposes and the preparation of land for irrigation. (2) Drainage. (3) The reclaiming of land from rivers. (4) The protection of land from floods. (5) The reclaiming, clearing and enclosing of waste lands for agricultural purposes. (6) The clearing of land from stones or other obstacles to cultivation."

The Earl of Mayo believed that much might be effected through the new Department towards improving the 'breeds of horses and cattle. The Government studs,' he said,' have hitherto done little in this respect for the benefit of the country at large. They have been maintained primarily for military purposes, and have

been managed on a very costly system, under which little advantage has been obtained for the agricultural or other interests. Measures are also urgently required for preventing and alleviating the destructive murrains which so frequently occur in this country, and which are lamentable and ruinous causes of injury to Indian agriculture.' Again, 'our attention has recently been directed to the fisheries of India. This is a subject which has hitherto been little cared for, but which appears likely to prove of considerable economic importance.'

"As far back as 1854, the Court of Directors, quoting the words of a distinguished educational authority in Bengal, had declared that there was no 'single advantage that could be afforded to the rural population of India that would equal the introduction of an improved system of Agriculture.' Lord Mayo more than once had to point out the very serious practical and economic difficulties which lay in the way of introducing any such change from above. But while fully realizing these difficulties, he believed that something might be done by the Government setting the example in small model farms, and proving quite silently but visibly to the cultivators the value of improvements by the result of actual experiments. 'In Europe,' he said, 'progress in this direction has been mainly based on private effort, and by the application of the intelligence of the agricultural classes themselves to the ends in view. In almost all civilised countries, however, in which, unlike England, the form of Government is *centralised*, the efforts of the people are powerfully aided by the co-operation of a State Department of Agriculture, which works in part directly through its own agency, and in part through agricultural and other societies. Even in India, such societies have been extremely useful, and they might properly receive more encouragement from the Government than has hitherto been given to them. But we cannot expect to obtain in this way very great results. The work that is performed by the great Agricultural Societies of Europe, must be performed in India by the Government or not at all."*

Lord Mayo selected MR. A. O. HUME, C.B., to carry out his scheme. Mr. Hume's father, Dr. Joseph Hume, was an officer in the Indian medical service. After his retirement, he was a zealous political reformer and economist in England. On his death in 1855 Lord Palmerston observed in Parliament: "It had been said of one eminent statesman (Mr. Burke) that he 'to party gave up what was meant for mankind,' whereas the very reverse might be said of Mr. Hume, for the party to which he had devoted himself was his country, and, beyond his country, the general interests of mankind at large."

* Hunter's *Life of Earl Mayo*, Vol. II. pp. 318-325.

Mr. A. O. Hume joined the Indian Civil Service. During the Mutiny, he was District Officer of Etawah, in the North-West Provinces, where he so distinguished himself that he was made a C. B. The estimation in which he was held by the inhabitants of Etawah is shown by the 'Hume's High School,' established as a memorial.

Mr. Hume, throughout his many years of service, had taken a warm interest in agriculture. Besides studying treatises in German and English on the subject, he had farmed in a small experimental way for his own information and amusement.

In 1870 Lord Mayo established a "DEPARTMENT OF AGRICULTURE, REVENUE AND COMMERCE," with Mr. Hume as Secretary.

In *Agricultural Reform** (pp. 8-11), Mr. Hume describes its working. It took over the Forest Department from the Public Works Secretariat; Studs and Horse-breeding from the Military Department; Inland Customs from the Financial Department; Land Revenue and Settlements from the Foreign and Home Departments. To these miscellaneous subjects were added from time to time, so that it became known as the *Et cætera* Department.

A great blow was given to the Department by the Secretary of State, who altered the title to the *Department of Revenue, Agriculture, and Commerce.* In a despatch (No. 27, August 3, 1871) he also ruled that

"The officer appointed to the post of Secretary in this Department should always be chosen on account of his knowledge of the subjects connected with revenue, rather than from any knowledge which he may possess of agricultural or commercial matters."†

Mr. Hume says:

"It will be seen, therefore, that, as constituted, this Department never was, and never was intended by the Home Government to be, a Department of Agriculture. Lord Mayo hoped to convert it into this, but with his death India lost the warmest, most competent, and, at the same time, most influential advocate for agricultural reform. No change, such as he contemplated, has ever been made in the constitution of the Department, and succeeding administrations have only made the official bonds more rigid, and converted its chief more and more thoroughly into a mere desk-tied Secretary." pp. 13, 14.

Mr. Hume, writing at Simla, July 1st, 1879, says in the preface to *Agricultural Reform:*

"This paper, written many months ago, had been long in type, when the Government emphasised many of the remarks that it contains by abolishing altogether the Department of Agriculture."

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* Reprinted with Mr. Hume's permission. † *Agricultural Reform*, p. 13.

DEPARTMENT OF LAND RECORDS AND AGRICULTURE.

Mr. Baines, in the *Third Decennial Report,* thus describes the changes which took place:—

"After eight years the experiment (a Department of Revenue, Agriculture, and Commerce,) was withdrawn, partly owing to financial pressure, and partly, no doubt, because the original scheme had not been thoroughly extended over the different provinces. The recommendations of the Famine Commission of 1880, however, placed the matter in a different light, and in 1881 the Department was resuscitated, and arrangements gradually introduced for providing the complement in each province of the assistance required in order to carry out the policy for the furtherance of which the central directing agency had been re-established. The objects of the new departure, broadly stated, are:—

"First, to ascertain more systematically and completely, and to render more generally available, statistics of important agriculture and economic facts, in order that the Government and its officers may be always in possession of an adequate knowledge of the actual condition of the country, its population, and its resources.

"Secondly, to pay attention to the general improvement of Indian agriculture, with the view of increasing the food supply and general resources of the people.

"Thirdly, to effect the better and more prompt organisation of famine relief, whenever the actual approach of famine may be indicated by the statistical information mentioned in the first paragraph above.

"In fine, agricultural enquiry, agricultural improvement, and famine relief.

"In accordance with the original proposals, Departments of Agriculture were established in all the provinces, according to the local system of administration, some being entrusted with more, some with less, multifarious duties, but all tending in the same direction. In most of the provinces of India, there is already available an agency which, when properly trained, is invaluable as regards the collection of agricultural statistics, namely, the village accountant, an institution of very long standing, but of uncertain quality. One of the main duties of the local Department, therefore, was to get the best work possible out of this class, not only in reference to the more or less routine information that had been hitherto customary, but, by training, inspection, and other methods, to extend its sphere of usefulness, until, ultimately, the results of its work would be relied on as the foundation of the whole of the revenue and agricultural statistics of the country. To effect this, the Provincial Director of Agriculture became also the Director of Land Records." p. 274.

AGRICULTURE "STARVED" BY THE GOVERNMENT OF INDIA.

The expressive word "starved," is not quoted from Sir W. W. Wedderburn, but from the Hon. F. A. Nicholson, I. C. S., in the Viceroy's Council Chamber, during the Budget Debate of 1898.

Mr. Nicholson found the expenditure under Land Records and **Agriculture as 102 lakhs, or Rx. 1,020,000. This seemed, *prima facie*, comparatively speaking, a fair amount; but on analysing it** one is reminded of **Falstaff's comparative expenditure on sack and**

bread. Mr. Nicholson found 97 lakhs devoted to Land Records and 5 lakhs, or Rx. 50,000, to agriculture proper. His principal remarks are quoted below:

"I turn now, and very briefly, to the last point on which I desire to touch, viz., the provision in the Budget for direct action upon agriculture. My Lord, when we look at the Financial Statement and see that the famine has cost Government alone more than 14 crores, when we remember that this famine is only one of several which have confounded the finance of the country and diverted vast streams of funds from much needed improvements, when we take stock of the wreckage, the loss in health and wealth of the people connected by the loss sustained by Government, I think we are justified when considering this Statement, in asking ourselves whether nothing can be done by Government to lessen the chances or the intensity of such recurrent misfortune. My answer to that question, my Lord, is that, wholly apart from the general action of a civilised and civilising Government, much can be done by specific and positive action upon the agriculture and stability of the ryot through Departments of Agriculture. In this connection I mean by a Department of Agriculture a Department dealing completely with the second of the three classes of duties mentioned by the Government of India in 1881, viz., 'the general improvement of Indian agriculture, with the view of increasing the food supply and general resources of the people.' I do not mean the Departments in their record and statistical branch, or in their work in organising famine relief, but I mean their duties in examining the local conditions and limitations of agricultural practice, in research and experiment in the fields, and in experimental farms, in examining and dealing with disease in crops and cattle, in fostering better farm practice; in encouraging popular agricultural education, in assisting the spread of associated rural credit.

"Now I venture to call to the recollection of the Council the opinion of His Excellency the late Lord Mayo when announcing in 1870 his intention of forming an Imperial Department of Agriculture. I am not able to give his very words, but he declared that Indian agriculture was in a primitive and backward condition; that it could not be doubted that when Western science was brought to bear upon it, the results would be as great as in Europe, and that the work performed by the Agricultural Societies in Europe must be done in India by the Government or not at all. The Famine Commission of 1880 followed suit, and since that time we have had numerous Conferences, Committees, Reports, and Resolutions all adopting similar views. I venture to follow this strong body of opinion, and to assert that an efficient Department of Agriculture in each province well and continuously supplied with funds to work out to a continuous policy of research experiment, instruction and assistance, and that not for a year or two but for generations to come, is an absolute necessity for Agricultural improvement, and, further, that agricultural improvement is, in India, the only sound basis of financial and economic stability. As a Tamil proverb has it, 'the ryot's goad is the ruler's sceptre.'

"Now I may be told that departments for Agriculture do exist in every province, that it is their fault if nothing has been done, and that

there is no obstacle to their starting on any line of enquiry that they please. Well assuming—what I do not altogether admit—that this is so, still there are sound answers to it.

"But the only one which I would give here is that the Departments on their purely agricultural side have been starved; it is only throwing money away to spend a few thousands here and there and now and then; liberal continuous supplies of funds are necessary if the Departments are to be more than a mere *nominis umbra*; it is the financial difficulty that is a main obstacle to progress; as lately pleaded by a Provincial Government. Money of course will not do everything, but without it we can do nothing.

"It is difficult to disentangle from the accounts the sums spent on or available for Agriculture proper as defined above. In the yellow book for 1896-97 about 102 lakhs are shown against Land Records and Agriculture, but this large sum was evidently spent almost entirely on Land Records, since 97 lakhs are shown as District charges, as we know that this means merely the cost of the village Accountants and Inspecting Staff who have nothing to do with Agriculture proper but only with accounts and statistics: much of the remainder went in salaries and miscellaneous charges of the Land Record officers. If we add together the cost of two or three Agricultural Colleges shown under Education, a certain moderate proportion of the salary of Land Record officers, such small portion of the expenditure on the Civil Veterinary Department as affects cattle as distinct from horses, which have practically nothing to do with Agriculture, and the sum of about 1½ lakhs shown in the accounts under 'Experimental cultivation,' we shall probably account for the whole amount spent in India on Agriculture proper.

"I think that the Council will agree with me that the provision in the Budget for Agriculture is wholly insufficient, and that the needs in this respect of a vast agricultural Empire demand far larger funds.

"Now, my Lord, it may very rightly be thrown as a duty on the Provincial Governments to provide for and to enter in their Budgets sufficient funds for the due and efficient working of efficient Agricultural Departments. But I conceive that there should be some very clear indication by the Imperial Government that increased and strenuous effort after agricultural development as distinguished from statistical and record work is the immediate and urgent order of the day. I think that there should now be a clear pronouncement that strenuous and immediate effort in the work of a department of Agriculture as defined above is as much and as urgent a part of the internal policy of Government in view to prevent or mitigate famine as the provision against invasion is part of its external policy. And since the Provinces plead lack of funds, and since the supply of funds is the best proof of a belief in the importance of a policy, I trust that a portion of the expected surplus may be formally devoted to Agriculture, and that for many years to come due provision for that Department may be inserted in every Budget."

These are the words of an experienced member of the Legislative Council of India, spoken within hearing of the Supreme

Government. No longer can the excuse be offered for the apathy shown towards what so intimately concerns the welfare of the poor dumb millions of India, "Behold, we knew it not."

The treatment Agriculture has sometimes received from the Government of India, is almost incredible. Six years ago Dr. Leather, an agricultural chemist, was sent out to India. When his engagement terminated, to save about £1,000 a year, his appointment was abolished, after he had acquired the experience which rendered him doubly useful. Happily he is not lost to India, for Sir A. Macdonnell secured him for the North-West Provinces.

The officers connected with the Department of Land Record and Agriculture have done what they could; but with Agriculture "starved," their labours have been largely in vain. As Mr. Nicholson remarked, "It is only throwing money away to spend a few thousands here and there and now and then."

Here a tribute may justly be paid to Dr. George Watt, C.I.E., of the Indian Museum, Calcutta, than whom no man has done more to make known the economic products of India. Among his other labours, he has edited an *Agricultural Ledger*, which publishes from time to time valuable papers.

Inconsistencies in the Government of India.

An old proverb, "The legs of the lame are not equal," may be applied to the Government of India. It is a strange compound of "penny-wise and pound-foolish" economy and enlightened liberality. It may be compared to a self-made millionaire, who retains some of the penurious habits contracted in his early struggle for wealth. The traditions of the "Company of Merchants trading to the East Indies," are mingled with the duties of a mighty Empire. The territory under the merchants for many years was insignificant; their main object was to increase their dividends. Hence, their establishments were small. At present there are cases where, from false economy, one man is expected to do the work of three. The duties of the Secretary, "Revenue and Agricultural Department," Calcutta, are thus summarized in Thacker's *Indian Directory*.

"Branches of Public Business.—*Land Revenues including Settlements and Takávi Advances—Surveys, excepting Marine—Agriculture and Horticulture, including Fibres and Silk—Horse-breeding—and Agricultural Stock and Fisheries—Minerals—Meteorology—Famine—Emigration,—Museums and Exhibitions—Archæology — Statistics — Forests — Patents — Cinchona — Weights and Measures.*"

On the other hand, the Trigonometrical and Geological Surveys, the Irrigation Works and Railways are monuments of enlightened liberality.

REASONS WHY INDIA SHOULD HAVE A WELL-ORGANISED SEPARATE AGRICULTURAL DEPARTMENT.

1. The Example of the Civilised World.

Sir H. S. Cunningham says:—

"When we consider that almost every petty state in Europe has important and costly arrangements for the promotion of scientific agriculture—while in India scarcely a germ of anything of this sort exists, the urgent need of such a department, and the importance of the work which it would have to undertake, requires no further enhancement. For one thing, experiments of the exact, elaborate, scientific order, from which alone any useful result can be hoped, are at present impossible; there are neither experts fit to conduct such experiments, nor the material means of doing so. Institutions, such as that which Mr. Lawes has for many years maintained on a magnificent scale at Rothamstead, are required in every Indian province, if any advance towards scientific agriculture is to be effected. Many thousands of acres, for instance, have of late years become barren from saline efflorescence, but of its real causes and remedies little has been ascertained, except that the recklessness of canal engineers has in many instances contributed to its formation by closing up the natural drainage of the country, and so water-logging the soil.

"In the same way the structure of Indian soils, the effects of intense solar heat, violent electrical changes, sand-storms, hot winds and the downpour of the monsoon—the protection from drought which, in some soils, may be obtained from deep ploughing—these and a hundred other vital questions are, scientifically speaking, unexplained. A few isolated inquiries and incomplete experiments have taught us how much there is to learn, and what enormous consequences the substitution of knowledge for ignorance on such subjects might produce. But at present the Indian Government possesses no machinery by which these all-important results may be brought about."*

Although agriculture in England occupies a comparatively subordinate place, it has a President of the Board of Agriculture, who is a Cabinet Minister, with a large establishment, maintained at an annual cost of £105,726.†

From 230 millions of ryots Government draws annually about 26 millions the largest land revenue in the world but it "starves" agriculture on which the ryots depend for support. Well, in this respect, may the civilised world point the finger of scorn at the rulers of India.

2. Self-Interest.

With manufactures still on a limited scale, land must be the grand source of revenue. More and more money is wanted for the

* *British India and its Rulers*, pp. 244, 245.
† Whittaker's Almanack for 1899, p. 152.

efficient government of the country. Sir W. Hunter thus states the difficulties of an Indian Finance Minister:

"The truth is that we have suddenly applied our own English ideas of what a good Government should do, to an Asiatic country, where the people pay not one-tenth per head of the English rate of taxation. It is easy to govern efficiently at a cost of forty shillings per head as in England; but the problem in India is how to attain the same standard of efficiency at a cost of 3*s.* 8*d.* a head. This is the sum in proportion which one finance minister after another is called to work out. Every year the Indian finance minister has to provide for more schools, more police, more courts, more hospitals, more roads, more railways, more canals. In short every year he has to spend more money in bringing up the Indian administration to the English standard of efficiency. The money is well spent, but it has to be found."*

Instead of 4 millions under instruction, there ought to be 40 millions. Where is the money for education and other purposes to come from? Income taxes, though equitable in theory, are hateful to the country. So with all *new* taxes. On the other hand taxes to which the people have been accustomed are paid without a murmur. Supposing that Government can gradually cause the labours of the ryot to be more and more productive, it may justly claim one-tenth of the increment.

Lord Mayo thus describes the interest of the Government of India in agriculture:

"There is, perhaps, no country in the world in which the State has so immediate and direct an interest in such questions. The Government of India is not only a Government, but the chief landlord. The land revenue which yields twenty millions sterling of her annual income, is derived from that proportion of the rent which belongs the State and not to individual proprietors. Throughout the greater part of India, every measure for the improvement of the land enhances the value of the property of the State. The duties which in England are performed by a good landlord fall in India, in a great measure, upon the Government. Speaking generally, the only Indian landlord who can command the requisite knowledge and capital is the State." †

Mr. Hume thus remarks on the fatuous policy of the Government so far as agriculture is concerned:—

"It is one of those incomprehensible instances of determined national blindness of which history records too many similar examples, but it is a fact that, landlords of an estate, let on comparatively short leases, with a gross rental of seventeen millions,‡ with the full knowledge that the great mass of our land is yielding less than two-thirds of what

* *England's Work in India*, pp. 116, 117.

† Hunter's *Life of Earl Mayo*, Vol. II. p. 322.

‡ I exclude about four and a half millions, the revenue derived from permanently settled and quit-rent estates."

it should and would if properly cultivated, we absolutely in practice refuse to take one single material step towards remedying this lamentable waste of our property." P. 21.

3. The Recommendation of the Famine Commission.

Section 135 of the Report says:—

"A Director of Agriculture should be appointed for each Province as executive head of the Department, chosen for his knowledge of the condition of the people, and particularly of the agricultural classes. He would directly control the special statistical officers and would be the adviser of the Local Government in all matters relating to agriculture and statistics. In ordinary times he should discharge these duties and superintend all measures designed to improve the agriculture of the country, and in times of famine he would be the officer responsible for warning the Government as to the agricultural outlook and for preparing such a forecast as should guide it in issuing instructions and setting on foot measures of relief. A corresponding officer should perform analogous duties under the Government of India, assisting it in its dealings with the Local Governments in the Agricultural Department and in the supervision of the Local Directors of Agriculture. All these officials and a certain proportion of the special officers in each district should have been prepared for their duties by a technical training in scientific and practical agriculture."

4. Feelings of Humanity.

Mr. W. Crooke thus touchingly describes the condition of the rural population of India:—

"There is, perhaps, no more pathetic situation in the whole range of human history that to watch these dull, patient masses stumbling in their traditional way along a path which can lead only to suffering, most of them careless of the future, marrying and giving in marriage, fresh generations ever encroaching on the narrow margin which separates them from destitution. Anxious statesmen peer into the mists which shroud the future, and wonder what the end of all this may be."*

This mournful procession is every year becoming vaster and vaster. Since the Famine Commission recommended the establishment of an Agricultural Department, about a hundred millions have passed into the silent land, while both the Home and Indian Governments, like Priest and Levite,† have looked on without taking any adequate measures for their relief.

Government may perhaps point to its Geological Survey, its Irrigation Works, its Roads and Railways. "These ought ye to have done, and not to leave" the weightiest of them all, agriculture, "undone."

* *North-Western Provinces of India*, pp. 173, 174.

† The Priest is more to blame than the Levite. It was the Secretary of State who wrecked Lord Mayo's scheme.

5. The Condition of Things will become worse and worse till the Burden is Intolerable.

According to the Indian standard of comfort, the *majority* of the ryots are fairly well off. As already mentioned, the difficulty is with the landless labourers.

Ricardo says:

"In those countries where the labouring classes have the fewest wants, and are contented with the cheapest food, the people are exposed to the greatest vicissitudes and miseries. They have no place of refuge from calamity; they cannot seek safety in a lower station; they are already so low that they can fall no lower. On any deficiency of the chief article of their subsistence, there are few substitutes of which they can avail themselves, and dearth to them is attended with almost the evils of famine."*

Sir H. S. Cunningham, after quoting the above, remarks:—

"The state of things thus described exists in India to the fullest possible extent; vast multitudes live at almost the lowest level compatible with continued existence; their wants and hopes are limited to the barest necessities of human life. Prudential considerations fail to operate where prudence could effect no sensible amelioration, and where life is so miserable that the prospect of a still lower stage possesses but few terrors. Increasing numbers add to the fierceness of the struggle for existence, and to its hopelessness."*

Nature, it has been said, is "a rude chirurgeon." Had she been left to do her work during the late famine, she would probably have lessened the pressure on the land by the removal of 5 millions of the above class. They have been preserved, and, as they are the most reckless in multiplying, they will add so many millions more to be supported during the next famine.

Constitution of the proposed Department.

Reasons have been given for its formation. Mr. Nicholson, in his Budget speech, thus explained what he proposed:—

"I mean by a Department of Agriculture a Department dealing completely with the second of the three classes of duties mentioned by the Government of India in 1881, viz., 'the general improvement of Indian agriculture, with the view of increasing the food supply and general resources of the people.' I do not mean the Departments in their record and statistical branch, or in their work in organising famine relief, but I mean their duties in examining the local conditions and limitations of agricultural practice, in research and experiment in the fields, and in experimental farms, in examining and dealing with disease

* *British India and its Rulers*, p. 56.

in crops and cattle, in fostering better farm practice; in encouraging popular agricultural education, in assisting the spread of associated rural credit."

Lord Mayo's Original Scheme.—Mr. Hume says:—

"Lord Mayo's original conception of this Department was as a purely agricultural bureau, presided over immediately by a Director-General of Agriculture and not by a Secretary. He considered the subject too great to admit of its being satisfactorily dealt with, unless the best man available gave it his entire time and thoughts. He intended the Director-General to be supreme in his own Department, and only nominally attached for official purposes to one or other Secretariat, in the same way as the Director-General of Post Offices is practically supreme in all departmental matters, though nominally attached to the Financial Department.

"The Director-General was to have immediately under him a small staff of experts, and was to keep up only just such an office as was absolutely unavoidable. There was to be as little writing and as much actual work as possible. Directors of Agriculture were to be appointed in each province, also to be aided by experts. They were to work partly through the direct agency of farms and agricultural schools, and partly through the revenue officials of all grades down to the village accountants. The Director-General was to be moving about generally whilst the crops were on the ground. He was to confer personally with all the Provincial Directors and their Governments, go thoroughly with the aid of his staff into all their projects and schemes, make himself fully acquainted with local wants and wishes, and then during the hot season join the Government of India, and lay before it as succinctly as possible all that was desired with his (and his experts') opinions and recommendations. He was to watch closely all the schemes and experiments carried out by the Provincial Directors, to furnish them with suggestions, information, and advice; to procure for them, if they wished it, chiefly through the Agricultural Societies of Europe and America, any information, seeds, cattle, sheep, models of implements, &c., that they required; to keep all fully informed through the medium of his journal of what all the rest were doing; and as his experience and practical knowledge increased, and alternate failures and successes gradually indicated these, to lay down the broad lines of the general policy in regard to agricultural matters that the Government should pursue.

"In connection with the Provincial Directors were to be model and experimental farms, which were to be at the same time agricultural schools for one grade or another, some of the farms being more specially devoted to the improvement of seed by selection, others to the introduction and acclimatisation of exotic staples, others to the trial of implements and mechanical appliances, others to stock-breeding, others to the purposes of tuition, and so on. Mechanical engineers were to be employed in connection with some of these farms and schools, whose special duty it was to be to adapt the results (where implements of all kinds were concerned) of European and American science, to the wants and means of the Indian husbandman. At first the best civil officers

available were to be picked out as Directors, and the best available trained European agriculturists were to be got out to direct the schools and farms, and act as advisers to the Director-General, and Directors. Continuity was to be secured by making the service one; Directors were to be promoted to Director-General, experts and heads of farms and schools were to be promoted to Directorships. Gradually, as the expert element acquired knowledge of the country, people, and language, the non-expert element of civilians was to be allowed to disappear. There was to be constituted a compact agricultural service in two divisions, the lower and larger one recruited entirely from the Indian schools, the smaller and higher division recruited to a certain extent from the lower, but, at any rate for many years, mainly from home.

"Under the Director-General a Journal of Agriculture was to be issued. A separate and competent editor was to be employed, but the Director-General was to be responsible, and he was to secure for it the aid of all his own and all the Provincial Agricultural Officers. The collection of agricultural statistics was to be the work of the local Directors, but the further tabulation of these statistics, and the preparation from the provincial reports of a monthly or fortnightly summary of the prospects and progress of the crops on the model of those issued by the Bureau at Washington—then, I believe, a new thing—was to be done by the Director-General or his immediate subordinates. The prices in Europe and elsewhere of important articles of Indian produce in which no trade already existed, were to be carefully enquired into by the Director, and published from time to time, and, if necessary, experimental shipment of articles in which a profitable trade seemed probable, undertaken. As the scheme developed itself, Government revenue officials were to be instructed to use their utmost endeavours to lead the landholders of each district to constitute Agricultural Associations; they were to be urged and encouraged to send some of their relatives to the schools. Exhibitions were to be held, prizes given, and every effort made to give dignity in the eyes of the natives to the pursuit of agricultural science. But nothing of this was to be attempted until some distinct success had been achieved which could be pointed to as proof that we had really something to teach, which it would pay to learn.

"There were a great many other details, but these do not call for recapitulation here, even were this possible. The above sufficiently indicates the main outlines of Lord Mayo's original scheme." pp. 15-17.

A scheme should be carefully formulated, based on the most recent and reliable information.

The Director-General should be a member of the Viceroy's Council.—As already mentioned, the President of the Board of Agriculture is a member of the British Cabinet. In the United States, the Secretary of Agriculture is "one of the eight chief officers who form what is called the Cabinet."

The Indian ryot regards the Revenue collector and the Settlement officer as his natural enemies. To gain the reputation of being a "crack Collector" and thus secure promotion, taking human nature as it is, this may sometimes lead to harsh treatment,

if not something worse. The Director-General of Agriculture would be the royts' representative in the Viceroy's Council to plead their cause when necessary. Is it too much to ask this for 250 millions of human beings, the backbone of the Empire?

Hitherto the military element has been too strong in the Council. The above proposal would reduce it.

A COMPLETE AGRICULTURAL SURVEY THE FIRST DUTY OF THE DEPARTMENT.

Lord Mayo, as already quoted, cautions us against telling the ryot to do things which he has been doing for centuries, or telling him to do things which he has no means of doing. A leading feature of the Famine Commission Report is the stress laid upon obtaining full and reliable information. The absence of this has been the cause of most failures.

Perhaps the first desideratum is a full and correct account of the indigenous agriculture. It is necessary to know this accurately, to retain in it whatever is valuable, and to decide what improvements can best be introduced. It should be obtained for each important nationality, and as complete as the Geological Survey.

The following remarks by Mr. Hume with regard to superstitious practices of ryots apply to every part of India. After giving the ryots credit, in many respects, he adds:—

"On the other hand, we must not over-rate their knowledge; it is wholly empirical, and is in many parts of the country, if not everywhere, greatly limited in its application by tradition and superstition. Innumerable quaint couplets, to which a certain reverence is attached, deal with agricultural matters. These, in Upper India, at any rate, are true 'household words' amongst all tillers of the soil. These govern their actions to a great extent, and often lead them wrong against their better judgment. They take omens of all kinds to guide their choice of crops and other operations of husbandry, and though some few of the more intelligent only act upon the results of these divinations when they coincide with their own views, the masses are blindly guided by them.

"So, then, it is not only external disadvantages against which the Indian cultivator has to contend, it is not only that his knowledge is still in the primary experience stage, but that even this knowledge is often rendered of no avail by the traditions of an immemorial religion of agriculture.

"It is necessary to realise this (of which few Europeans ever even hear), as it is one great practical difficulty against which agricultural reform in India will have to contend." p. 6.

In the Appendix to his Pamphlet, Mr. Hume gives examples of the "quaint couplets" by which ryots in North India are mainly guided. One is reminded of the similar maxims in ryhme of our forefathers. The Madras Department has published *Tamil*

Sayings and Proverbs on Agriculture. They should be collected and compared over the whole country.

The officers of the Agricultural Department should seek to gain a thorough acquaintance with the circumstances of the ryot; the difficulties he has to contend with, and how they may best be overcome. By kind sympathetic action in this direction, the happiness of the people might be greatly promoted.

Agricultural Problems.

Some of the principal are noticed in Mr. Hume's interesting papor. The reader is referred to the following:

1. **Manure and Hot Weather Forage.** pp. 26-35.

In a *sanitary* as well as in an *agricultural* point of view, the *Manure question is most important.* Mr. Robertson thus describes the present state of things in villages:—

"As nearly the whole of the grain produced on the unirrigated land is consumed by the people of the country, the night-soil should suffice for manuring the greater part of the grain-producing land; but instead of being used as manure, human excrements are allowed to pollute the neighbourhood of every village; near some it is impossible to camp, the effluvia is so abominable. The excreta-saturated soil, after every fall of rain, gives off pestilential miasma, and poisons the air; while, not unfrequently, after rain the drainage-water off the land flows into the village tank, upon which the whole of the villagers have to depend for drinking water."

It may be objected that there is no hopo of any change. Mr. Hume is more sanguine. He says:

"The Chinese system,...by the help of combined tact and authority, kindness, patience, and gentle pressure, *could* even now be introduced, in two or three years, into *any* small well-supervised tract, and thence spread gradually over the entire empire."

"Undoubtedly the introduction of this system which, while largely benefiting agriculture, would perhaps do more than any other conceivable measure to restrict the ravages of cholera, should never be lost sight of. Its importance cannot be over-rated." pp. 26, 27.

2. **Indebtedness of Ryots.** pp. 36-48.

This is a question of the utmost importance, demanding the most careful study of the Department. Better arrangements are required under the Land Improvement Loans Act. Agricultural Banks have been proposed. Mr. Nicholson's Report on them proves their unfitness for India. The *Pioneer* has an excellent article on this point, entitled, "Find Raiffeisen," quoted in *Madras Mail*, April 29th, 1898.

3. **The Reh Problem.** pp. 25, 49, 50.

Referring to its ravages, Mr. Hume says:—

"Along the little old Western Jumna Canal, thousands of fields are to be seen thus sterilised. Along the course of the mighty Ganges Canal—a work as it were but of yesterday—the dreary wintry-looking rime is already in many places creeping over the soil.

"Come it quickly or come it slowly, the ultimate result here also is certain; and, unless a radical change is effected in existing arrangements, we know, as definitely as we know that the sun will rise to-morrow, that the time must come when some of the richest arable tracts in Northern India will have become howling saline deserts." p. 25.

4. **Economy in Seed Grain.** p. 51.
5. **Cattle Breeding.** p. 51.
6. **Agricultural Implements.** pp. 52-53.

Undue Expectations.

Mr. Hume has the following remarks on this point:

"No magic transformation can be looked for. With the most careful selections, the utmost energy and good will on the part of all concerned, three or four years must elapse before, with an organisation such as is proposed, the men will have really settled down to their work, and perhaps as many more before all the most important problems, first demanding solution, will have been clearly marked out. Even then it may be only slowly that with silent fingers Science will unpick the knots, and if as, without being in any degree sanguine, we may fairly expect, after twenty years' work, and after spending four or five millions, the main obstacles have been overcome, a thorough reform effected in the agriculture of particular localities, and the people as a whole awakened to what can be and has been done in this way, we shall have made the best investment that ever landed proprietor did." p. 22.

Gradual Progress Practicable.—Sir Richard Temple says: "Eleven bushels of grain per acre are produced in India as compared with thirty in England."*

The present rate of produce in England was obtained only gradually. In the days of Queen Anne it was about 15 bushels; towards the close of last century the yield was about 20 bushels. In England the average yield, according to Mark Lane Returns, is now about 32 bushels; in Scotland it has advanced to 40.†

Sir William Hunter admits that it is not possible at one bound to introduce scientific agriculture; but he thinks sufficient progress might be made to meet the exigencies of the case. According to Sir James Caird, if one bushel an acre could be added to the produce of Indian fields it would feed 22 millions. Sir William Hunter shows that to meet the increase of population all that is required is to add 1½ per cent. a year to the produce.

Estimated Cost of the Department.

Mr. Hume made a careful estimate for Lord Mayo's original scheme. He says:

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* *India*, p. 85. † *Nineteenth Century*, Nov. 1885.

"But the present Secretary of this Department, at that time residing with Lord Mayo, and with whom he discussed all the details repeatedly, prepared an estimate, the best he could then furnish, of the cost of carrying out such a scheme, including Director-General and seven Directors, and their staffs and offices, and forty model farms, with schools or colleges of one grade or another attached, contingencies and plant, &c. &c., showing that the *net* expenditure when the scheme was in full play would amount to nearly 25 lakhs of rupees (£250,000) a year, independent of an initial, virtually unreproductive, outlay for offices and buildings of possibly not less than 25 lakhs. (£250,000)." pp. 17, 18.

Twenty five lakhs, Rx. 250,000, may be taken as a fair estimate of the cost of the Department when in full working order. It will take several years before this is arrived at. Part of the balance might be reserved for offices and buildings.

Ways and Means.

As already mentioned, the Behar famine of 1873-4, suggested to Lord Northbrook the necessity of making some financial provision against famine as one of the ordinary charges of the State. The terrible famine of 1876-7, lead the Government of Lord Lytton, with Sir John Strachey as Famine Minister, to appoint a Famine Commission. The President was General Strachey, its Secretary, Sir Charles Elliott. Among its members was Sir James Caird. The Commission travelled over the country and prepared a very complete and valuable Report. It is now apparently out of print, but Sir H. S. Cunningham, one of the members, has given what may be called a *resumé* of it in his *British India and its Rulers*, published in 1881 by Messrs W. H. Allen and Co.

One of the chief measures adopted was to enter in each year's Budget Rx. 1,500,000 for famine relief. Sir John Strachey says:

"The original scheme under which Rx. 1,500,000 was to be annually devoted to the reduction or prevention of debt was subsequently modified, and it was determined that a portion of this should be directly expended on the construction of railways and canals required for the protection of districts specially liable to drought and consequent scarcity."*

The Famine Commission did not limit its recommendations to Railways and Irrigation Works. It strongly recommended the establishment of a Department of Agriculture, the expense of which might be "fairly chargeable against the Special Famine Surplus."

It is suggested that one-sixth of the Special Famine Surplus, amounting annually to 25 lakhs, be devoted to the efficient support of the Department of Agriculture.

Mr. Hume, writing in 1879 of the so-called "Department of Revenue, Agriculture and Commerce," says:

* *India*, p. 184.

"There is not, and never has been, any real Agricultural Department in India. There is a Miscellaneous Department of the Government of India, which, amongst its various titles, bears the word 'Agriculture,' but that Department has not, and cannot, from the nature of things, exercise any potential influence on the agriculture of the country *quoad* which it is a *vox et prœterea nihil*." p. 8.

The scathing exposure of Mr. Nicholson shows how agriculture is "starved" by Government at present, and is a mere "*nominis umbra*.

While the country is being "gridironed" with railways, while millions have been spent on famine relief, it is surely high time that agriculture should receive adequate attention.

OTHER REMEDIAL MEASURES.

Though improved agriculture is the crying need of India, there are other agencies indispensably necessary. A few may be noticed.

1. **A separate Department of Manufactures.**—The Famine Commissioners begin a section of their Report by saying:—

"We have elsewhere expressed our opinion that at the root of much of the poverty of the people of India and of the risks to which they are exposed in seasons of scarcity, lies the unfortunate circumstance that agriculture forms almost the sole occupation of the mass of the population, and that no remedy for present evils can be complete, which does not include the introduction of a diversity of occupations, through which the surplus population may be drawn from agricultural pursuits, and led to find the means of subsistence in manufactures or some such support."

The Commissioners conclude by thus reiterating their opinion:—

"To whatever extent it is possible, however, the Government should give assistance to the development of industry in a legitimate manner, and without interfering with the free action of the general trading community, it being recognised that every new opening thus created attracts labour which would otherwise be employed to comparatively little purpose on the land, and thus set up a new barrier against the total prostration of the labour market which in the present condition of the population follows on every severe drought." p. 176.

Under this head Technical Education would be included.

2. **A well-organised Emigration Department.**—

Government has already Emigration Agents to protect labourers in tea districts and emigrants to colonies. Though useful in their place, the relief thus afforded is totally inadequate. Emigration is required on a far larger scale.

France is a fertile country, but the population is only about 180 to the square mile. There are districts in India with 800 to the square mile. As Sir William Hunter remarks:

"Millions cling with a despairing grip to their half acre of earth a piece, under a burden of rack-rent or usury."*

From ignorant fear and want of energy, the great bulk of the people are unwilling to leave their own province. The dislike to it would be largely obviated if a number of families could be induced to go together. Difficulties about marriage would thus be settled.

An officer of experience and ability should be placed on special duty to collect enquiries about congested districts and waste land available for settlements. A separate Department is even necessary. Some measure of this kind is urgently required. As already quoted, Sir H. S. Maine is of opinion that in no country of the world will the pressure of population on the means of subsistence be more severe than in India. Emigration is one great remedy.

Full detailed information of the land available should be published both in English and the Vernaculars, and widely circulated. Noblemen, like the Maharajah of Durbhangah and other Zemindars, might get colonies led out from congested portions of their lands.

Very favourable terms ought at first to be allowed to the emigrants.

3. **An intelligent and extended system of Education.**—The establishment of an Agricultural Department is only the beginning of measures for the benefit of the ryots. Mr. Robertson, formerly connected with the Madras Agricultural Department, expressed the opinion that developing the intelligence of the ryot lies at the root of all improvement.

The value of the education given to ryots will depend upon its character. The remark was made years ago, "Our present system of education tends to give the native youth a taste for a town, rather than a country life, . . . the very thing which ought *not* to be done."

A series of elementary text-books should be prepared, suitable for Primary Schools in rural districts.

Natural phenomena, as wind, rain, lightning; the formation of soil; the growth and structure of plants, would be excellent subjects for lessons. The prevailing defects in Indian agriculture might be shown, with the advantages of an opposite course.

In 1881 the Government of India pointed out "that no general advance in the agricultural system could be expected until the rural population had been so educated as to enable them to take a practical interest in agricultural progress and reform."†

The Agricultural Conferences of 1893 and 1895-96 remark:

* *England's Work in India*, p. 4.

† *Proceedings of Agricultural Conferences*, p. 34.

"As it would only be through, and by, the native community, that agricultural improvements could, on any important scale be carried into the country, measures must be taken to secure their co-operation by a proper system of intelligent instruction in the schools."*

Reform in the higher Education urgently needed.—One great defect is thus pointed out by Sir John Stratchey. Referring to English Schools and Colleges in India, he says:—

"These institutions give, in the English language, a more or less good imitation of the purely scholastic part of an ordinary English education, but the young men of India learn in them almost nothing about their own country, or about the Government under which they live, and, least of all, are they taught to be good and loyal citizens."†

The truth of this is abundantly shown by the Bloomsbury meeting, held in London in December 1897.

A "Conference of Indians resident in England," men supposed to be the highest "product" of forty years' University education, "unanimously and with considerable enthusiasm," passed a Resolution in which the British Government of India is thus characterised:

"That this Conference of Indians resident in the United Kingdom is of opinion that of all the evils and 'terrible misery' that India has been suffering for a century and-a-half, and of which the latest developments are the most deplorable famine and plague, arising from ever-increasing poverty . . . and the general insufficiency and inefficiency of the administration—of all these and many other minor evils the main cause is the unrighteous and un-British system of Government which produces an unceasing and ever-increasing bleeding of the country and which is maintained by a political hypocrisy and continuous subterfuges unworthy of the British honour and name, and entirely in opposition to the British people and utterly in violation of acts and resolutions of the most solemn and repeated pledges of the British nation and Sovereign. That unless the present unrighteous and un-British system of Government is thoroughly reformed into a righteous and truly British system, destruction to India and disaster to the British Empire must be the inevitable result. . . . That, as a necessary immediate instalment of justice, a large proportion, if not the whole of the famine and plague expenditure, and the whole cost of the present unwise frontier war, must be met from the British Exchequer, remembering that England drains from India some £30,000,000 or £40,000,000 every year."

The proceedings fully justify the following criticism of *The Saturday Review*:

"The Indian medical, law, and civil service students whom Mr. Dadabhai Naoroji drew together on Tuesday from Bayswater to Bloomsbury might have been better employed that afternoon than in talking unmitigated rubbish about British rule in India. We have no wish to deny that the defects of our rule in India are grave and many;

* *Proceedings of the Agricultural Conferences*, p. 25. † *India*, p. 121.

but the resolutions passed at Bloomsbury are not creditable to the common sense and are indeed scarcely compatible with belief in the sanity of those who proposed or adopted them. The best friends of India in this country—they are not so very many—can but deplore this last exhibition of India's silliness. It is just the constant use of this kind of blatant impractical nonsense by some of their number which discredits educated Indians in British eyes."

The late Sir Monier-William says:

"After much labour we rulers of India turn out what we call an educated native. Whereupon he turns round upon, and, instead of thanking us for the trouble we have taken in his behalf, revenges himself upon us for the injury we have inflicted on his character by applying the imperfect education he has received to the injury of his teachers."*

No doubt several causes have contributed to bring about the state of feeling manifested at the Bloomsbury meeting, but it is largely explained by the defect pointed out by Sir John Stratchey. The subject is too extensive to be discussed here. Remarks on it, with suggestions, are offered in the pamphlet noted below.†

4. **Co-operation of the People Themselves.**—This, after all, is the most important point. One of the most distinguished Indian statesmen of modern times, Sir Madhava Row, successively Prime Minister of Travancore, Indore, and Baroda, says of his countrymen:

"*The longer one lives, observes, and thinks, the more deeply does he feel there is no community on the face of the earth which suffers less from political evils and more from self-inflicted or self-accepted, or self-created, and, therefore, avoidable evils, than the Hindu community!!*"

Imprudent marriages, the insane marriage expenditure, indiscriminate charity, the inveterate tendency to run into debt, &c., are evils beyond the reach of Government. It is so far a sign of progress that social conferences are being held with a view to reform. Such efforts should meet with every encouragement. The press might exert a powerful influence. Lectures and public meetings are also useful. But the most potent of all would be the *personal example* of educated men.

"THE MOST PRESSING ADMINISTRATIVE WANT OF THE DAY."

Sir H. S. Cunningham a member of the Famine Commission of 1878, has the following remarks on this point:

* *Modern India*, p. 305.

† *Indian Educational Reform*, 8vo. 23 pp. 1 An. Sold by Mr. A. T. Scott, Tract Depôt, Madras.

"The creation of an Agricultural and Industrial Department,* with a Central Office at the headquarters of the Government of India, and subordinate branches in the several provinces, is, I venture to think, the most pressing administrative want of the day. It would involve the expenditure of large sums in organising the machinery with which it would have to work, and securing the services of the experts, through whom alone it could render efficient service. Men skilled in various branches of technical science must be tempted into the service of Government, and be so remunerated and honoured as to render them contented with their position. The Civil Service must open its ranks to physicists as at present to lawyers and scholars; and technical education, varied and thorough, such as that which is now offered to Englishmen by the 'Yorkshire College,' at Leeds, must be brought within the reach of the Indian masses. Much patience and skill will, no doubt, be necessary for the successful introduction of a system, which, though long familiar on the continent, has hardly as yet taken root in England. Many mistakes will be committed, and much needless outlay probably incurred; but whatever be the cost of the system, the advantages which might be expected from its introduction are so great, and the need of such assistance is so urgent, that the task of devising and elaborating the means for its establishment in India ought no longer to be deferred."†

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* Separate Departments are preferable.

† *British India and its Rulers*, pp. 246, 247.

(REPRINT.)

AGRICULTURAL REFORM IN INDIA.

BY

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PREFACE.

THIS paper, written many months ago, had been long in type, when the Government emphasised many of the remarks that it contains by abolishing altogether the Department of Agriculture.

This Department has never, as fully explained in this pamphlet, been able to effect much where Agriculture was concerned, but it was working in a right direction; it knew what was required, and from time to time, when allowed a chance, did a little good on its own motion, or supported and assisted the efforts of others in this direction.

So long as it existed, there was always some one at the Head-quarters of the Government of India who possessed a knowledge of these subjects, and was at hand to support and advocate the sanction of all reasonable and practicable projects for improving in any way, however humble, the Agriculture of the country. So long as it existed, there was always a hope, that amid the vicissitudes to which public affairs are subject, some lucky turn of the wheel might bring more enlightened ideas on these subjects into vogue, and thus render possible its conversion into a real, working AGRICULTURAL BUREAU.

All this has passed away, and the only hope for India now lies in the chance that the real bearings and vital importance of the questions herein discussed may be better understood and appreciated in England than they have ever been, since Lord Mayo's death, by those in power in India.

A. O. HUME.

SIMLA,
July 1st, 1879.

AGRICULTURAL REFORM IN INDIA.

RECENT and oft-recurring famines have revived, to a slight extent, the feeble interest which has occasionally, in past times, been evinced in regard to agriculture in India.

Some few people are found who ask whether improved husbandry might not do much to mitigate the intensity and limit the areas of these calamities.

Others, looking to India's present impecuniosity, to the difficulties involved in any very material reduction in her present expenditure, to the urgent necessities that must arise in the future for increased expenditure, to the comparatively slow growth of existing sources of revenue and the apparent impracticability of opening out new sources that her populations would accept without dangerous dissatisfaction, enquire whether the time has not come for a careful reconsideration of our management of the land of the country. The land revenue in all historical periods has been the main financial resource of every successive Government, Hindoo or Mahomedan. We have done much for the country, have enormously increased the value of its produce, yet province for province we are not receiving much more than many of our predecessors, Akbar for instance, did. Are we really making the most out of the land?

Philanthropic manufacturers of agricultural machines, introducers of new forage plants, patentees of improved cattle food and the like, overcome by the woes of the Indian ryot, are perpetually dinning into the ears of the authorities and the public their unselfish anxiety to regenerate the country by supplying it with their wares on a large scale.

One way or another a dim conception seems to be gaining ground that, perhaps, we have left well (or ill?) alone too long, and that possibly a systematic improvement in its agriculture might prove a remedy for many of India's present troubles.

This is not the first time that some little stir has been made about this matter. The orbit is not calculable, but a certain periodicity has been observed, and every ten or fifteen years the idea has emerged into the blaze of public opinion. Whether this time it is destined to develop into a permanent source of light, or once more, its perihelion passed, to dart off into the space of oblivion, cannot be foretold. The chances are, it is to be feared, greatly in favour of the latter; but who can tell? The laws of mind are not as those of matter; and anyhow, so long as a chance

exists, all, however, humble, who hope and believe—hope that at last the time may have arrived for energetic and sufficient action in this matter, and believe that that action will confer great and lasting benefits on a considerable fraction of mankind—are bound, so far as in them lies, to endeavour to lead others to the same hope and belief.

Most certainly the question, are we making the most out of the land, must be answered in the negative; but this, not through any imperfection in the existing revenue administration, but because the land itself yields nothing like what it should.

It is undeniable that in the tenures we have created, and the systems we have adopted, there have been grave errors. Take, for instance, the Permanent Settlement of Bengal. Here, as elsewhere in India, the ruling power was the sole proprietor of the land. Other people enjoyed various classes of occupancy rights, and could not, according to custom, be deprived of these (though they often were so by our predecessors) so long as they continued to pay the demand of the ruling power, which again, though in practice often only limited by rebellion, ought to have been, according to tradition, one-sixth of the gross produce, or again, which according to custom is the same thing, one-half of what the actual cultivator paid the middleman who made the collections. No doubt over vast tracts the produce was nominally equally divided between cultivator and middleman (*adh-buttai* as this division is called), but as a matter of fact, owing to the frauds of the cultivators, we may say broadly, that these never did over any large area, for any prolonged period, yield more than one-third of the gross produce to the State collectors, middlemen, zemindars, &c. who, in various parts of the empire, at various periods, have been the primary recipients of the dues of the soil.

It would be foreign to my present purpose to enter further into details here. Suffice it to say that the State, even if strictly adhering to traditional usage, retained the right to share in any increased productiveness in its property, and similarly to increase the tale of its demand if *prices* of produce rose, or the value of the currency fell.

In Bengal, with the most laudable intentions, we relinquished this right. We began by fixing a demand higher than the existing condition of affairs justified according to traditional theory, but not higher than what our immediate predecessors had taken, and this demand we stereotyped for ever.

Time has rolled on; a roadless wilderness has been traversed in all directions by railways and roads; under our protecting rule a vast internal and foreign commerce has been developed, prices of agricultural produce have risen, new and extremely remunerative staples have been introduced, and vast tracts of waste have come under the plough, but our demand remains the same as it

was seventy years ago, and is probably between four and five* millions less than it would have been at the present moment had our predecessors contented themselves in Bengal, as elsewhere, with fixing the demand for periods of twenty or thirty years.

These extra millions would have made the administration easy. We should never have heard of licence and income taxes, hateful to the country, however equitable in theory; famine expenditure would not, as now, have involved proximate insolvency, and nine-tenths of the fiscal measures of the last fifteen years, which have created a more or less sore feeling in every section and grade of the community, would have been unnecessary.

Had the country gained by it, we might derive some consolation in looking back on this stupendous error. But the result has been only to create a multitude of absentee landlords and rent-charge holders, and to leave the masses, except in particular localities,† worse off and more miserable than those of any other part of the empire.

Again, throughout large tracts elsewhere, we have created middlemen and converted into joint proprietors with ourselves men formerly only representatives of a community, men anciently only *primi inter pares*, collecting for a small *honorarium* the dues of their brethren, now lording it as masters, and intercepting one-half of the State dues.

In these and similar cases we are doubtless *not* now getting by perhaps eight millions a year as much as we might have done, but for the well-meant errors of our predecessors. But these are accomplished facts; they have been built into the very foundations of the new social order that has arisen under our rule, and no wise or competent ruler could now dream of changes in these directions. For good or for evil, there they are, and there they must remain, unless we desire to shake society to its base and risk the overthrow of the fabric on which three generations have laboured.

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* It will be doubtless urged that, according to the road cess returns, the gross rental is barely 13 millions, and that therefore at the outside the Government demand could not have exceeded $6\frac{1}{2}$ millions, or say $3\frac{1}{4}$ millions in excess of its present amount. The writer, on the other hand, is confident, looking to area, soils, rates, and population that the "assets" of Bengal, as calculated for a North-West Province settlement, are not under 16 millions, and probably exceed this considerably.

Years ago, when the Bengal population was assumed at from 40 to 44 millions, the writer, from similar considerations, asserted in a printed memorandum to Government that it could not be less than 60 millions. Everybody ridiculed the idea, and many excellent jokes were made at his expense, *but*, three years later, the first census was taken, and the population was proved to be 66 millions.

† The Mahomedan cultivators of Eastern Bengal, whose turbulent pugnacity has enabled them to hold their own to a certain extent, must be excepted

Broadly speaking, accepting these tenures and systems that we have created, and of which we *cannot* and *must* not even *try* to rid ourselves, it may be safely asserted that we *are* making as much on the whole out of the land as, in its present condition, we can.

It is only necessary, at any rate for those who understand these questions, to read the more recent Settlement Reports of any of the temporarily-settled provinces, such as Bombay, the North-Western Provinces, the Punjab, to realise the patience and research, the care and intelligence, with which the assessment of the Government land revenue is now conducted.

Certainly, making due allowance where settlements have been running for some time, for improvements that railways, canals, and other less direct causes have effected in the value of produce, as a whole we are taking as much from the land as we can, consistently with not injuring the capital value of our property. Like all great works, the workmanship varies somewhat in quality, and it is only in human nature to err at times. Districts, both somewhat under and somewhat over assessed, might easily be indicated, but taking a wide purview no competent authority can deny that, conditioned as it is by the irrevocable acts of the past, the land revenue administration is, on the whole, making as much out of the land as it can fairly be expected, as now worked, to yield to Government.

If, then, our revenue from land is to undergo any very marked development, and to bear hereafter that proportion to the rest of our revenues that in the times gone by it has always borne, it is to an increase in the produce of the land, to an improved system of agriculture in fact, that we must look.

And here it is due to the patient, frugal, and not unintelligent husbandmen of India to admit freely that, looking to the conditions under which they labour, their ignorance of scientific method, and their want of capital (and all that capital enables a farmer to command), the crops that they do produce are, on the whole, surprising.

So far as rule-of-thumb goes, the experience of 3,000 years has not been wholly wasted. They know to a day when it is best (if only meteorological conditions permit) to sow each staple and each variety of each staple that is grown in their neighbourhood; they know the evils of banks and hedges, dwarfing the crops on either side and harbouring vermin, and will have none of them; they accurately distinguish every* variety of soil, and so far as the

* Nothing, indeed, is more perplexing than the enormous number of names applied by native agriculturists to soils, the more so that probably almost every district rejoices in at least a dozen purely local names which are unknown elsewhere. There is no real confusion, however. Native cultivators as keenly appreciate the smallest differences in the relative qualities of different soils as do the best European farmers, but the fact is that independent of names indicative of the quality of the soil (and often to the entire *exclusion* of these) they make use, in describing their land, of names having reference to external conditions, the frequency or recency of cultivation therein, its situation as regards inhabited sites, &c., its position as upland or recently-formed alluvium, its occupation for pasture, fields, or gardens, its external features, &c., &c. Nothing is more common than to hear soils referred to as such, by names which really only indicate features or circumstances altogether external to the soil itself and independent of its intrinsic quality. This is no doubt inaccurate, but it is very natural since the value to the agriculturist of any land will often depend far more on these external circumstances than on the inherent quality of the soil, which latter, moreover, will, as time goes on, be often greatly modified by the former, as where "*bhoor*" or light sandy soil, becomes in course of time, by proximity to a village, constant cultivation and manuring, a kind of "*do mut*" between garden mould and rich loam.

crops they grow are concerned, the varying properties and capacities of each; they fully realise the value (though they can command but little) of ordinary manure, ashes, and the like, and recognise which are most required by which kind of crops; they know the advantages of ploughing, in most cases as deep as their imperfect implements and feeble teams will permit, and of thoroughly pulverising the soil; and they also recognise where, with a scanty or no supply of manure, it would be folly to break the shallow-lying pan. As for weeds, their wheat-fields would, in this respect, shame ninety-nine hundredths of those in Europe. You may stand on some high old barrow-like village site in Upper India, and look down on all sides on one wide sea of waving wheat broken only by dark-green islands of mango groves—many, many square miles of wheat and not a weed or blade of grass above six inches in height to be found amongst it. What is to be spied out creeping here and there on the ground is only the growth of the last few weeks, since the corn grew too high and thick to permit the women and children to continue weeding. They know when to feed down a too forward crop; they know the benefit of, and practise, so far as circumstances and poverty permit, a rotation of crops. They are great adepts in storing grain, and will turn it out of rough earthen pits, after twenty years, absolutely uninjured. They know the exact state of ripeness to which grain should be allowed to stand in different seasons; in other words, under different meteorological conditions, to ensure its *keeping* when thus stored; and equally the length of time that, under varying atmospheric conditions, it should lie upon the open threshing-floor to secure the same object.

Imperfect appliances, superstition, money troubles, and the usurer's impatience, often prevent their practising what they do know, but so far as what may be called non-scientific agriculture is concerned, there is little to teach them, and certainly

very few European farmers could, fettered by the same conditions as our ryots, produce better, if as good, crops.

On the other hand, we must not over-rate their knowledge; it is wholly empirical, and is in many parts of the country, if not everywhere, greatly limited in its application by tradition and superstition. Innumerable quaint couplets, to which a certain reverence is attached, deal with agricultural matters. These, in Upper India at any rate, are true "household words" amongst all tillers of the soil. These govern their actions to a great extent, and often lead them wrong against their better judgment. They take omens of all kinds to guide their choice of crops and other operations of husbandry, and though some few of the more intelligent only act upon the results of these divinations when they coincide with their own views, the masses are blindly guided by them.

So, then, it is not only external disadvantages against which the Indian cultivator has to contend, it is not only that his knowledge is still in the primary experience stage, but that even this knowledge is often rendered of no avail by the traditions of an immemorial religion of agriculture.

It is necessary to realise* this (of which few Europeans ever even hear), as it is one great practical difficulty against which agricultural reform in India will have to contend.

What other Government is so favoured as that of India? A fertile soil, and nine-tenths of it (excluding Lower Bengal) still so far the property of the State, that the latter can, and does, levy a full rent on all of it—a rent which it can periodically enhance as circumstances enable the land to bear it.

And yet we are always in difficulty about money.† Conceive the Government of Great Britain similarly situated, and yet having to levy income taxes, and license taxes, and the like.

Well may the people of India cry out against innovations like these, and say, "the State keeps all the land in the country; this ought to suffice for any Government; if it does not, the Government, whatever its other merits, is too dear at the price." And this *is* the feeling that is slowly, but surely, creeping over the face of the empire. It is not the confirmed malcontents only, these must always be numerous in a country governed by foreigners; it is equally those best affected to our rule who begin to say, "The Government means well, it does much for us,

* To give some more definite idea of this superstition, a brief extract from an unpublished Memoir on the Agriculture of the Doab is reproduced as Note A., at the close of this paper.

† The writer can remember no period within the last twenty years, when any attempts to obtain funds for agricultural improvements were not negatived on the ground of financial pressure.

it gives us peace internally, but this is a poor country, and the Government costs too much!"

We must be blind indeed to the teachings of history if we cannot, to some extent, foretell to what this must ultimately lead.

Now that the people feel so keenly the costliness of the Government is due in some degree to unwise and unnecessary expenditure,* but mainly to the fact that our land revenue, not having advanced in proportion to the growth in other directions of the empire, money has had to be raised in ways which, however equitable in principle, are opposed to the traditions and repugnant to the feelings of the people.

Were our land revenue now only thirty instead of twenty-two millions, our expenditure might be precisely what it is, and yet no one, malcontent or otherwise, would ever have grumbled. All the money we needed would have been obtained by what the people consider constitutional and legitimate means, and so long as we adhered to old-established lines and introduced no new forms of taxation (and we should have needed none had our land revenue been what it should) we were welcome to spend all we got and, for all the masses cared, how we pleased.

That our land revenue has not kept pace with the general development is due to two causes:—

The first, mistakes in system, already alluded to—mistakes now irremediable.

The second, our absolute neglect, though sole or part proprietors of the major portion of the land, to attempt the smallest improvement on a primitive system of agriculture, stereotyped two thousand years ago, when the conditions and requirements of the country were utterly unlike what they are now, and when scientific method was undreamt of.

So long as we hold the country and see a fair prospect of continuing to hold it for another quarter of a century, it can never be too late to repair this second error, and the sooner we boldly face the necessity of doing this, and take action on a scale commensurate with the greatness of the task, the sooner we shall extricate ourselves from the trying position in which we are now placed, and relieve the country of troubles mainly due to our own past, unintentional, mismanagement.

And here the reader may possibly think that some injustice is being done to our administration, and remembering that eight years or so ago a good deal was heard of the establishment, under Lord Mayo's auspices, of an Agricultural Department in India, may ask how the existence of this special department is compatible

* This is too large a question to enter on here, though one branch of it has been glanced at in a later portion of this paper.

with such an entire neglect of agricultural reform as has been asserted.

The answer is simple: There is not, and never has been, any real Agricultural Department in India. There is a Miscellaneous Department of the Government of India, which, amongst its various titles, bears the word "Agriculture," but that Department has not, and cannot, from the nature of things, exercise any potential influence on the agriculture of the country *quoad* which it is a *vox et præterea nihil*.

Nothing is more calculated to deter earnest men from exerting themselves to secure for India that agricultural development of which she stands so grievously in need than the belief (erroneous as it is) that there already exists a special local organisation for this very purpose, and I propose, therefore, to explain—

What the so-called Agricultural Department really does;

How, though bearing this title, it has done, and (as at present constituted) can do, nothing (worthy the name) to reform Indian agriculture;

What organisation is necessary to any real and efficient Department of Agriculture in India, and the urgent need in which the country stands of this.

Lastly I shall, by way of illustration, glance at some few of the more important problems that would probably, at the outset, engage the attention of any such Department.

I.

What the so-called Department of Agriculture really does and has done.

Although circumstances (to be explained later) had deprived Lord Mayo's new department of all claim to be considered an Agricultural Bureau, its formation marked an era in the history of the country, and served a most useful purpose. In it were gathered up into one homogeneous whole numberless branches of the administration, all more or less potential factors in the material progress of the empire. Branches, therefore, scattered amongst the different secretariats of the Government of India, to be attended to or not, as the more obligatory business of these secretariats might, from time to time, permit; and when obtaining attention, dealt with too often by officers necessarily possessing neither the special knowledge nor the experience essential to their satisfactory direction.

The administration of the Forest Department was transferred from the Public Works Secretariat, and with it the immediate

control of a large staff. This involved the general direction of the demarcation, conservation, and improvement of all State forests in the Bengal Presidency, of the supply of timber and firewood to State Departments and the general public, of the formation of new plantations, the *reboisment* of denuded tracts, and the other very varied operations of this extensive Department.*

From the Military Department was transferred all business connected with studs and horse-breeding. From the Financial Department the supervision of the Department of Inland Customs, and salt matters generally, including all correspondence connected—at first with the maintenance and guard, and later with the gradual abolition,† of the vast customs' barrier, then extending across the continent of India from above Attock to near Cuttack; with the working of the great salt mines in the Punjab and the Sambhur lake, and with all measures relating to the security and development of the salt revenue in India, and the reduction of the price of this necessary to consumers.

From the Foreign Department was taken over the control of all matters connected with Land Revenue and Settlements in the non-regulation provinces; and from the Home Department all similar work pertaining to the regulation provinces.

The business thus devolving on the new Department included all questions connected with the settlement and assessment of the land in all that portion of India which is not permanently settled (*i.e.* nearly the whole empire with the exception of the major portion of Lower Bengal and the Benares division); all questions connected with waste lands, and their grant in lease or fee-simple to European and other settlers; all questions connected with the alienation of the State revenue derived from the land; all questions connected with the imposition of local taxes and cesses on the land, and later, when an Act was passed providing for the making of

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* Although the Secretary possesses some knowledge of forestry, and has co-operated cordially with Colonel Pearson, Mr. Baden-Powell, and Dr. Brandis, who have successively (the first two officiating) held under him the office of Inspector-General of Forests, the real credit for the enormous progress effected in forest administration, since the formation of the Revenue, Agriculture, and Commerce Department, is primarily due to Dr. Brandis, the founder, in India, of scientific forestry.

† This, though the proposal was of old standing, and the measure has received the approval, and more or less the support, of Lords Lawrence, Mayo, Northbrook, and Lytton, was more especially the Secretary's work. Its feasibility depended on the negotiation of a series of treaties with numerous native states. Writing of this recently, the Secretary of State remarked (Despatch No. 3 of 6th February 1879, para. 8):—"I entirely concur in the high appreciation of Mr. Hume's long and valuable services expressed by your Excellency's Government; for to him, as you observe, is due the initiation, prosecution, and completion of that policy which has led to the agreements entered into with the several states concerned."

pecuniary advances by the State to aid the landholder or cultivator in improving his land, all questions connected with the working of that Act.

From the Home Department also, the following other branches of work were transferred :—

Surveys.—Under this head were included the direction of the Trigonometrical, Topographical, Revenue, and Geological Surveys, and the administration of the vast establishments charged with their execution. Connected with the Geological Survey were explorations for minerals,—coal, petroleum, &c., and the grant of leases and concessions to individuals or companies desirous of searching for, or working these in various parts of the country.

Industry, Science, and Art.—Including questions connected with the representation of India at Exhibitions in Europe, America, and Australia; the holding of art and other exhibitions in this country; the general control of museums of natural history and economic products of such scientific matters as the maintenance of astronomical observatories and the arrangements for observing solar eclipses, the transit of Venus, and securing daily photographs of the sun; also all questions connected with industrial products, and the encouragement and development of local industries.

Meteorology.—Including the administration of the Meteorological Department, and the initiation and control of a system for the regular record and weekly or daily publication of reports on atmospheric variations and the prospects of the seasons.

Agriculture and Horticulture.—Including the general direction and control of model and experimental farms and botanic gardens; the introduction of new products; and of improved varieties of those already grown in the country; the introduction of new implements, and the improvement of those used by cultivators; the improvement of stock, and the prevention and cure of cattle disease; the conduct of operations connected with the cultivation of chinchona and the preparation from its bark of a really cheap and efficient febrifuge.

Fibres and Silk.—Including all questions connected with the improvement of the quality of Indian cotton, and the development of the trade in it; the improvement and development of Indian silk, the produce of the domesticated as well as of the wild worms; the introduction of suitable machinery for the treatment of rhœa; the development of paper-making from fibres grown in the country, and the experimental cultivation of new or hitherto little known and neglected fibres.

Fisheries.—The whole of the inland and sea fisheries of the different provinces of India were systematically inspected and reported upon under the orders of this department, and measures taken, where necessary, in communication with Local Governments, for their conservation. A scientific manual of

Indian Fishes by Dr. Day was also arranged for and has been published.

Port Blair and the Nicobars.—The administration of these settlements was vested in this department, and remained with it for over a year and a half, when, for reasons of administrative convenience the work was retransferred to the Home Department.

Sanitation.—Questions connected with rural, urban, and army sanitation, and the organisation and working of the Sanitary Department, and the administration of lock hospitals. This work was retransferred about twenty-seven months later to the Home Department.

Municipalities.—Including all questions connected with municipal taxation and municipal government generally; the making of loans to municipalities for the execution of projects of local improvement, and cognate matters. This work was, after five and a half years, retransferred to the Home Department.

Emigration.—Including the regulation and control of emigration from India to British and Foreign colonies, and correspondence connected with the treatment of the emigrants there, and their return to India; also all correspondence connected with emigration to the tea districts of Assam, and State schemes of emigration, such as the emigration from Bengal to Burmah in 1874, during the famine in Behar, and the emigration of agriculturists to the Central Provinces from other over-populated tracts.

Statistics.—Operations connected with the Weights and Measures Act (a dead letter), the taking of the census of India, and the preparation of a Gazetteer, based on the results of an elaborate statistical survey.

To all these departments were added :—

In 1874—All correspondence connected with merchant shipping, lights, buoys, and beacons, ports and port dues, pilots and pilotage.

In the same year—The administration of a new department then constituted for the purpose of surveying systematically all the coasts and harbours of India, issuing charts of the same to the public, publishing hydrographic notices and notices of dangers to navigation, and changes in positions of lights and buoys, registers of wrecks, and accounts of light-houses and light-vessels.

In 1875—The compilation of statistics of trade, sea-borne and inland, for the whole empire, their collation and prompt publication, with explanatory notices and reviews of the figures, involving detailed enquiries into the commercial and industrial aspects of the country.

In 1875—The administration of the sea customs revenue, bringing with it the control of all the custom, houses and the discussion of all matters connected with the tariff of import and export duties.

II.

Why the Agricultural Department has not done, and never can do (as at present constituted), anything material for the improvement of Indian Agriculture.

The organisation essential to any efficient Bureau of Agriculture and the urgent need in which India stands of such a department.

The above brief *résume* of the work with which the Department of Revenue, Agriculture, and Commerce has been charged, and of the very numerous subjects dealt with in it, might, to a certain extent, be held to explain why so little, comparatively, has been done where agriculture is concerned.

It might, with much show of reason, be argued that with such an inordinate variety of questions to deal with, with such a vast mass of operations of the most diverse kinds, to direct, control, or supervise, no small department, with a single Secretary and Under Secretary, could possibly find time, after disposing of current work that inevitably came before it, to make new work, such as any effective action in the direction of agricultural improvement must involve.

This explanation, this argument, however valid *per se*, would not fully or sufficiently state the case.

Despite its heavy normal work, this Department *has* found the time to introduce more or less important reforms in the majority of the other branches with which it is supposed to deal. It has continually, and it is believed usefully, made new work for itself and carried out that work. It is in agriculture only that the Department, conceived originally mainly as an instrument for agricultural reform, has done next to nothing, and the reasons for this lamentable anomaly are to be sought for in causes widely different from the mere pressure of other work.

Though originally designated the Department of Agriculture, &c., this Department has never, from the first, been so constituted as to permit of its dealing either directly or efficiently with agricultural matters.

Lord Mayo's conception was one thing, the sadly modified scheme that as the result of vehement opposition he was compelled to accept, another. Lord Mayo accepted this as a sort of instalment, as a grant of ground on which he might later build what was necessary, but no one was more thoroughly alive to the fact than himself, that in the shape in which his cherished project ultimately saw the light, it afforded little or no prospect of material improvement in agriculture. He believed that in a few years this might all be changed, and had he lived, this might have been so, but he fully realised the position, and his invariable reply

to protests on this subject were: "We must have patience; it will all come right."

Lord Mayo clung, however, to the idea of ultimately making this really a Department of Agriculture, but the Secretary of State did not approve of even this.

Lord Mayo named it the Department of Agriculture, Revenue, and Commerce. The Secretary of State objected to this, said that Revenue, and not Agriculture, was the main object of the Department, and ordered the name to be altered* to "Revenue, Agriculture, and Commerce."

Lord Mayo selected as head of the Department, an officer whom, from his own thorough† knowledge of the subject, he ascertained to be well versed in practical European agriculture, who had, for his own information and amusement, farmed in a small experimental way throughout his many years of service in India as a District Officer, and who was fairly conversant with all the then more modern German and English writings on the theory and practice of agriculture.

The Secretary of State remarked (replying as it were officially to what Lord Mayo had written to him on this subject privately or demi-officially) that the next head of the Department was to be chosen for his knowledge of revenue and not of agricultural matters.

It will be seen, therefore, that, as constituted, this Department never was, and never was intended by the Home Government to be, a Department of Agriculture. Lord Mayo hoped to convert

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* Extract paras. 3 and 4 of a despatch (No. 27 of the 3rd August 1871) of Her Majesty's Secretary of State for India, to His Excellency the Governor-General of India in Council.

"3. I consider, however, that the change that has been made in the designation enjoined in paragraph 20 of my despatch of the 22nd September 1870, No. 61, by transposing the words Revenue and Agriculture, is objectionable, as giving rise to the notion that the revenue subjects, which are undoubtedly of the first importance, are not so esteemed by the authorities in this country or in India. Of such paramount importance are these subjects, that it is obviously necessary that the officer appointed to the post of Secretary in this Department should always be chosen on account of his knowledge of the subjects connected with revenue, rather than from any knowledge which he may possess of agricultural or commercial matters.

"4. I must, therefore, direct you to revert to the title settled by my despatch above alluded to, which, indeed, is the designation most frequently made use of by your Excellency in Council in the Resolution of the 6th of June.

† Lord Mayo was probably the only Governor-General who has farmed for a livelihood and made a living out of it. When he came of age (he was then Mr. Bourke), his father (whose elder brother was still living) could not afford to make him any allowance, but rented to him one of his farms to make what he could out of it. This Lord Mayo farmed himself ("Many a day," he used to say, "have I stood the livelong day in the market selling my beasts,") and made enough out of it to enable him to attend Parliament regularly from after Easter to the end of the Session.

it into this, but with his death India lost the warmest, most competent, and, at the same time, most influential advocate for agricultural reform. No change, such as he contemplated, has ever been made in the constitution of the Department, and succeeding administrations have only made the official bonds more rigid, and converted its chief more and more thoroughly into a mere desk-tied Secretary.

A Secretariat is under no circumstances the form of organisation best suited to the promotion of agricultural development. Still even a Secretariat might do much if it possessed three needful adjuncts:

(1) Competent advisers, not tied to an office, but able to move about, collect and digest the necessary facts, and put schemes before it in a shape in which sound decisions can be arrived at.

(2) A qualified agency, either of its own, or belonging to administrations subordinate to it, to give effect to its decisions.

(3) Money to expend in giving effect to these and in experiments, &c.

The Department of Revenue, &c., has *never* had *any one* of these three requisites at its command.

The only person connected with it from first to last who has possessed any knowledge of both the theory and practice of agriculture has been the Secretary, who has had always from eight to ten hours a day (and often much more) office work, and who for ten years has barely seen a field, except from the train, on the occasion of the half-yearly migration of the Government of India between Simla and Calcutta.

It has never had any agency, though the creation of a Directorship of Agriculture in the North-Western Provinces in recent years has at last originated a nucleus in *one* province out of which such an agency will, it is to be hoped, develop. Last, but not least, it has had no money.

How it comes that the Government should have no money to spend on improving the one branch of industry to which it chiefly owes its revenue, will be briefly discussed further on. At present it is sufficient to say that it had *not* the money to give. There was no illiberality. Without a fundamental alteration in its entire policy, no Government, situated as ours has been, could have given for agricultural reform anything that would have been of material use.

Constituted therefore and carried on under these conditions, no one possessing any real insight into what is required could ever have expected from this Department any very tangible results in the way of agricultural reform.

Its possible sphere of action in this direction was limited to a degree that rendered almost nugatory any efforts it might make.

Still it never abandoned the tradition of what its ultimate

object was intended to be. What little did fall within its reach it dealt with in the best fashion that its means and appliances permitted.

But what little it may have done (and of this a brief account will be found in the appendix, note B.) is to what is requisite, if any tangible results are to be secured within any reasonable period, as the scratchings of sparrows' feet to deep ploughing.

And the soil we have to deal with is the stiffest of clay: an indigenous agriculture, that no frost of our disapproval will disintegrate; self-coherent from the intermixture of the traditions and superstitions, almost a religion in themselves, of innumerable past ages.

If this Department has succeeded in some solitary instance in doing a minute amount of good in such matters, it is much as though a grain falling by chance into the little bird's tracts, and favoured by unusual fortune, gave rise to a solitary plant boasting some few good ears, and bears to what it ought to have accomplished had it been properly constituted much the same proportion that those straggling ears do to the massive yield of some adjacent well-ploughed field.

What that proper constitution would have been may, perhaps, be gathered by looking back to what Lord Mayo first contemplated; to what he would have carried out had the decision rested entirely with him.

Lord Mayo's original conception of this Department was as a purely agricultural bureau, presided over immediately by a Director-General of Agriculture and not by a Secretary. He considered the subject too great to admit of its being satisfactorily dealt with, unless the best man available gave it his entire time and thoughts. He intended the Director-General to be supreme in his own Department, and only nominally attached for official purposes to one or other Secretariat, in the same way as the Director-General of Post Offices is practically supreme in all departmental matters, though nominally attached to the Financial Department.

The Director-General was to have immediately under him a small staff of experts, and was to keep up only just such an office as was absolutely unavoidable. There was to be as little writing and as much actual work as possible. Directors of Agriculture were to be appointed in each province, also to be aided by experts. They were to work partly through the direct agency of farms* and

* By farms are to be here understood real model farms on carefully selected sites, presided over by picked experts, and liberally supplied with funds and all requisite appurtenances. No plots of waste, such as of late years have almost universally done duty as model farms, waste brought roughly under cultivation by amateurs or florists, who never enjoyed a single day's real training in either theoretical or practical agriculture, and never had at their command more than a fraction of the funds requisite, if justice

agricultural schools, and partly through the revenue officials of all grades down to the village accountants. The Director-General was to be moving about generally whilst the crops were on the ground. He was to confer personally with all the Provincial Directors and their Governments, go thoroughly with the aid of his staff into all their projects and schemes, make himself fully acquainted with local wants and wishes, and then during the hot season join the Government of India, and lay before it as succinctly as possible all that was desired with his (and his experts') opinions and recommendations. He was to watch closely all the schemes and experiments carried out by the Provincial Directors, to furnish them with suggestions, information, and advice; to procure for them, if they wished it, chiefly through the Agricultural Societies of Europe and America, any information, seeds, cattle, sheep, models of implements, &c., that they required; to keep all fully informed through the medium of his journal of what all the rest were doing; and as his experience and practical knowledge increased, and alternate failures and successes gradually indicated these, to lay down the broad lines of the general policy in regard to agricultural matters that the Government should pursue.

In connection with the Provincial Directors were to be model and experimental farms, which were to be at the same time agricultural schools of one grade or another, some of the farms being more specially devoted to the improvement of seed by selection, others to the introduction and acclimatisation of exotic staples, others to the trial of implements and mechanical appliances, others to stock-breeding, others to the purposes of tuition, and so on. Mechanical engineers were to be employed in connection with some of these farms and schools, whose special duty it was to be to adapt the results (where implements of all kinds were concerned) of European and American science, to the wants and means of the Indian husbandman. At first the best civil officers available were to be picked out as Directors, and the best available trained European agriculturists were to be got out to direct the schools and farms, and act as advisers to the Director-General and Directors. Continuity was to be secured by making the service one; Directors were to be promoted to Director-General, experts and heads of farms and schools were to be promoted to Directorships. Gradually, as the expert element acquired knowledge of the country, people, and language, the non-expert element of civilians was to be allowed to disappear. There was to be constituted a compact agricultural service in

was to be done to their charges. That these gentlemen and their so-called farms were unsuccessful was surely their misfortune, not their fault, and they deserve, most of them, much credit for doing their best. But let no one gauge the capacity for good, in solving agricultural problems and in imparting agricultural knowledge, of well organized model farms by these failures.

two divisions, the lower and larger one recruited entirely from the Indian schools, the smaller and higher division recruited to a certain extent from the lower, but, at any rate for many years, mainly from home.

Under the Director-General a Journal of Agriculture was to be issued. A separate and competent editor was to be employed, but the Director-General was to be responsible, and he was to secure for it the aid of all his own and all the Provincial Agricultural Officers. The collection of agricultural statistics was to be the work of the local Directors, but the further tabulation of these statistics, and the preparation from the provincial reports of a monthly or fortnightly summary of the prospects and progress of the crops on the model of those issued by the Bureau at Washington—then, I believe, a new thing—was to be done by the Director-General or his immediate subordinates. The prices in Europe and elsewhere of important articles of Indian produce in which no trade already existed, were to be carefully enquired into by the Director, and published from time to time, and, if necessary, experimental shipment of articles in which a profitable trade seemed probable, undertaken. As the scheme developed itself, Government revenue officials were to be instructed to use their utmost endeavours to lead the landholders of each district to constitute Agricultural Associations; they were to be urged and encouraged to send some of their relatives to the schools. Exhibitions were to be held, prizes given, and every effort made to give dignity in the eyes of the natives to the pursuit of agricultural science. But nothing of this was to be attempted until some distinct success had been achieved which could be pointed to as proof that we had really something to teach, which it would pay to learn.

There were a great many other details, but these do not call for recapitulation here, even were this possible. The above sufficiently indicates the main outlines of Lord Mayo's original scheme.

All experience in other branches of the administration, in Forests, Post Offices, Telegraphs, Education, Surveys, leads irresistibly to the conclusion that Lord Mayo's first idea was the right one, and that until some such distinct and thoroughly homogeneous organisation is here created for this express purpose, no very perceptible or *remunerative* improvement in Indian agriculture can be looked for.

But the present Secretary of this Department, at that time residing with Lord Mayo, and with whom he discussed all the details repeatedly, prepared an estimate, the best he could then furnish, of the cost of carrying out such a scheme, including Director-General and seven Directors, and their staffs and offices, and forty model farms, with schools or colleges of one grade or

another attached, contingencies and plant, &c. &c., showing that the *net* expenditure when the scheme was in full play would amount to nearly 25 lakhs of rupees (£250,000) a year, independent of an initial, virtually unreproductive, outlay for offices and buildings of possibly not less than 25 lakhs (£250,000).

Lord Mayo, when convinced that this estimate (avowedly tentative) was in the main not a grossly exaggerated one, considered the whole thing as utterly hopeless, and fixed his mind on carrying a much more modest and admittedly imperfect scheme, to serve as a beginning, a peg to which as time went on all else could be by degrees appended. Even this idea was greatly modified before the scheme was officially put forth; this, again, was met with perhaps the most strenuous opposition any long-considered project of a Viceroy, himself a practical expert in the particular subject, ever encountered, and when at the last the Department was created, it had lost every one of the essential characters on which its possible success as a Bureau of Agriculture was absolutely dependent. It has done, it is hoped and believed, some good and useful work in other branches, but as regards agriculture it was and still remains virtually impotent.

That from the traditional and long-established Indian administrative point of view, Lord Mayo was right in considering the expenditure likely to be involved prohibitive, no experienced Indian official will deny. But the question remains whether from the earliest period of our rule our administration, as regards this most important matter, has not been utterly and fundamentally wrong; whether we have not systematically ignored the gold at our doorsteps, while we moved heaven and earth to scrape together copper from all quarters of the globe; whether our present position, as regards local agriculture, after so long a period of rule, is not the very most conspicuous blot on our administration; and whether many of the more serious of our internal troubles, past and present, debt, famine, and discontent, have not been mainly and directly due to the long-continued failure to realise what is alike our duty and our interest, where agriculture is concerned.

Our mighty military expenditure has always been (whatever people unacquainted with the country may think) to a very great extent beyond our control. The exigencies of our position, and the irrepressible growth of our empire, have been such as to render impracticable any great reduction in this item.

But in our civil expenditure, which really was within control, we have, with the best of intentions, misapplied too large a share of the limited funds available.

We have gone on elaborating in every branch highly organised systems of administration which were alike beyond the wants and the wealth of our Indian fellow-subjects.

So long as the masses of the population remained as poor, and

therefore necessarily as ignorant, as they still are, all that was needed was a rough system of patriarchal administration, a purified and somewhat systematised reproduction of the native rule that we replaced, a development of the then existing (now unfortunately almost extinct) system of local self-government by juries, and a rigid repression of all crimes of violence. Under such a form of government, and it has existed for a time in almost every province we have acquired, the people have ever been more contented and better satisfied with their lot than under any of the more advanced and Europeanised forms that have later always displaced it.

Had one-fourth only of what has been expended in developing the existing elaborate and unpopular system of civil administration been steadily and judiciously employed in the improvement of agriculture, had even only the same energy and the same funds been devoted to this purpose, that have been devoted to the cause of education, the people would now be comparatively wealthy, famines would have been greatly limited in area, and their pressure, even within these narrowed limits, greatly lessened, and there would have been no necessity for those unpopular cesses, license taxes, and the like, which, however, inevitable, create equally inevitable discontent, and the land revenue of the country, our main source of income, would have stood at at least 30* per cent. above its present level.

Without undervaluing anything that has been done, above all in the direction of education, it can scarcely be denied that the first essential is to fill the stomachs of the people, and that a certain degree of material comfort, considerably in excess of what the masses of the population now enjoy, must be attained before any *real* necessity can exist for elaborate† systems of civil

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* If the produce were increased by 50 per cent,, we could *double* our land revenue, and yet leave all classes dependent on the land better off than they are now.

† In a recent debate (7th May 1879) in the Imperial Legislative Council, the Hon. Mr Cockerell remarked:—

"For an elaborate Code of Procedure naturally not only promoted an increase of litigation, but also tended in a still more marked degree to enhance the time occupied in the disposal of every contested suit. The Secretary to the Government of the North-West Provinces, in a letter addressed to the Government of India relating to this measure, wrote:—

"'*Although Sir George Couper has always been strongly in favour of the non-regulation system, he must admit that, owing to various causes, it is now out of date. It is enough to mention one fact; and that is, the number of legal practitioners who practise in our Courts. Formerly the parties appeared in person, and the Judge had little difficulty in ascertaining the facts of the case. Now, in a great number of suits, the parties are represented by barristers or pleaders; it is not only much more difficult to get at the bottom of the case, but a great deal of time is taken up by the arguments of the lawyers; and it is no exaggeration to say that a case which would formerly have been disposed of in one hour now often occupies the Court for two days.*'"

administration. That we have spent our money in these rather than in promoting what would have simultaneously enriched the people and the Government, in a degree that no other conceivable measure could approach, must be held to have been a most grievous error.

That with proper manuring and proper tillage, every acre, broadly speaking, of land in the country can be made to yield 30, 50, 70, per cent. (according to circumstances) more of every kind of crop than it at present produces, and this with a fully corresponding increase in the profits of cultivation, is a patent fact that the writer has proved with almost every common North-Western Provinces' crop, that Mr. Robertson has proved with most of the Southern Indian staples, that has been in fact established as well as any point can be, until the masses prove it for themselves.

But—and this is the explanation of the apparent apathy that has ever left our most important source of revenue, the only one capable of very great development, absolutely, if I may use the phrase, uncultivated—the immense majority of officials in India never have, and do not to this day in the least believe it, while the very few who do realise it as an abstract truth, stand aghast at the gigantic nature of the task involved in securing the supply and use of this proper manure and recourse to this proper tillage.

It is, however, just to pick to pieces a formidable obstacle like this, that looms so portentous when viewed from a distance and *en masse*, and to demolish it in detail, that a special and skilled agency is required.

And, whatever the expense involved, it would seem that, looking to the enormous magnitude of the mere pecuniary interests at stake and the almost overwhelming necessities that oppress us, we should, we *must*, have that agency.

After all, a healthy equilibrium of the finances is a primary condition of the well-being of the State. Can anything be more gloomy than *our* financial prospects? More money we must have; *much* more as time goes on; look round on all possible sources of income and say *where* there is any hope of such a material increment as, in the face of an ever-falling exchange, would relieve our anxieties on this score.

From the opium revenue, long threatened, but like threatened men living long, we can at best expect no permanent material increase. Insolvent as we are, an Imperial policy demands the reduction of our customs duties. Stamps and excise might each yield some trifling increment, but the former at a greater cost, perhaps, where the true interests of the people are concerned, than it would be worth. Three or four extra millions might be on a temporary emergency extracted from salt, without much local

dissatisfaction, but only in direct opposition to the policy which the Government have so earnestly avowed. Lastly, by additional direct taxation, a couple or even three millions extra might be raised, but not without creating the most widespread discontent that any accident might develop into a costly outbreak or series of outbreaks.

We have really only the land to look to, and here, though we have for generations steadily refused to see it, the gold lies thickly for the gathering.

It is one of those incomprehensible instances of determined national blindness of which history records too many similar examples, but it is a fact that, landlords of an estate, let on comparatively short leases, with a gross rental of seventeen millions,* with the full knowledge that the great mass of our land is yielding less than two-thirds of what it should and would if properly cultivated, we absolutely in practice refuse to take one single material step towards remedying this lamentable waste of our property.

We spend millions on the minds and morals of our fellow-subjects, but shrink, as if from a crime, from spending a quarter of a million on what would bring to each that full quota of daily food they need, and which the masses now never enjoy for any twelve consecutive months, and with this would relieve the State of the existing all over-shadowing financial incubus.†

Here, in improved agriculture, lies the one reasonable hope of extricating ourselves from our difficulties, and our present apparently almost hopeless financial position offers the most irresistible argument against further delay.

So long as things went fairly smooth with us, as we could drift along after a fashion and pay our way, our neglect of this great source of revenue might, looking to the formidable difficulties which undoubtedly surround the question, be only weak and foolish, but now, when herein appears to lie our sole hope of renewed prosperity, to hesitate longer would be criminal.

Unfortunately, while none will deny our necessities, few, very few, are competent at this stage to realise the certainty of the ultimate success of the proposed remedy. Of those, even who clearly admit the theoretic truth of the proposition, the vast

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* I exclude about four and a half millions, the revenue derived from permanently settled and quit-rent estates.

† I need scarcely point out that it would not only be directly as regards the food of the people and their land revenue that improved agriculture would operate. Increased production would involve an increase in exports, and *pro tanto* probably some diminution of the exchange burthen. It means an increase of imports, and a relief to manufacturing interests at home, who then might realise (hungry men can rarely stop to be rigidly honest about the food they grasp) the true merits of their recent cry and leave us the remnants of our customs. In a dozen ways, it would act and re-act beneficially.

majority will at once recur to innumerable practical difficulties, and if we are not prepared with immediate answers for each, abandon the whole project as impracticable, forgetting that it is just to sift these difficulties, to gather the right facts in regard to, and bring a scientific method of solution to bear upon them, that we in the first instance require the powerful organisation suggested.

The best European experts, selected specially with reference to the peculiar qualifications required for our purposes here, and working hand in hand with the ablest of our Indian Revenue and Irrigation Officers, will unquestionably meet with difficulties at every step; but nothing is more certain than that all such difficulties must disappear when attacked in a thoroughly systematic and scientific method.

No matter how complicated and ill-conditioned the knot, the patient tracing out of each string reveals the point where the first advance may be successfully made, and this done, the next and the next "follow fast and follow faster," till all that once seemed so tangled becomes smooth and straight.

But this absolute certainty of ultimate success, of a success yielding results beyond what the majority would now even dare to *hope* for, is in no degree incompatible with a full realisation of the difficulties that do at present bar its attainment.

No magic transformation can be looked for. With the most careful selections, the utmost energy and good will on the part of all concerned, three or four years must elapse before, with an organisation such as is proposed, the men will have really settled down to their work, and perhaps as many more before all the most important problems, first demanding solution, will have been clearly marked out. Even then it may be only slowly that with silent fingers Science will unpick the knots, and if as, without being in any degree sanguine, we may fairly expect, after twenty years' work, and after spending four or five millions, the main obstacles have been overcome, a thorough reform effected in the agriculture of particular localities, and the people as a whole awakened to what can be and has been done in this way, we shall have made the best investment that ever landed proprietor did.

It will be said that five millions is an enormous sum. But then the return is certain; it may be more or less delayed, but it is the one investment that will, we know, return cent. per cent. and more.

It is as though one were sinking a shaft to a bed of coal, the depth, quality, and extent of which have been ascertained. It may be far to sink, and some very hard beds to cut through, and here tools break, and there new tools have to be specially designed for the particular work, and the water is troublesome, and some of the beds very loose, and so on; it may be a little sooner or a little later, but we go on, neither grudging time nor expense, because

we are certain, from our ascertained facts, that when we do get the coal, it will repay us tenfold all we can have possibly expended in reaching it.

It is not, however, as the sole practicable means of materially increasing our revenues and ultimately restoring our finances to a healthy position that energetic action in improving agriculture in India may be insisted on.

On the contrary, not only is this necessary if we desire any large increase of our land revenue, but it is equally so if we desire to avoid a material diminution of this hereafter.

Notwithstanding the enormous additional areas brought under cultivation, notwithstanding our vast irrigation schemes, and our improved and really admirable systems of settlement, our land revenue (excluding Burmah, still almost virgin soil, and making allowances for annexations, such as those of Oudh, the Punjab, &c.) has, if the rise of prices be taken into account, remained stationary, if it has not actually decreased. Yet the agricultural masses (there are more of them, no doubt) are, to say the least, neither wealthier nor better fed, taking the country as a whole, than they were seventy years ago.

The sole explanation is, that the older tilled lands, as a body, yield now lighter crops than they formerly did.

This is what almost every experienced and intelligent cultivator in Upper India will tell you is the fact in regard to all but that little circle of fields skirting each inhabited site, which gets the great bulk of what little manure is available. This, too, might be gathered by comparing what was reckoned in the "Ain Akbari" as a full yield for several descriptions of crops in the Agra, Muttra, Mynpooree, and Etawah districts (in regard to which the Emperor's information must have been accurate), with the known yield in these same localities at the present time.*

But it seems needless to dwell on arguments of this nature, which are always liable to be directly traversed by people who have no real knowledge of the question, which from the complication of factors combining to produce any crop, in any field, in any season, requires not only a multitude of investigations, but their intelligent manipulation by an expert to establish them (and even then carry no conviction to the generality of minds), when we can prove from the nature of things that such *must* be the case.

* As the result of scores of careful personal experiments carried out in the Allyghur, Mynpooree, and Etawah districts, the writer would state fourteen bushels an acre of wheat to be a high average for good fields, *i.e.*, fields with which their cultivators are fairly satisfied; in other words, for the more successful fields, of the best land, which alone is used for wheat. The "Ain Akbari" gives nineteen bushels as an average yield in those days. I need not say how far both these figures fall short of the yield of well-tilled first-class lands, in East Norfolk for instance.

Owing to a variety of causes, some of which may be touched on in the next section, agriculture in India has become, and becomes daily, more and more what Liebig happily designated a system of spoliation. Deep as the purse may have been, and rich as much of our soil unquestionably was, it is clear that a time must arrive when, by continually taking out a great deal and putting back very little, both purse and soil are exhausted.

Unlike the European peasant, the Indian husbandman more or less fully realises the evils of this system; it is only on compulsion that he robs his mother soil, and it is only in comparatively quite recent times that this spoliation has acquired the alarming intensity that now characterises it.

Only fifty years ago, when jungles and grazing grounds abounded, when cattle were more numerous, when much wood was available as fuel, there was actually a much greater amount of manure available and a very much smaller number of fields on which to spread it.

The evil is a growing one, it is one of gigantic magnitude, and though, like all great causes, it operates slowly, no one who has really watched agriculture for years in this country can doubt its effects are already showing far and wide; no on who understands the question can doubt that they will deve with most disastrously increasing virulence as years run on.

Here, again, is a question in regard to whic here can be no doubt. How quickly or how slowly a perpetua cropped and rarely, and then only scantily, manured field will become thoroughly exhausted and unculturable, depends, of course, on what we may term the original capital of that field, and on the proportion that may exist between the disbursements and receipts, but it being admitted that the former are and have been for years greatly in excess of the latter, and that this disproportion is increasing, the ultimate result is certain.

That the gradual (and perhaps later suddenly rapid) deterioration of the major portion of our cultivated lands is, unless a totally new system be inaugurated, inevitably impending, can be denied by no one conversant with the subject.

It is impossible for Government to disbelieve this; they may think, and perhaps rightly, that it will last their time, but they cannot doubt as to what they are preparing for their successors.

And it is not as in other countries, where the land is private property. It is its own land that Government is allowing to go to ruin, its own financial blood that it lets run to waste. This is the sole goose that ever would or could lay golden eggs for us, and we are smiling as it is slowly starved before us, and will not make a single effort worthy of the name to arrest the catastrophe.

Yet again, from another and distinct source, ruin and desolation, more palpable and speedy in its course, though more limited

in its operation, await vast tracts in Northern India, unless the voice of reason can gain a hearing and science be allowed to guide agriculture.

In Oudh, the Panjab, and the North-West Provinces, the soils mostly contain an appreciable admixture of saline particles. With the construction of high-level canals, the subsoil water level is raised, the surface flooded, the earth yields up its soluble salts to the water, which again restores them (but on the surface) as it passes away in vapour. At first the result may be good, and marvellous are the crops that have been raised in the Doab on the first introduction of canal irrigation, owing to the first slender doses of potash and chloride of sodium.

But nature works on blindly and unceasingly. The water below searches out one by one each soluble particle in excess of the particular soil's capacity of retention, and, as it slowly creeps up by capillary attraction, leaves these ever behind it on the surface.

Time passes on, some crops begin to be unprofitable; in the hottest time of the year, a glimmer as though of a hoar frost overspreads the land. The land grows worse and worse, but ever night and day nature works slowly on, and the time comes when, abandoned by the cultivator, the land glitters white and waste as though thickly strewn with crisp, new-fallen snow; never, alas! to melt away, except under the rays of science.

Along the little old Western Jumna Canal, thousands of fields are to be seen thus sterilised. Along the course of the mighty Ganges Canal—a work as it were but of yesterday—the dreary wintry-looking rime is already in many places creeping over the soil.

Come it quickly or come it slowly, the ultimate result here also is certain; and, unless a radical change is effected in existing arrangements, we know, as definitely as we know that the sun will rise to-morrow, that the time must come when some of the richest arable tracts in Northern India will have become howling saline deserts.

The task, no doubt, looked at from a distance, seems almost a hopeless one, but when it is more closely examined, and when we fully realise the vast strength of our revenue and irrigation establishments throughout all those portions of the empire in which we have the most direct interest in the progress of agriculture,* it will be perceived that the plant for much of the work is already on the ground, and that all that is primarily necessary is an efficient directing and controlling agency.

* In Lower Bengal no doubt these establishments are weak, but then the land revenue is here permanently settled, and we have not the same *immediate* pecuniary interest in the reform of agriculture there.

III.

Some of the problems that would at the outset engage the attention of an Indian Bureau of Agriculture.

Assuming that now, *at last*, some real steps will be taken in the direction of agricultural reform, it may be useful to glance at some few of those problems which should apparently at the outset engage the attention of any working department of agriculture in India.*

First and foremost unquestionably stands the increased provision of manure, not merely because this is the crying want of Indian agriculture, but because unavoidably any practicable arrangement for supplying this want must at the same time supply many other minor ones.

We may pass lightly over the first branch of this subject, viz. the introduction of the Chinese system, because though by the help of combined tact and authority, kindness, patience, and gentle pressure, it *could* even now be introduced, in two or three years, into *any* small, well-supervised tract, and thence spread gradually over the entire empire, every one conversant with agricultural literature knows all about it, and knows that it would in India need for its support legislation, and a happy combination of enthusiasm and discretion in working the law, that at the present time is scarcely to be expected.

* I have no doubt that many will be inclined to urge that Agricultural education—a kind of education infinitely more needed than the education in Law and Letters, now given at such a vast cost in our Colleges and Universities—is one of the first things to be undertaken, and that Agricultural manuals and text-books, with object lessons in elementary schools, &c, are primary essentials.

But this is not my view—these things, good as they are, belong to a more advanced stage of progress.

At the outset, the Agricultural Department will have mainly to teach itself. Scientific truths are immutable, but their profitable application demands a thorough knowledge of the entire environment of the particular position, a thorough comprehension of local conditions, and we cannot usefully begin to teach natives the theory of Agriculture until we have first taught ourselves (and are, therefore, in a position to teach them also) how, under the peculiar local conditions, of India and different provinces of India, we can advantageously give practical effect to that theory.

I may add, though this is a distinct but germane question, that I believe in teaching botany, vegetable physiology, chemistry, and geology in schools, and practical farming on a farm; I do not advocate mixing up the two. For the great mass a practical training and the enforcement, as axiomatic rules of action, of certain definite maxims and precepts, is all-sufficient. To the few whose capacities are of a higher order, or whom circumstances call to a higher position, a thorough scientific education should be first given, and then they should, in a distinct institution, be initiated in the full practice of what they have already mastered in theory.

Undoubtedly the introduction of this system which, while hugely benefiting agriculture, would perhaps do more than any other conceivable measure to restrict the ravages of cholera, should never be lost sight of. Its importance cannot be overrated, but the immediate difficulties to be encountered, and the prejudices to be overcome, are (or *seem* to be, for this may be *partly* a chimera) so great that action in this direction may reasonably be postponed while there is so much else immediately practicable to be done.

Setting this aside, the main causes of the scarcity of manure are the comparative paucity of cattle, and the almost universal use of their dung as fuel.

The paucity of cattle is due almost entirely to the incredible losses of stock sustained from starvation and different forms of cattle disease. The consumption of their droppings as fuel is due to the impossibility, in some places, or expense, in others, of procuring wood.

Over a great portion of the empire, the mass of the cattle are starved for six weeks every year. The hot winds roar, every green thing has disappeared, no hot weather forage is grown, the last year's fodder has generally been consumed in keeping the well bullocks on their legs during the irrigation of the spring crops, and all the husbandman can do is just to keep his poor brutes alive on the chopped leaves of the few trees and shrubs he has access to, the roots of grass and herbs that he digs out of the edges of fields, and the like.

In good years he just succeeds; in bad years, the weekly ones die of starvation. But then come the rains. Within the week, as though by magic, the burning sands are carpeted with rank luscious herbage, the cattle *will* eat and over-eat, and *millions* die of one form or other of cattle disease, springing out of this starvation, followed by sudden repletion with rank, juicy, immature herbage.

Many years ago, the writer, when advocating the establishment of Veterinary Colleges,* estimated the average annual loss of

* I quote from the memorandum on this subject which I submitted to Government:—

"According to censuses taken in the Punjab, Central Provinces, &c., there is at present in India about one head of horned cattle to every two human beings. This would give us about 100 millions of cattle, worth at the very lowest calculation £75,000,000."

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"It is not too much to say that one-half the whole capitalised wealth of ninety-nine hundredths of the whole population of India is to be found in their cattle; it is not too much, I believe, to assume that the value of this cattle falls little, if at all, short of 75 millions sterling. Hitherto diseases of the most virulent character have raged amidst agricultural stock unchecked,

cattle in India by preventible cattle disease of one form and another, at fully ten million beasts, roughly valued at £7,500,000 and subsequent experience and enquiry has led him to believe that this estimate materially understated the case.

The Indian Climates, varying as these do, appear to be specially favourable to cattle. Every one who has kept cattle here knows that if moderately fed, and given plenty of work and kept away from contagion, they never seem to be sick or sorry, but work on, hardy and healthy, from youth to extreme old age. They are very prolific too. If our poor beasts only had reasonably fair play, the whole empire would swarm with cattle, and cattle able to work the heaviest ploughs, and, in soils and situations where this was necessary or desirable, to plough as deep as you like.

But what can be expected under existing conditions? Annually a rigid Lent, too often merging into actual starvation, followed by a sudden gorging with unwholesome food. The people are keenly alive to the dangers of such alternations, and labour hard to prevent the latter, or they would not keep a single head alive; but despite all their care, their losses are enormous. In bad years, whole provinces are devastated. But a few years

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and almost unknown to and uncared for by the Government. Periodically, plagues and murrains have devastated vast districts, sweeping away the hard-earned savings of millions, and not only depriving them of the means of subsistence, but seriously endangering the food supply of the empire. Are we to accept such calamitous visitations as dispensations of Providence to be acquiesced in humbly, and submitted to as inevitable? The spirit of the present age will permit no such passive submission. Misfortune and disease will and must come; but whether in the case of man or beast, it is for intelligent rulers to struggle against the calamity, and circumscribe, by every effort that science can suggest, the limits of its action. Everything must have a commencement. Sanitation of human beings has been set on foot, and we have now that of their humble but indispensable servants to care for. I expect no great success at first. I look for no *immediately* valuable results. The best trees take longest to grow. All I ask is to be allowed to plant the seed; and I submit that, having regard to the circumstances of the country, it is no unreasonable request to urge a grant of £1,000, and a yearly allowance (for the present) of about half that sum, to secure the establishment of an institution, which, if a success, will pave the way to an efficient system for bringing cattle epidemics by degrees more and more under control, and for introducing throughout the Bengal Presidency improved methods of dealing with stock, both in health and in disease"

This project received Lord Mayo's warmest support; it was, in fact, his own idea worked out by the writer. Before the design could be carried out he was taken from us. His successor promised support. The principal of the first College was nominated, the premises even were taken, and the necessary alterations in them commenced, when the then Viceroy changed his mind, started off the Principal, Mr. J. B. Hallen (*the only* man then in India who could have successfully inaugurated this important work) elsewhere, and "concluded" the project. *Ex uno disce omnes!*

ago more than half the cattle in Oudh were lost during two successive bad seasons.

And be it noted that it is not only the supply of manure that this fearful mortality amongst the cattle, and their resulting paucity, so greatly restricts; it is the little hoarded capital of the peasant, the very mainspring of agriculture in India, that is thus flung away. There is nothing new in all this; everybody in India, Government and people, all know it, after a fashion, but beyond putting a single veterinary surgeon in a couple of provinces to try and train a score of native cow doctors, nothing is done. Nothing ever will be done until there is a special and properly organised department, whose sole business it is to look after it.

Some are cautious: "We must begin gradually," say they; "Rome was not built in a day," &c. Every one knows these nauseating commonplaces by rote.

Well and good, they make their infinitesimally minute beginning, but the moment you desire to go on, there is the cry of expense, "We cannot afford it."

The policy of the Government of India in these matters for the last twenty-five years can only be likened to that of some nobleman, who, with his magnificent palace slowly burning beneath his gaze, first, after much hesitation, allows you to hire a boy with a penny squirt, as a beginning, to prove that water *can* extinguish fire, and then, this simple fact established, directly you urge the hire of a powerful steam fire-engine to take up the work of extinction in earnest, shudders at the expense and will hear nothing further on the subject.

But to return: Prevention is better than cure, and desirable, nay essential, as it will become later to disseminate correct veterinary knowledge amongst Indian agriculturists, and place sound advice on all matters connected with the treatment of cattle in health as well as in disease, within every villager's reach, the first thing clearly is to attack the root of the evil and to mitigate the intensity of those causes to which three-fourths of the mortality amongst Indian cattle are primarily due.

It is the hot-weather privations that have first to be dealt with.

Now, no doubt, it may seem easy to deal with this. European agriculturists will say, "What simpler? Grow sorgho, Guinea grass, &c., &c." and probably twenty years hence, when the Agricultural Department gets a real hold upon the country and the people, and other changes to be hereafter foreshadowed have come about, this *will* be done to a certain extent. But at present the condition of the people is such that it is doubtful whether even the most stringent legislation, worked by the most energetic executive, would secure any such general growth of hot-weather forage as would, taking the country as a whole, materially ameliorate the miserable lot of our cattle.

Fairly good land, and a great deal of it, would be wanted, and the people can't spare this; and irrigation is essential, and this is not at all generally available during the hot weather; and a certain amount of capital would be required, and the people have it not; and the money-lenders would not advance it for a crop of which the greater part was not to come to them direct, *and* it is altogether a *new* thing, such as neither they nor their forefathers ever heard of; and, though in particular localities it might from the very outset be pressed, and perhaps successfully, on some few of the people, it must be many many years before there can be the smallest chance of its general adoption.

But there is one thing that can be done—a thing that is entirely in accord with the traditions of the country—a thing that the people would understand, appreciate, and, with a little judicious pressure, co-operate in, and that is the planting up with trees of a certain sufficient area in *every* village in the drier portions of the country.

The undertaking is a very large one, but presents no insuperable difficulties; it is a gigantic hill to cut away, but it is all earth and no rock, its greatness is purely numerical. There are an immense number of spadesful to be lifted, but the lifting each is perfectly easy. Energy, perseverance, and time are all that is necessary. Once a sufficient area planted in each neighbourhood as a communal forest, and the cattle difficulty is at an end; the forest would be closed till other fodder was consumed and the fields were bare, and then they would be opened to the village herds. In India, wherever you have a closed grove of trees, there spontaneously you have a luxuriant growth of herbage, and at the end of April, even in the hottest and driest parts of Upper India, where the whole country round is as bare as any desert, you will find in preserved groves (such as the more wealthy zemindars often keep for their own cattle and in view to the sale of the grass in neighbouring towns) a mass of hay above and green grass below, that is perfectly astounding.

This is due partly to the rich humus, the result of the decay for many years of fallen twigs and leaves, and partly to the diminished evaporation from the soil protected by the trees.

But with this improved provision of fodder we obtain simultaneously an improved supply of fuel, and an immediate great diminution in the consumption of manure as such. Very few natives will cook with cowdung cakes if they can procure sticks, and it is chiefly for cooking* purposes that fuel is required in India. Moreover, in the wood ashes we have a new useful source of manure.

* Doubtless *chiefly* for cooking, but there is a vast consumption in brick-making, and here the P. W. D. are great sinners. The increase of brick-making, and with it, the consumption of dung as fuel (it being, in most places, cheaper than wood), has been enormous of late years.

Two main questions would have to be considered:—First, how the land is to be obtained; second, how it is to be planted.

For the first, legislation would be required. Recourse to the Act would not be necessary in all cases; a great deal could be done by the influence of the local officials, but the power to act with or without consent must be taken.

In some places, Government has plenty of land of its own which it could plant up, but this is almost exclusively in thinly populated and imperfectly settled tracts where no special action is required. Generally throughout those portions of the empire where this planting up is most urgently required, the Government has little or no land in its own exclusive possession. It is a sleeping partner in *all* the land, but it has made the management over to landholders of one class or another, whom it has taken in as working partners, on condition of receiving certain yearly payments, supposed to be equivalent to half the average profits. Such payments are fixed for longer or shorter periods, and are liable to alteration at the close of these at the pleasure of the Government.

In almost every village, larger or smaller tracts of land are to be found quite good enough for planting up with hardy trees, but yet too poor to be worth cultivating; while besides these there are often considerable tracts of land, which, though culturable, are never cultivated, and bring in nothing to the landholder. Legal authority would be required to set apart portions or the whole* of such lands as communal forests, without any compensation to the landholder, *unless* it appeared that he derived any revenue therefrom, and that in consequence of the action thus taken, his receipts from his estate (technically called the "assets") were reduced below twice the Government rent, or as we call it, revenue.

In nine cases out of ten no compensation would be required, and certainly at first I would only attempt to deal with the nine cases and leave the tenth, in which compensation would be necessary, to stand over till the people had fully realised the enormous advantages of the scheme.

At the first glance it may be thought that what is proposed would involve a serious and indefensible interference with the rights of private property. It may be said: "True, these landholders are not absolute proprietors in the sense that we understand the word in England; their tenures are more like copyholds, subject to periodical enhancement of rents at the will

* Under any circumstances, as this land serves, after a fashion, as a grazing ground, it could rarely be taken up *at once* as a whole. Part would be first planted, and five or six years latter, when the trees in that part were sufficiently large to allow of the admission of cattle, another part would be taken up, and so on.

and pleasure of the real proprietor, the State, but still they have a certain proprietary right, which they can in most places sell and mortgage and bequeath, a right to continue to hold the land undisturbed, so long as they continue to pay the demand which the State from time to time assesses on it."

Clearly we could not take anything that directly helps them to pay this assessment, without a corresponding diminution in this latter; but our primary condition is, that we shall grant this, where this is equitably required, and that we shall at first confine our action to lands which are at present bringing in nothing. And we are not going to take these lands away, nor are we going to derive any direct benefit from them. We are going to convert land, now valueless, into land which will directly and indirectly enrich alike landholder and cultivators; we, in fact, only re-assume control over certain lands (in which, be it remembered, we are partners) because their utilisation in the manner demanded by our interests, the landholders' interests, and the interests of the entire nation, requires an organisation and intelligence that our managing partners cannot command and do not possess.

Looking to all that depends upon the measure, looking to the impossibility of carrying it out without State interference, I do not think that the most ardent advocate for non-interference with private rights would deny that here was a case in which it was not only justifiable, but incumbent, on the State to interfere.

I do not go further into details; every one's ideas on such a subject must be crude until we actually begin to carry out the work in practice. It is to elaborate the practical details of procedure here as in other matters that we require a special organisation.

The land available, it will be necessary to surround it with a good stout mud fence, such as the people now construct around any grove they plant, and the ground inside must be more or less ploughed or broken up, and if the soil be such as to warrant the planting of fruit-trees, such as mangoes, some sort of a well may have to be dug.

I do not hesitate to say that all this the villagers should be required to do, and that power should be taken to order this, and to punish by some trivial fine disobedience of such orders.

This power existing in the background, no competent revenue officer would find the least difficulty in getting all that was necessary done with the entire good will of the people, and at really no cost to them or the State. There are several periods in the year when every cultivator can give half a day's labour daily at no loss to himself, and when, if not helping at the communal enclosure, he would be idling.

And there are no people in the world that can be more easily led by an intelligent superior into combining to carry out a single

work (the benefit of which they understand) under his eye; a few rupees given away and a few sweetmeats would convert the entire business into a sort of festival. Here once let it be clearly understood that the enclosure would be preserved during the cold season, and (after the first five years) thrown open to cattle in the hot season, and every man will appreciate and approve them.

In Mhairwarra, for forest purposes, Government took up *large* reserves. The measure, though necessary, was a very unpopular one. Last year when the country suffered from drought, and the starvation of their cattle stared the people in the face, these reserves were thrown open to them. Forest conservancy was a little thrown back, but the people are no longer opposed to it; on the contrary, they quite appreciate it.

As to *what* should be planted, hardy indigenous trees merely for shade, trees furnishing fruits for men or cattle, in what localities and in what proportions—these are points to be worked out gradually by the Department.

Again, rules will be required to regulate the use and prevent the abuse of these communal forests or groves. A system of management will have to be elaborated, the leading idea of which must be to induce the people to act to the greatest possible extent for themselves. A dozen other details will have to be dealt with, but there is not one single difficulty to be encountered of which we shall not be able to say *solvitur eundo*.

I am quite sure that, looking at the work sketched out, many able and experienced officers will say at first, "It is too vast, it cannot be done." But these same officers would not deny that they could, if vested with the powers above contemplated, make all necessary arrangements and carry out the scheme in, say, a dozen villages. Nor, again, that having done this, they could repeat the operation more readily in another group of hamlets; nor that when thus far advanced, their senior native revenue officers could carry on the work on the same lines in many villages, though some would still require their personal intervention to overcome difficulties. Nor would they deny that one pergunnah completed, the neighbouring ones would be much more easily dealt with, and so on. The truth is the fagot, taken in the lump, *is* rather alarming, but the sticks are all very little, and you have only to pick the fagot to pieces, to make the task a very easy, although a tedious and lengthy, one.

Of course works like these are not to be commenced broadcast or at random. The work would be begun in specially selected localities, and the greatest available strength turned on to these from Revenue, Irrigation, Forest, and Agricultural Departments; and you would begin prudently, not forcing the measure down any one's throat, but talking about it to everyone, and having public meetings (and very effective these are in the

interior of districts if you manage properly) and devoting spec
endeavours to convincing men who, you know, carry weig
locally, and letting it leak out that there will be turbans a
dresses of honour for people who materially aid the progress of t
scheme, and just possibly a C.S.I. or C.I.E. for any one w
carried a large tract of country, and so on. Every one who h
carried a new great measure through a district, such as th
voluntary 1 per cent. subscription to schools was in the old days
knows all about it, and knows that any harmless and beneficia
measure, not opposed to the religious opinions of the people, ca
be carried by patience, perseverance, and tact, if only it be know
that the Government approves and really wishes, and sooner o
later intends, to have it carried.

It may here be noticed that this extensive reboisement, while operating to augment materially the manure supply, to improve the breed and increase the supply of cattle and economise the agricultural capital of the country, cannot fail to exercise a powerful check over the ravages of famine.

How far the increase of trees in level country operates (if at all) to increase the rainfall, is still an open question; but that a tract thickly studded with forests and groves retains the water it receives a great deal longer than one devoid of these, is a matter of everyday experience; and it is certain that widespread and entire failure of crops over enormous areas, such as we have witnessed so often in the last quarter of a century, would have been impossible had cultivation and forest been interlaced throughout them as has been above proposed. There would, no doubt, have been some total failure, and much partial failure, but the intensity of the calamity would, beyond all question, have been much mitigated, and it is quite an open question whether, in some cases, it would not have been altogether averted.

Moreover, it is fair to presume that a considerable proportion of the trees planted will be fruit-trees, the mango for instance, which always fruits most heavily in seasons of drought, and which furnishes a very important, and not unwholesome, supply of food to the people, at the most critical period of years of scarcity.

The enormous increase in the supply of such food that the proposed measure involves would most materially assist the people in tiding over bad seasons on greatly diminished rations of grain.

And in famines, the death of the cattle is almost as disastrous to the State, from a mere utilitarian point of view, as the death of the men, and for the cattle our forests will provide. The cattle will never starve with these wide plantations everywhere, as there are scores of indigenous trees whose foliage furnishes fairly nutritious fodder, and in seasons of great drought the people would be allowed to make the utmost of every leaf.

In many of the tracts where famine has raged, a thorough reboisement, with improvement in cattle, and an abundant supply of manure would admit of deep ploughing, such that, with a large portion of the surface protected by trees, no total failure of the crops *could* result from the failure of a single monsoon.

It is needless, however, to pursue the subject into all its details; my object merely is to convey some general conception of the scheme which, the more it is considered, the more pregnant it will prove of direct and indirect benefits to agriculture in India.

Although all that has been urged in regard to wholesale reboisement is applicable to, perhaps, the major portion of the temporarily settled districts, no one rule holds good, and no one scheme can suffice for the whole of this vast empire. There are regions as large as the British Isles, where no reboisement is requisite, and where altogether different arrangements in regard to supply of manure are needed, where we have chiefly to teach the people more care in collecting it, more care in storing it, resort to available mineral manures, of the value of which they have little or no conception, and the like.

Again, farm-yard manure, though I have laid so much stress on it, as it really contains *everything* that we take out of the land, is not the only organic manure readily available to which the Agricultural Department will have to direct attention. Outside each village is a golgotha, where the bones of all cattle and animals that die whiten and slowly decay in ghastly piles. At present this enormous supply of phosphates is absolutely wasted. Really portable bone-crushers, that could move easily over the sandy village tracks, will have to be devised. These will have to be sent round from village to village, crushing for each community their, at present, useless heaps. The people will have to be taught how, when, in what doses, and for what crops, to administer this powerful fertiliser, and how to increase the rapidity of its action by treating it with sulphuric acid, which latter will have to be *loaned* to them as an advance.

There are districts where it will probably be found necessary to manufacture manures outright, and *advance* them to the cultivators, as any other advance is made, until, their pecuniary value established and a permanent demand created, private enterprise steps in to supply it.

And of course careful analyses of soils (which in India are wonderfully homogeneous over wide areas) would be necessary to indicate with precision the nature of the plant food more especially wanting in each case, whether with reference to a particular soil or a particular crop; but these are among the necessities of scientific agriculture everywhere; there is nothing in regard to them peculiar to India; and, with many other similar matters, they need no special notice here.

Although with diminished mortality and improved condition of cattle, the agricultural capital of the country will be, as time runs on, notably increased, it would be idle to suppose that the generally impoverished condition of the actual cultivators of the soil, almost throughout the empire, will need no other or direct relief.

Wherever we turn we find agriculturists burdened with debts running on at enormous rates of interest. In some districts, even provinces, the evil is all-absorbing—a whole population of paupers hopelessly meshed in the webs of usurers.

No one probably needs to be told that no farmer or cultivator hopelessly in debt, can ever do any justice to himself or his land.

If only on account of our own direct and vital interest in the land, some action is necessary on our parts to limit the progress of and gradually wholly eradicate this plague of indebtedness certainly next to the manure question, there is no other that wil earlier demand the attention of the Agricultural Department.

The subject is so large and complicated, its difficulties so protean, and the remedies required necessarily so liable to vary in relation to each of the almost innumerable combinations of circumstances under which the evil will have to be dealt with, that it is impossible to discuss it at all exhaustively in a sketch like this. Still some indication may be given of the manner in which this indebtedness has come about and of the direction in which a remedy for it should be sought.

A theory is at times gravely maintained, even in India, that the ryot is a thriftless, reckless fellow; that no matter what he gets, he will always spend more than his income; that it matters nothing whether the rent he has to pay is high or low; that he rather likes than otherwise having a balance *against* him at his banker's; and that do what one will, he *will* always be in debt.

Nothing can convey a more thoroughly and utterly false conception of our agriculturists as a body.

That these, in common with the entire population, high and low, do, in accordance with immemorial custom,* spend a great deal more upon marriages than according to *English* ideas any similarly circumstanced sane man ought to or would, may be at once admitted.

Any real, vigorous, and persistent action† to check this common form of extravagance, taken under sound native advice, would be a real blessing to the country. But, after all, this is the

* In most parts of India custom is still, be it remembered, where social matters are concerned, an iron, all-embracing, law.

† Hitherto, as in most other matters in India, there has been a vast amount of "cry," and the smallest possible amount of "wool." Every now and then the question crops up, a great deal of talk ensues, nothing effective is *done*, and the matter drops.

poor fellow's only extravagance; these are almost the only white days in his dull-coloured life of toil and pinching, and unless he is singularly blessed (or unblest?) there are not many of them, and for the rest, a more careful frugal being is not to be found on earth.

He hates debt; he hates the usurer's name; let any stroke of luck befal him, and see how soon the monstrous account against him is settled. This is not the case merely with individuals, the population of whole provinces (like Guzerat and Berar, owing to the abnormal profits from cotton during the American war) have similarly cleared themselves.

Fools are scarce nowhere, but only show our ryots how to free themselves from the toils of the moneylender and how to keep out of his books, and none need fear that the great mass of them will long remain plunged in their present comparative misery; for misery of a kind it is.

A very happy natured, contented race, as a whole, are our village husbandmen, and they have their little amusements and festivals, and when harvests are very good, pretty much all that, with their simple habits, they need. The picture is not all black, or how could we or any one hold the country? But withal their lives are *very* hard and toilsome, and through it all too many are pressed with debt. Good crops ease the pain a little, and the village merry-making brings a temporary forgetfulness, but the sore is always there, and except in very good seasons multitudes for months in every year cannot get sufficient food for themselves and their families. They are not starving, but they are hungry, they get less than they want and than they ought to have.

No doubt they make the best of it, and keep cheerful under pressure that would crush men of more advanced races, but this very child-like nature involves dangers, and we may see from the Deccan riots and sporadic cases occurring constantly everywhere, that quite independent of the necessities of agricultural reform, and quite apart from the duty of ameliorating a lot on the whole so unenviable, cogent political reasons exist for grappling with this growing evil of indebtedness.

Much has been said about tenures in connection with this matter, and many have ascribed the origin of the present depressed condition of the peasantry to mistakes perpetrated in regard to these.

No doubt many errors have been here committed, and no doubt, other things being as they are, these have powerfully contributed to bring about the present lamentable state of affairs. But the root of the evil is not here, and but for other and utterly distinct mistakes, these errors, though involving in some cases injustice or hardship to individuals, would have brought abou no general indebtedness of the agricultural classes.

It has already been remarked that we have wasted on an elaborate, cumbrous, and unsuitable system of civil jurisprudence money that ought to have been employed in improving our agriculture and increasing the material comforts of the masses; it may now be added that the system on which it was expended has been the chief and direct cause of the major portion of the indebtedness and impoverishment of our agriculturists.

Errors as to tenures; forcing proprietary rights upon people incapable of appreciating or understanding them; forcing upon districts where one system of landholding was indigenous a wholly different, exotic, and therefore unsuitable one; the want of elasticity in our system of realising the revenue; unlimited subdivision of holdings, and a dozen other causes, may be indicated as having, *our courts being as they are*, contributed to it, but these courts themselves are the *fons et origo* of the evil, and had they been the simple summary courts of equity and not of law, which was all the state of the country demanded, all these other causes would have smouldered on almost innocuously.

It is necessary to realise the radical changes that our courts and revenue systems combined have wrought in the position of our agriculturists.

Previous to our rule no private person had, broadly speaking, any property in the soil.* All proprietary right, in the sense in which we at home understand the word, vested directly in the State or vicariously in some powerful chief or official. All that the people as a body enjoyed were a high class of occupancy rights, heritable but not transferable.

A man might be ever so much in debt, but you could not interfere with the land he held, for that was not his, but his ruler's; and such rights as he possessed therein were personal to himself and family, or, in some cases, clan; and if any outsider had obtained possession, the State would have stepped in and resumed the property. No doubt, if sufficiently bribed, the local officials would, and often did, wink at transfers, but these were opposed alike to custom and tradition which then constituted the law, such as it was, on this subject.

There was, therefore, in those days no great inducement to money-lenders to advance money to landholders or cultivators of any degree, still less was it their interest to tempt those to take money, which they really did not want, in order to make an extra display at a wedding or a durbar.

They lent money, but only at enormous rates of interest; but this was not unfair, as they never hoped even to recover

* We must perhaps except lands given to Brahmins, saints, &c. for temple, mosque, or other religious or charitable purposes; but even these were, properly speaking, inalienable.

the principal, while for such interest as they were to get (a widely different thing to what was written in the bond) they were dependent on the good will of their debtor, or the rare, paternal interference of some superior, who, appealed to with suitable presents, would say, "Come, Rambuksh, you owe the Sahoo Sahib a lot of money, and you have paid him nothing for two years; you just satisfy him by some proper payment on account, or it will not be well for you."

And even such interference was rarely needed, for the people are naturally very honest; the creditor had no object in cheating, because he could, as a rule, only expect to get what he could convince his debtor was justly due, while as for the debtor, though he had no intention of paying off his creditor, whose debt was perhaps six generations old, and who moreover never expected this, still neither had he any objection to make, from year to year, such payments on account as he could afford and as according to custom (everything was custom in those days) were fair and right.

It was a point of honour with him, and the natives of India had a very keen sense of honour; they saw many things from a different point of view to what we do, but they kept, I think, as a whole, closer to their standard than we as a nation have ever kept to ours.

It was almost a point of honour with them to defraud the State, to make false statements to superiors, &c., just as it used to be for boys to rob their master's garden, and mislead him whenever possible; but it would have been as base in their eyes to cheat or bilk their friend, the family banker, as it would have been for the schoolboy to steal from one of his own companions.

So there was debt in those days too, but it hurt nobody; the banker got his annuity so long as things went well, and even if in bad times he got little or nothing, he knew that there were always strong arms and sharp swords, ready to defend him if things went wrong with *him*; each party was dependent more or less on the good offices of the other, and so far from being enemies they were friends, bound together by the remembrance of many acts of mutual kindness, and if by chance they could not agree,—and men, though both honest and well meaning, will at times fall out and differ,—they called in a party of respectable neighbours and friends (whose intervention only cost a good dinner) who heard all both had to say, effected a wise compromise, and settled the matter. There was no appeal; the brotherhood, or mixed jury, as the case might be, had spoken and the matter was at an end.

But with the enlightened rule of the British Government all this was to cease. Brimful of philanthropy, we could not let well alone, or indeed believe that anything could be well

for others, which was not in accordance with what we thought good for ourselves. With our innovations, our exotic systems of land and law, we have dissolved the bonds of society, we have turned peace into war, we have arrayed every class against that on which it was most dependent, capitalists against landholders, landlords against tenants, every man almost against his fellow.

There is not, I believe, a single wise and good native of India who will not freely admit that, whatever the failings and shortcomings of individual officers, the motives and intentions of the British Government, where India is concerned, have, on the whole been, pure and noble. But I fear that there is not one who would not condemn, in terms stronger than I have the heart to use, the cruel blunders into which our narrow-minded, though wholly benevolent, desire to reproduce England in India has led us.

We began by conferring proprietary rights (the poor people, no ownership in the soil, mere serfs!) or, where as in Bombay we stopped short of this, we gave additional strength to occupancy rights, and made these transferable. Every one knows the European arguments about enhancing the value of rights by making them transferable. Such a great thing to enable them to be brought into the market! Buying and selling, as a wise writer once said, is an Englishman's idea of Paradise, and in the most unselfish spirit we desired to introduce our native fellow-subjects into this same Paradise.

No one saw that the people were on the whole happy and contented as they were, that their past sufferings, where they had suffered, were due not to any defects in their position or rights as established by custom, but to those rights having been ignored, and that custom having been over-ridden.

No one seems to have realised that the tenures of a country are the outcome of its whole past history, ever, as time rolled on, adjusting themselves to the varying conditions and relations of the different classes of the community. That they must necessarily, therefore, be under the circumstances, those best suited to the country; that though they may require change as these conditions and relations vary, it must be

"Change that broadens slowly down from precedent to precedent,"

and that any sudden and arbitrary, externally imposed, change must, however noble the impulse that prompted it, involve new and necessarily unsuitable combinations.

Human institutions to be healthy must grow where they are to stand.

Not so reasoned our predecessors. They gave a new value to the land, by rigidly limiting their demand on the soil—a good thing, quite in accordance with the people's ideas of what a good

prince should do,—and they conferred partial proprietary rights (which no one wanted or appreciated) wholesale, and they made all the rights they created or acknowledged in the soil transferable.

Up to our time such rights as existed were entailed in the strictest fashion; creditors could not get hold of the land, even during the lifetime of the debtor. We raised the character of the rights, but cut off the entail without the consent of the heirs.

At first this did no great harm. Nobody understood the change, our people then were no lawyers, courts were few, and administered simple justice according to equity and good conscience, and the majority of civil disputes continued to be settled by people amongst themselves in the old fashion.

But as times passed on new and new laws were continually made, and courts were multiplied and gradually modified into courts of law, where justice sat fettered by codes, and whence equity and good conscience had been banished for contempt of court, and a swarm of professional pleaders (good and bad, but specially the latter) spread over the length and breadth of the land, and village verdicts ceased to carry weight, and in the simplest matter, which formerly would have been settled on his own village platform by his own brethren and elders, and rightly settled in an hour, a man now had to put up with wrong, or walk twenty miles to court, and fee pleaders, and waste a week or more, and many weeks' earnings, and all as often as not merely to see the wrong triumph. Or, if successful, to be dragged yet another fifty miles, on appeal to a higher court, where there were even more expensive pleaders to fee, and more time and money to waste, dangling about the court-house steps or compound, dogged by peons and emissaries of the underpaid native subordinate officials, all threatening loss of his case, unless he bribed, bribed, bribed. And if he,—*O fortunatus nimium*,—gained his case here too, and prepared to start for his neglected fields, a half-ruined and yet partly happy man, (for natives acquire a passion for litigation, just as Europeans do for drink or gambling,) lo and behold, a second or special appeal on some miserable quibble of law, evolved out of clumsily drawn statutes, and he is dragged away yet another one, two, or three hundred miles to the provincial capital, where, after wasting months, and spending all he had with him or could borrow in fees to lawyers and bribes to hangers-on of the courts, he, as likely as not, finally loses his case. Constituted as our civil courts are, the chances on each hearing do not preponderate largely in favour of real justice being done. What exactly the chances are of this happy event occurring three successive times in one case, I leave those, who make "the odds" their study, to calculate.

Winning or losing, he often returns utterly demoralised to his home; he has heard all the pleadings; quibbles and fictions on his side, quibbles and fictions on the other side; and he has listened to many other cases besides his own, and has been impressed with the fact that, on the whole, *dis*honesty is the best policy, and henceforth this conviction shapes his dealings with his banker and his neighbours. His banker on his part is in no way behind his debtor; indeed, having necessarily more to do with the courts, he earlier, as a rule, became a convert to the gospel of fraud; and the temptation to him was immense, for lands are saleable now, and the impossible rates of old bonds entered as a matter of form, when no one dreamt of repaying capital, are now enforcible, and the principal can be recovered too, and every landholder of every degree can be sold up out of house and home.

And perhaps our man is sold up, and the banker buys his land, and takes possession, and then—now and then the inherent love of his ancestral lands, his strongest passion, is too strong for the poor homeless wretch, and one evening in the dusk, when the unwary usurer, who has paid a visit to the village to see his new purchase, is wending his way homewards, there is a rush and the heavy thuds of a club, and the gallows ends the tragedy which our blundering philanthropy has so elaborately prepared.

And similarly, be it noticed, though it is a digression, that our laws and courts have set landlord against tenants, and converted too many of both classes into sad rogues. In the old days there was no talk of tenants-at-will, and tenants with occupancy rights, and so on. No doubt every landholder, where such really existed, *could* evict any tenants he chose, and if a man seduced his neighbour's wife (they were poor ignorant creatures), or otherwise insulted or offended the community, evicted he was, but custom barred, and far more effectively than any British law or court, any arbitrary exercise of this power, and the landlord who might any day have to defend his Penates against a Maratha inroad, an imperial functionary, or a band of dacoits, was obliged to keep good friends on the whole with the mass of his cultivators, on whose strong arms the safety of his property and the honour of his house might, at any moment, become dependent.

Both classes here, again, were bound together by ties of mutual obligation and inter-dependence, but we, with our ill-starred mania for exact systems of law, have dissolved the bonds, and have converted into antagonists the two great classes on whose harmonious co-operation not only their own welfare, but in many parts of the country the progress of our land revenue, so materially depends.

Let others write panegyrics on those who "first planted the seeds of a civilised system of jurisprudence in India": I, looking

sadly now on the Upas tree that has crowned their labours, can only say:—

> Ille et nefasto te posuit die,
> Quicunque primum, et sacrilegâ manu,
> Produxit, arbos, in nepotum
> Perniciem, *opprobriumque pagi!*

No doubt it may startle some to propose that we should in these respects retrace our steps, and, eschewing the highly seasoned and artistic messes of civilisation, revert to the simple fruit and herbs of our unenlightened predecessors.

But the case stands thus:—The country is on the high road to bankruptcy: sudden and arbitrary reductions in all directions, not impossibly really wasting more money than they seem to save, will of course be resorted to, and a nominal equilibrium restored for a while.

No such measures, however, can restore the finances of a growing country to a healthy condition any more than cutting off strips from the ends of the legs to let in as gussets into the seat, is calculated to place the trousers of the growing boy in a permanently satisfactory condition.

He is bound to outgrow them, and the country is bound to outgrow the existing revenue, snip and patch, botch, and tinker as you will.

The only source from which you can derive that large increase of revenue which the empire must have hereafter if it is to continue to flourish, or even exist, is the land; and from the land this increase is not to be got so long as throughout wide provinces all classes of agriculturists are crippled by poverty and debt.

Some parts of the country are comparatively free from this blight. No measures that we decide to take need be universal in their application. In no two provinces, probably, would the remedy take precisely the same form, but broadly speaking, what is necessary wherever this disease has gained much ground, is to remove all cases connected with the money and grain transactions of agriculturists as such* from the cognisance of the regular courts, and secure the adjustment of all these by local tribunals.

Natives of known probity and fair intelligence (and in every province there are thousands of these, ignorant enough of law, but thoroughly able to settle fairly a money question between two other natives, when they have the real facts before them), such natives, we say, would be selected, many no doubt from our

* Perhaps one in a thousand agriculturists is a trader as well as an agriculturist. With these and their trade transactions we need not concern ourselves.

huge revenue establishments, and sent as judges, from village to village, to settle up, with the aid of the village elders, every case of debt of the kind referred to, in which any one of its inhabitants was concerned.

These judges would be fettered by no codes and no forms of procedure, and they would hear both parties' stories, *coram populo*, on the village platform of the debtor's own village. It is needless to tell any one who knows the country that while, when you get him into court, no witness seems to be *able* to tell the truth, on his own village platform, surrounded by his neighbours, no villager in personal questions like these seems able to tell an untruth. Everybody knows everybody else's affairs; let the speaker deviate perceptibly from the *facts*, and immediately out go tongues all round, and jeers and cries of "Wah,"* "Wah," remind him that he is *not* in court, and that that kind of thing will not go down at home.

The decisions thus passed would be final. Very likely some few of them would not be quite correct according to our ideas, but that signifies little; they would embody simple justice according to native ideas, and that is all we want; and even though a fraction did not do full justice according to even native ideas, we must accept some drawbacks in every arrangement, and, as every native says, better half justice at once than full justice after long delay and expensive litigation. Above all, even if in a few cases a partial failure of justice resulted, they would be absolutely insignificant in number as compared with those in which, under our present system, the failure is total.

Common sense would be the judge's sole guide. He would consider the merits of the case, the sum originally advanced, the payments made on account, the ordinary profits in regular (as opposed to speculative) trade in the neighbourhood, and either declare the debt discharged, or fix the amount still fairly due, and the interest, if any, thenceforth payable.

All this is in favour of the agriculturist; but, the decree given, the capitalist would no longer have to spend and spend, and petition and petition, to get it executed. The decree would be made over to the head revenue official* of the jurisdiction, whose duty it would be to see it realised, as an arrear of land revenue, as rapidly as was consistent with not ruining the debtor, without the money-lender taking any further trouble about the matter.

In some localities the state of the people is such that it would be desirable to set perhaps a hundred such judges to work for three months in a single district, assigning to each a circle of from ten to twenty villages according to population, and requiring the judges to adjust every such matter pending

* *Tahsildar* (Upper India); *Mookteearkar* (Sindh); *Mamlutdar* (Bombay), &c.

in each village, and voiding all claims not laid before them for adjustment. In other districts, again, one such judge for each pergunnah, tuppah, or other convenient local subdivision, or even one such for each thasil or other local revenue circle would suffice, and it might not be necessary here to void claims not presented, but only to empower the judge to decide all cases brought before them by *either* party.

In many districts no immediate action seems called for, and most of those in which it is needed would be found to present minor peculiarities, requiring a corresponding adjustment of details. In some cases it would only be necessary to deal with the indebtedness of the landholders, in others only with that of the cultivators; while in some all classes of agriculturists need protection. All this would be for the decision of the local administrations in consultation with their revenue and agricultural officers; all that it is here pretended to give, is the cloth; if it is to wear well the coat must be carefully fitted in every instance.

The broad principles are, that whenever and wherever agricultural progress, on which the future welfare of the empire must, in a great measure, depend, is impeded or rendered impossible by the indebtedness of any or all classes of agriculturists, all questions connected with such indebtedness shall be removed from the cognisance of the civil courts, and their summary and final adjustment provided for by the instrumentality of respectable native judges versed in rural affairs, aided, but not governed, by the advice of the local elders in the village where the debtor resides; no fees of any kind to be paid; no stamps to be required; no pleaders or lawyers to be allowed to take any part in the transactions; decisions to be given effect to (equally without charge) by the revenue officials of the circle as speedily as is consistent with not ruining the debtor, and these officials to possess, in regard to amounts decreed, the same powers that they do in regard to arrears of land revenue. Adjustments once effected, arrangements to be made, either by the retention of a limited number of these rural judges or by other measures, to prevent a relapse.

It must be freely admitted that, under the proposed system, something like two-thirds of the existing total claims against agriculturists will probably be disallowed. In former days, when relations between money-lenders and agriculturists were less strained than they have now become in many places, the writer, taking advantage of his position and influence as district officer, has, as arbitrator, disposed, with the consent of both parties, of hundreds of such cases, precisely as he now proposes that the rural judges should be *empowered* to dispose of them.

Every case varies, and naturally some money-lenders are

more honest, others more usurious; but it is believed that, taking a large series of such claims, it might be broadly asserted that, out of the sum total claimed, one-third was fairly due, one-third fairly enough put on to compensate for the uncertainties and intolerable delays and expenses (licit and illicit) of our courts, and that one-third was an inequitable charge due to exorbitant interest and compound interest.*

It would appear, therefore, that the proposed measure would be a great blow to the capitalist class, and that there might be danger, existing debts once cleared, of the money-lenders refusing to make new advances.

In the first place, once the people were fairly out of debt much fewer advances would be required, and the majority of these would not be to *save* ancestral holdings, but only to improve them; advances always more readily obtainable and at easier rates, because often made by classes of capitalists who will not deal with nearly ruined men.

In the second place, the native mofussil capital employed in usury is believed to be more than three-fold that employed in trade. By no possible means could the amount of the latter be more than doubled for many years, so that for a long time two-thirds at least of the capital now employed in money-lending in the mofussil *must* continue to be so employed.

In the third place, as a matter of fact (and this assertion is based on the repeated assertions of scores of village bankers in the Doab), many money-lenders would be perfectly content to have all their money out in agricultural advances at nine per cent. *if* they might make these at the village platform, before the rural judge, without going near any other court, without any bonds or stamps, and could then look for the recovery of any items not voluntarily repaid, to the revenue officers of the circle, and they would gladly let Government keep half per cent. of all it realised for them (and this would more than cover any expense incurred), and accept such slight losses as might prove inevitable.

It is necessary here to explain that losses, under such circumstances, would be rare in the extreme. Aside from the fatal lotteries of the civil courts, and dealt with in his own village, the Indian peasant is very honest, and he is still a great respecter of authority. Only death could prevent ninety-nine hundredths of our rural population paying a debt fairly incurred, on which a reasonable rate of interest was charged, and which they understood that the authorities required them to pay. And in the event of death, in nine cases out of ten, the heirs and representatives of the deceased who take up his land, would be quite as ready to take up

* 24 to 30 per cent. are not at all unheard-of rates.

the debt as if it were their own, and anyhow whoever took the land would have to take up the debt. In estates under the Court of Wards, not leased out but managed direct by revenue officials, large sums are often given out as advances, and again recovered to the uttermost fraction. Or when some loss is sustained by men dying, or others whose cattle have died, and whose crops have failed absconding,* this under good management is small.

Nor is it even *necessary*, though it is desirable, that there should be authority behind to sanction the debt. A gentleman, many years a planter in a district of which the writer had charge for a decade, remarked to him, speaking of cultivators:—

"Deal with them wisely and fairly, and there is no difficulty. I give out large advances every year. I have never had a suit in *any* court with any ryot, and I have never lost any money worth speaking of. Misfortunes will happen, and you may have to wait and to do what sometimes looks like throwing good money after bad, but give them *time* and they will pay, if they feel you have always been on the square with them."

It may safely be asserted that it rests merely with us to redeem our people from the slavery of debt, and to ensure them a continuance of the enjoyment of the major portion of the capital hitherto available to them, and on *incomparably* easier and more satisfactory terms.

But it is conceivable that in some particular locality there might be a temporary *strike* of the moneylenders, and it is not only conceivable, but certain, that in some localities the Agricultural Department will find that the capital theretofore there available is wholly inadequate for the efficient working of the land.

So most certainly it is necessary to foresee the probability in *some* instances of Government having itself temporarily to undertake the duty of making advances.

Here it will perhaps be said that the system has already been tried and has failed. As a matter of fact, no real trial has ever been made, and it is, humanly speaking, certain that any properly made trial must succeed.

What has been done two or three times is this: Some district officer, already burthened with absolutely innumerable other duties answerable to from twelve to twenty different superiors, each worrying his life out about his own section of the administration, has yet seen what was wanted and has asked permission to make

* As a rule it is *bad* management when men abscond. It is from fright they do so; they know they owe money: they find themselves, by some calamity, beggars; they do not know what the consequences may be, and they run away. Many a time, in wards' estates, have I sent some relative with a few rupees to reassure and bring such men back, and many a time have I known others, who could not be traced, come back two, three, four, years later, with their whole debt, earned elsewhere, in their hands.

advances. This has been accorded on a small scale, too small to pay its way, but still calculated to be of some use as an experiment. A beginning has been made, in one instance that I can recall in Oudh, on marvellously good lines, considering that the responsible officer had no time to give to the matter. Still his heart was in it, and at first something seemed to be coming of it. Long before any conclusion could be formed, the father of the scheme falls sick, or is promoted, or is transferred, and a new man comes who cares for none of these things; how many amongst us care to be bothered with other folks' trouble-giving children? Of course the scheme dies away.

Naturally I contemplate no such half-hearted peddling arrangements. The advances must be on a scale to pay for their administration, and the officer who makes them must have these and nothing else to attend to; it must be by these he makes or mars his reputation, stands or falls.

The agriculturist can well afford to pay nine per cent. for any money he wants. It is to him what money at three per cent. would be to a farmer at home.

With no courts, no stamps, no bonds, nine per cent. will, if work is done on a considerable scale, pay all expenses of management, all *losses*, and return at least a clear six per cent.

It is not even possible that Government should have to undertake this business generally; it will only be in some special localities that its intervention will be needed. Nor is it contemplated that it should anywhere *permanently* carry it on; there are political objections to an alien Government becoming the universal creditor. Men are but men, and when the debt grew burthensome and hard to be repaid, there might be a tendency to seize the sponge of rebellion and wipe out the foreign creditor. And, indeed, even from the first it is probable that much of the capital required for these rural banks could be obtained locally from natives on a guarantee of six per cent., the money only to be called for as required, and to be repayable at any time. Great native bankers even have repeatedly assured the writer, that when money was perfectly safe, and there was no chance of courts or other trouble, they were well satisfied to have a portion of their money out at six per cent. And by a little tact in dealing with the subscribers, utilising their local knowledge, giving them a sort of voice in the management of affairs, and so paving the way for it, there is no doubt that after a time Government would be able to drop out of these rural banks, leaving them in the hands of partners or associations, and retaining no responsibility except for keeping up the rural judges, before whom the advances would be made, and who would settle disputes about them, (and once the system was in force there would be few of these), and for giving effect, as above described, to the judge's decisions.

But we must not pursue further this inexhaustible subject; suffice it if we have conveyed some idea of the more prominent features of this great obstacle to agricultural reform, and have afforded some indication of the direction in which remedies may be sought.

There is another large, and in Upper India very pressing, question which *must* have the early attention of the Agricultural Department. We have already described the progress and explained the inevitable future results of that insidious saline efflorescence known locally as "*reh*." No one can doubt that one of two measures is essential—either give up all hopes of making canals pay, and only allow irrigation, in localities where the soil is favourable to the formation of this pest, once or twice in every ten or eleven years, in other words, in seasons of severe drought, or lower the level of your head of water, reduce your subsoil water level, allow only irrigation by lift and none by flow, and have recourse to subsoil drainage.

So little is generally understood of the natural properties of soils that here in India, at any rate, two strong objections are often raised to subsoil drainage:—

1*st*.—That the soils are poor enough and light enough as they are, and that to encourage the water to run through them as a sieve, would in two or three years ensure all "the goodness" being washed out of them.

2*nd*.—That where "*reh*" is concerned, all subsoil drainage could do would be to draw into the soil what is now on the surface, and make matters worse.

The answer, as all agriculturists know, is complete. Without trenching on debateable ground, and avoiding the details of this very difficult question, it may be stated that, so far from water passing through the soil being able to wash out of it "the goodness," the soil exercises the most powerful attraction over the food constituents of plants, and not only retains those existing in it but seizes these out of solutions passing through it. Thus phosphoric acid, potash, ammonia, and (except in soils very poor in lime) silicic acid, the most important of the food elements, obtained from the soil, cannot normally be washed out of it by any amount of subsoil drainage; on the contrary, the soil acts like a filter to arrest these and decomposes solutions containing these which pass through it in order to retain them.

Of course there are limitations, most prominent amongst which is the fact that for each soil there seems to be a point of saturation, if we may use the word, of each food constituent; up to that point the soil seizes all it can get of that element; beyond that point it allows it to pass away in solution. Nothing is more greedily seized by most soils than potash, but you may get bog-earths that allow potash solutions to pass through them untouched.

Of course, you may raise the point of saturation for any element by adding more of some other element, but this is in effect changing the soil. For *each* soil the point of saturation for each food constituent is liable to vary.

Other minerals, not useful to plant-life, pass freely in solution through the soil, and food constituents even, when by the chemistry of the soil they have assumed forms useless as the food of plants, or forms of which there is already a full supply, pass away. So while by subsoil drainage our soils will lose* no appreciable percentage of plant food not already stored therein up to their maximum retention capacity, all the excess salts now lying thick on the surface will be redissolved, carried down through the soil, so far as needed, decomposed therein, all useful portions retained which are necessary to make up the full capital stock that the particular soil can hold, and the excess together with useless or injurious matter passed away with the drainage water.

Varying as does the composition of this always complex saline efflorescence, in different localities† very different additions to the soil, organic or mineral, may be necessary to enable it to seize the maximum share of the utilisable portions of the "*reh*" when by subsoil drainage it is filtered downwards.

All these are details which must be worked out by experiment on scientific principles; the broad truth remains that save under for India, exceptional circumstances, the only practicable mode of purifying land now sterilised by this "*reh*," or protecting land in course of being so sterilised, is by passing the excess of saline matters away by subsoil drainage.

It is needless to add that, independent of this special evil subsoil drainage, and the deep working and oxidization of the soi that it involves, by multiplying many fold the area of storag of moisture and food constituents available to the crops, mus in the case of many‡ soils exercise a most powerful influence i controlling the ravages of drought.

The great difficulty with us, where subsoil drainage is most required, is to obtain a suitable outfall, but this again, like so

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* In solution, of course, is meant; *mechanically*, anything may, by bad arrangements, be *swept* away.

† Lime, soda, potassium, magnesia, as carbonates, chloride, sulphates, nitrites, and nitrates, all *occur*, but the soda salts are usually the chief constituents, and the nitrites and nitrates are scarce.

‡ In the preceding remarks I have endeavoured to avoid putting forward partial as absolute truths. Yet I feel that even now there is scarcely a sentence that does not require further limitations and qualifications to make it *accurate*; but how is it possible to convey in a couple of pages *truly* accurate ideas on such subjects? A general, if rather hazy, bird's-eye view, neglecting all but the most prominent features, is all that can be hoped for.

many of the points touched on in the foregoing remarks, is just one of those questions that we require an Agricultural Department to thresh out thoroughly.

Innumerable other minor matters naturally suggest themselves as falling within the scope of the Agricultural Department.

One not unimportant point is economy in seed grain. It is astonishing what an enormous amount of grain is wasted in most parts of the country in over-seeding, the result being a poorer and lighter crop than if one-third of the quantity had been used as seed. It ought not to be difficult to bring this gradually home to the minds of the masses.

The unquestionable improvement in the size, strength, and condition of the major portion of the cattle when relieved of the cruel yearly fast which now so certainly dwarfs the young, and injures permanently the stamina of the adults, has been already alluded to. Few realise how great this *improvement* would be; the writer has out of pure pity taken almost moribund calves out of skeleton herds, to turn them out, three or four years later, double the weight and almost half as big again as any adult in the herd from which they sprung. Ensure the existing herds sufficient food all the year round for a dozen years, and the whole aspect of our cattle will have changed. But it is not therefore contended that much besides this may not be done to improve the breed in many places by an infusion of a superior strain. On the contrary, there is no question that this will have to be done. There are whole provinces in which the climate is less favourable to cattle than that of others, and where the constant infusion of new blood will be necessary to maintain a fine breed. There are limited tracts again where the cattle are perhaps, for the purposes for which we require them, second to none in the world, and clearly the diffusion of these fine strains will become a necessity later. And perhaps the Agricultural Department may improve on these even by judicious crossing.

It must here, however, be noticed, for the mistake is often made, that the last cross we require is with prize English cattle. At home they have for generations bred for meat and milk. We want to breed for work.

If existing domestic breeds do not suffice (and they are very numerous and some of them very fine), then further efforts should be made to obtain crosses from the magnificent indigenous wild stocks (the Gaur and the Mithun, *Bos gaurus* and *Bos frontalis*), grand beasts that stand seventeen hands high, whose rush is like that of a broad-gauge express, and who yet scamper over rocks and ravines almost like goats.

Greater cleanliness in harvesting, and greater care in

separating grains * and seeds intended for or likely to reach foreign markets, would probably do much to improve the demand for our agricultural products, and doubtless some endeavours will be made by the Agricultural Department to impress this on the people, both by precept and by example at their own farms, but this is typical of a whole class of reforms, on which it is needless to touch, as they must mainly be brought about by private enterprise and by the pressure of purchasers. Could we only secure a fairly steady and moderately large export trade in wheat and barley, for instance, there is no doubt that in a very few years the better prices given by the purchasing agents of exporting firms would effect a complete change in the existing slovenly practices, but unfortunately it would seem that, at any rate until the more easily accessible virgin lands of Western America are more or less exhausted (and they do appear to be exhausting these in a wickedly wasteful manner), it will only be under favour of bad seasons elsewhere, or of wars interfering with the natural course of trade, that our wheat is likely to find a wide European market.†

Again, as typical of another class of duties which the Department would undertake, but of which little need here be said (so obviously do they fall within its province) may be instanced, the improvement of staples, both by disseminating the better existing indigenous varieties in tracts where now only inferior ones are cultivated, and by further improving the best existing sorts by selection‡ and careful cultivation.

But among the secondary objects of the Department, not perhaps so obvious, may certainly be mentioned the improvement of agricultural implements and mechanical appliances. The magnificent mechanical developments of European scientific agriculture are, and will for many generations probably remain,

* It is not merely that grains of two species should not be muddled up together as now, but that the different qualities of each grain, *e. g.* red and white, soft and hard wheat, and the like, should be kept distinct.

† It has, however, been asserted that a great deal of this wheat has been put into the European market below its cost price, having been carried in America at nominal rates in consequence of certain railway combinations. In the absence of particulars, it is impossible to say whether this can appreciably affect our future trade.

‡ The word "selection" is here used in its widest sense, and is not intended only to signify the picking out for seed purposes the biggest grains out of the finest ears and the like. It is meant to include the careful study of varieties, with reference to local conditions, and the further development of peculiarities which in any locality tend to diminish the chance of the failure of the crop or increase its probable yield. Take, for instance, the Long-husked Giant Millet (or *Chuncha Jowari*), which is even now almost proof against the attacks of crows, mainas, and the like, and which a very slight further development of its peculiarity would render absolute proof against all birds but parroquets.

utterly unsuited to Indian requirements. On the other hand, the indigenous appliances that here do duty for these, are of the crudest and most inefficient character. Improvements in these are urgently called for, but they have yet to be created, and this not by the bodily importation of the results achieved by science in Europe, but by the application of the principles on which those results are based to the widely different conditions and requirements of this country. Of these, the people who pester Government to purchase grand combined steam ploughing, reaping and threshing machines for the ryots here, seem to have about as accurate a conception as a certain Maharajah, who was with difficulty dissuaded from sending home an elephant to an old pensioner at Bayswater (who complained of being no longer able to get about on foot and being too poor to keep a conveyance), had of those of our London suburbs.

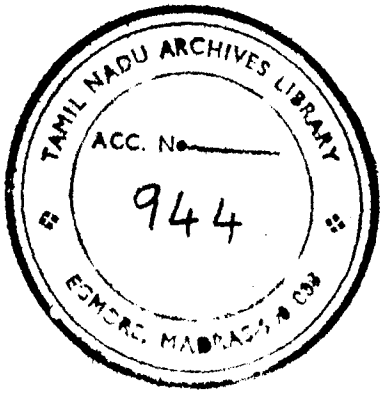
Perhaps next to ploughs, in regard to which Mr. Buck has already done something (and if we had half a dozen provincial Directors, each aided by proper mechanical engineers, and each improving on the improvements of his neighbours, we should soon get the very thing wanted), next we say to ploughs, no mechanical appliances will more emphatically demand the study of the Department than those for raising water by wind-power. Assuming, as we may, that as the Agricultural Department obtains a real hold upon the country, high-level canals rendering subsoil drainage impossible, and involving the gradual sterilisation of the soil, wherever this is at all appreciably impregnated with saline substances, will become things of the past, and assuming, too, that irrigation on a rational system will be largely developed, the importance of cheap and efficient contrivances for raising water becomes obvious.

And for cheapness, in a country like India where, over whole provinces, winds blow with almost the regularity of clockwork, probably no motive power could compare with that of wind.

At present a gigantic wind-power (second only to the equally unutilised sun-ray power) is running to waste, utterly uncared for over the whole empire, and any successful application of this to the purposes of irrigation would inaugurate a new era in the history of Indian Agriculture.

But it never was intended in this paper to enter into details like these, or to attempt even in the most preliminary fashion an exhaustive sketch of the work which lies before a real working Department of Agriculture in India. On the contrary, although we may even now form certain general conceptions of some of the problems awaiting its investigations, it will not be until years after its establishment that the Department itself will be in a position to set out the majority of these problems with that precision and fulness which is essential to any scientific method of solution.

After all, despite the attempts that have been made in this paper to give a somewhat more definite, and to the ordinary mind, more satisfactory reply, the best answer to the question—"For what do we need an Agricultural Department in India?"—must still remain,—firstly, to ascertain *precisely* what reforms are essential in our existing agriculture, as practised in various parts of the empire; secondly, to work out systematically the best methods of carrying through these reforms.



APPENDIX.

NOTE A.

(Extract from an unpublished Memoir on the Agriculture of the Duáb, written in 1859-60.)

SEASONS.

Our European calendar year, which is based on the true tropical year, or the interval between two successive arrivals of the sun at the vernal equinox, provides for the return of the seasons on which depend all agricultural operations on the same dates, year after year.

Not so the native calendar, which is alone in general use amongst our up-country agriculturists. They have, it is true, a *Sourburkh* or solar year of 365 days, and *Sourmas* or solar months; but these, though referred to by the Pundits in calculating horoscopes, and fixing auspicious days and seasons for marriages and the like, are dead letters to the rural population, who universally, in every-day practice, deal only with a lunar year of 12* months, consisting of between 354 and 355 days. This year being more than ten days shorter than the tropical year, a thirteenth month, known as *Lond* or *Adhikmas*, has to be intercalated every 32 or 33 months, and a variety of other corrections (which I once knew, but have now forgotten) have to be applied; the result of which is, that the seasons do not recur year after year on the same dates, or even in the same months.

The consequence of this non-conformity is that, as a rule, agricultural operations are, so far as any calendar goes, chiefly governed by what our villagers call *nakhats*, and the Pundits *nichaitr*; properly speaking, I believe, *nakshattra*. These *nakhats* are nothing but subdivisions of the Zodiac, of which there are 27 in all, or $2\frac{1}{4}$ in each "*burj*" or sign, and their names are given to the periods during which the sun's apparent path lies within them. Of course by the slow effects of precession and nutation, the seasons in which these *nakhats* fall *very slowly* change, but practically they are sufficiently immutable for every-day life, and cultivators commonly enquire about them from the Pundits, regulate their sowings not a little by them, and have the firmest belief in certain traditional prognostications, favourable and unfavourable, to their crops, dependent on what happens during their course.

With the 15 *nakhats* that lie between about the 27th November and 23rd May we need not concern ourselves, as one hears comparatively little of the good or evil influence of these; but the 12 *nakhats* which begin about the 23rd May play an important part, according to our agriculturists, in all their operations, and must be separately noticed.

1. ROHINEE.—From about† the 23rd May to the 5th June. In this

* These 12 lunar months, of about 29 days and $12\frac{3}{4}$ hours, which reckon from new moon to new moon, *i.e.* from the moon leaving its conjunction with the sun to its return to conjunction, must not be confounded with the periods (of about 27 days $7\frac{3}{4}$ hours) at the end of which the moon returns to a position *amongst the stars* nearly coincident with that it held at the commencement of such period.

† Owing to differences in the calendars, the *nakhats* do not always begin on *exactly* the same European dates, sometimes *Rohinee*, for instance, begins on the 22nd May.

period, say the people, the rains should commence, and this is the time to sow maize, *oorud* (*Phaseolus Roxburghii*)—*murroou* (*Eleusine coracana*). The native couplet runs—

"Rohinee mirgsir boŏ mukkha
Oordh, Murrooa, dŏo na taka":

"Sow maize and mâsh (or oorud) and millets in Rohinee or Mirgsir, but, pay no rent."

2. MIRGSIR.—From about the 6th to the 19th June. In this period also the crops above mentioned are sown, but if much rain falls during it, neither *jowar* (*Sorghum vulgare*) nor cotton must be sown, otherwise, when they come to flower, insects will surely attack them; the only consolation being that if it rains well in *Oottra nakhat* (*vide infra*) the insects will disappear. *Panicum milliaceum*, though generally a hot-weather crop with us, is said to succeed specially well if sown at this time. I have never seen it grown at this season, but the proverb runs:—

"Mirgsir men boŏ chena,
Zemindar ko kuch mut dena":

"Sow chena* in Mirgsir, give nothing to the zemindar."

3. ADRA.—From about 20th June to the 4th July. This is the great sowing season, and if only sufficient rain falls at this time, the majority of the autumnal crops are got in. For *til* (*Sesamum orientale*), *jowar* (*Sorghum vulgare*), *urhur* (*Cajanus indicus*), *mŏth* (*Phaseolus mungo*), *moong* (*P. mungo*), cotton, *Rouse* or *Lobeea* (*Dolichos sinensis*), *kulthi* or *koortee* or *bhutwas* (*D. uniflorus*), *oorud* or *mŭsh* (*P. Roxburghii*), *sumun* (*Panicum miliare*), *kukree* (*P. italicum*), and some others of the lesser millets, this is *the* time *par excellence*, but *bajera* (*Penicillaria spicata*) is said not to succeed if sown in this *nakhat*. If there is no rain at this time, the yield, both of cotton and *jowar*, is seriously endangered.

4. POONBURSOO.—From about the 5th to the 17th July. This and the next following *nakhat* are the favourite sowing times for rice; the legend runs:—

"Pookh, Poonbursoo bowe dhân
Aslaikha ko do din parmân":

"Poonbursoo, Pookh, and two days of Aslaikha are best for sowing rice." *Bajera* is also sown to some extent during this period.

5. POOKH.—From about the 18th July to the 1st August. This is the best time for sowing *bajera*, and rice that could not be got in in Poonbursoo is sown now.

"Boŏ bajera aye Pookh,
Phir man mate bhogo sookh."

In other words, if you want things to go happily sow your bajera when *Pookh* appears.

6. ASLAIKHA.—From about the 2nd to the 15th August, *Kodon* (*Paspalum scrobiculatum*) is generally sown at this time. Heavy rain during this period is considered very injurious, and clear weather during its continuance is greatly preferred. If it does rain, the cultivators never allow the water to lie in the fields (except perhaps in those of rice and sugar-cane), but drain it off or bale it out most perseveringly. You may sometimes see every man, woman, and child in a village hard at work at this.

* This is the common native name for *P. miliaceum*, and is of course quite different from *chenna*, which is the ordinary gram.

If the water be allowed to lie, the crops turn yellow, and even if they do not rot, yield a much smaller harvest.

7. MUGHA.—From about the 16th to the 29th August. This is considered the most critical time of the year, and good rains are devoutly prayed for. The people say:—

"Mugha ke burse,
Mata ke purse":

"The rains of Mugha are like mother's milk."

Not only does the *kharif* or autumn crop greatly depend on good rains at this time, but many of the *rabi* or spring staples, and most especially gram, are thought to be materially influenced for the better by really good heavy rain. At this time good rains in this *nakhat* make up for most previous shortcomings; as the people say "Chhoot khet ootur jata hai," "The failings of the fields disappear." The only exceptions are, *til* (*Sesamum orientale*) and other oil seeds; in their case it is asserted that if it rains without stopping during the first five days of Mugha, insects are sure later to attack the plants. The water of this *nakhat*, unlike that of the preceding one, is commonly allowed to lie in the fields, and is said to be specially beneficial to many of the millets and pulses. On the whole this is the period on which, according to the cultivators, most depends:—

"Jo kahin Mugha burse jul,
Sub najon men honge phul":

"If only Mugha gives us rain,
Every field will teem with grain."

8. POORBA.—From about the 30th August to the 11th September. Rain at this time is considered injurious; if the weather is clear, blight and insects rarely do much harm, but if there is much rain, they make sad havoc of the crops:—

"Jo kahin Poorba pani dewen,
Jinson sub ko keera khawen":

"Whenever Poorba brings us rain,
In every crop, worms mar the grain."

9. OOTTRA.—From about the 12th to the 25th September. Rain during this period is most desirable; the crops make great progress, and where insects have attacked the plants, they disappear. The legend goes that if there is good rain at this time, the harvest will be so plentiful that even the dogs will be too satiated with grain to eat it.

"Jub bursenga Oottra
Naj na khawen kootra":

10. HUST.—From about the 26th September to the 8th October. If there has been no rain in the previous period, it is anxiously looked for now, and under any circumstances, though rain at this time may injure some of the *kharif* crops, it will be most beneficial for the *rabi*.

11. CHITTRA.—From about the 9th to the 22nd October. If the two previous *nakhats* have passed without rain, and there is much rain in this one, the *kharif* is reckoned as lost, and apprehensions of scarcity, if not famine, become serious. Although thus injurious to the *kharif*, it promises well for all the *rabi* crops, except barley (which it is said to injure), and this, I think, is the purport of the traditional couplet:—

"Oottra, ootur de gaeen, Hust gae mookh more,
Jae jo kuheeo Chittra se, gae sumae lao buhore":

"Oottra's come and gone again. Hust has passed with face averted. Go prithee, and bid Chittra bring a missing harvest back again."

12. SWANT.—From about the 23rd October to the 4th November. Rain

at this period is most injurious to the majority of the autumn crops. Cotton it almost ruins if heavy; indeed the legend says:—

"Jo bursen Poonurbus Swant,
Chule na churka, buji na tant":

"If both Poonurbus rain and Swant, spindles and looms alike stand still."

Jowar loses its flavour, and the grain turns a reddish brown. *Bajera* yields but little, and that little very often so indurated as to be nearly useless. As for the "musemah," as the pulses (*oordh, moong, moth, rousa*) are collectively called, insects attack and more or less seriously injure them.

My own personal experience does not lead me to place *implicit* confidence in these standing prognostications (of which, by the way, I have only noted a few of the most important), but they are so generally believed in by our cultivators that it was impossible to overlook them in even the briefest sketch of the existing state of agriculture, and they may possibly embody more or less substantially correct generalisations from the experience of bygone ages. I have given only the existing popular versions, but the Prakrit originals are known to some Pundits.

All these prognostications refer, as will have been seen, to that agriculturally pre-eminently important portion of the year lying between the beginning of June and the end of October, which includes the periodical* rains; and, indeed, it is only natural that in a country like the plains of the Duáb the cultivator's chief source of anxiety should be the rains; for though the extension of canals is slightly changing the position of affairs, a bad rainy season still means a bad harvest, high prices, and scarcity; and a good one, plenty and comparative comfort to all classes.

It is hardly necessary to say that, with so much at stake, an ignorant and superstitious people have recourse to a variety of ceremonies, both to ensure success to their cultivation and to ascertain, beforehand, their prospects. The taking of omens (*shegoon*) is universally practised, the full moon of *Asarh* (generally in June) being one of the great days for this. The methods adopted are very various, but the most popular are those based on the direction of the wind at the time of the full moon of Asarh, *Pun purchutea* as it is termed. The cultivators assemble in some open plain, collect a little finely-powdered earth, and throw it up in the air. If the dust drifts northwards, the omen is bad, and insufficient rains are expected; if southwards, westwards or eastwards, it is favourable. Sometimes, instead of earth, raw cotton is loosely twisted into a thread and tied to the end of a bamboo (this is called *Dhujabundee*), and the direction of the wind ascertained from this. In all cases, a south, south-east, or south-west wind at this time is considered to indicate bad rains and a poor harvest. This is only one class of omen. All kinds of absurd practices are in vogue; for instance, at this same full moon, a few ounces of grain are carefully weighed, and are placed in little earthen saucers, in some open and elevated place well away from the village. Next morning the grain (if any remains, *my* experience being that it is generally eaten during the night) is carefully weighed; if it has gained weight the cultivator is sanguine of a good harvest; if it has lost, then he looks for a poor crop; if it has disappeared altogether, *then* the harvest will be as God wills.

Ridiculous as these superstitions must seem, they deserve notice, because cultivators are often governed in their choice of crops for the coming season by the result of these omens, and because it is impossible to introduce any improved system of agriculture without realising the extent to which the present practice of the art is governed by superstition.

* The periodical rains of the rainy season, which occur between Asarh and Kwar, say from June to October, are called "Chomas," while the cold-weather showers, which ought to occur about Christmas, are known as the "Mahawut."

NOTE B.

Some matters Agricultural and Horticultural in which the Department of Agriculture has been able to assist.

One step towards the development of agricultural and industrial enterprise in India certainly consists in the collection and dissemination of useful information. There has always been a good deal of information on record on matters connected with this important subject, but scattered and hidden in public offices and elsewhere, undigested, fragmentary, incomplete, and vague. One of the first objects of the Department was to gather up all this information, collect fresh facts by special enquiry, co-ordinate the whole, bring the facts down to the latest date, and publish them in a handy and useful way for general information. Amongst the papers published in accordance with this plan are the following:—

1. An account of silk.
2. A report on tobacco.
3. A note on lac,
4. A note on vanilla.
5. A note on flax.
6. A note on the *Eucalyptus globulus*, or blue gum of Australia.
7. A note on the various other species of *Eucalyptus* adapted to cultivation in India.
8. A note on *Ceratonia siliqua*, the carob tree.
9. A note on *Calophyllum inophyllum*, an oil-producing tree.
10. A note on *Malachra capitata*, an excellent fibre, quite neglected as yet.
11. A note on the *Arachis hypogœa* (the ground nut).
12. A note on *Sorghum saccharatum*, a valuable fodder.
13. A note on Cardamom cultivation.
14. A manual of Cinchona cultivation in India.

Others are still under preparation in the Department:

15. On dyes and tans.
16. On fibres, with special reference to paper-making.
17. On Carolina rice.
18. On wheat.
19. On Manilla hemp.

Some of the Local Governments have followed the example thus set, and under their instructions reports on jute, tea, tobacco, and cotton have been compiled by local officers. In the N.-W. P. especially the local Department of Agriculture and Commerce has issued notes on economic minerals, gums and resins, and dye-stuffs, and a Dictionary of Agriculture is under preparation. In Madras a text-book of Agriculture has been compiled by Mr. Robertson, but in these two provinces alone has the example and encouragement given by the Department for the compilation of agricultural text-books been of any practical use.

Actual experiments have been undertaken in the cultivation of most of the articles on which papers have been published, and in many cases the results have been very successful. In tobacco, for instance, but little more remains to be done by the Government, an energetic European firm having undertaken the cultivation and manufacture of it on good principles in farms made over to the firm for the purpose (they were old stud farms) on very favourable terms by the Government.

In silk, experiments with tasar have been a complete success, and there is undoubtedly a splendid future for the trade in this article, little known or appreciated, out of India, until this Department moved in the matter.

Experiments in the propagation of lac have been quite successful, but a fall in prices in the foreign markets renders the further prosecution of this business for the present unnecessary.

The cultivation of vanilla, so profitable in Mexico and Réunion, a trial of which in India was strongly urged by this Department, was a success in one province, at any rate, until the occurrence of a drought which desolated it. This article offers peculiar advantages to those who would wish to derive profit from an ornamental plant occupying little space, and which may be grown in the garden adjoining the house.

The carob tree, though long previously introduced, has also, by the instrumentality of this Department, been largely propagated, and this useful fodder tree and resource for human beings in seasons of drought (as in Cyprus) may now, like the Australian gums, be considered naturalised in India.

The ground nut is extensively imported into France from the west coast of Africa, and this article, which is well known in India, though not regularly exported, may become an important trade, if properly worked. So far as exhortations and the supply of information goes, this Department has done its best to stimulate the cultivation of this valuable product.

Sorgho has done remarkably well. Its very heavy yield makes it a most valuable crop for cattle food. Year after year this Department has imported and distributed the seed, has directed and encouraged the experimental culture of the plant, and has collected from the growers, and compiled and published records of the results.

Cinchona is now completely established in India, and the alkaloid prepared from the bark is largely used in the hospitals and in private practice.

The introduction of the cinchona was due to others, but to the persistent efforts of this Department is mainly due the fact, that we have now an excellent and efficient febrifuge, little, if at all, inferior to the sulphate of quinine, which can be, and is, sold retail in every bazar at R. 1 (or say 1*s.* 9*d.*) the ounce.

The results of numerous experiments made with Carolina rice, another staple of which this Department has, year after year, imported and widely distributed, large quantities of the best seed, are still indecisive, but the trials are being continued. This rice is far superior to the finest rice now grown in India, and is worth, in the London market, double the price of the best Bengal rice.

Many of these experiments were tried in the so-called model and experimental farms established under instructions from, or by the advice and with the encouragement of, the Department. Of these farms, there were eight last year, viz. at Allahabad, Cawnpore, Nagpore, in Khandesh, in Sind, at Bangalore, in Madras, and in Burma. There were also two old stud farms which were made over on favourable terms to a European firm for the cultivation and manufacture of tobacco on an improved system. One of these was at Ghazipore, and another at Poosah.

No doubt several of these farms were so managed as to exhibit rather what to avoid, than what to imitate, but located in bad sites, and managed by people who had no real knowledge of farming, all the Department could do was to get such little good out of them as it could, and try and keep things a little straight by means of remarks, criticisms, and suggestions on the reports periodically received.

The necessity for a proper system for the management of such farms, and the need for the creation of agricultural schools, working in connection with them has been, time after time, emphatically pointed out to the local

Governments in letters and resolutions, and close attention to the subject has been earnestly commended to them. Without the co-operation of the local Governments no sort of progress could be made as matters stood, seeing that, under the scheme of provincial finance, the whole cost of farms and agricultural schools has to be borne by provincial revenues.

In these farms experiments have been tried with new crops as well as crops known in the country, under different conditions and in different soils, the results being carefully recorded, and trials have been made of improved implements of every kind, ploughs, pumps, hoes, &c. Of course the principle to observe is that the lighter, simpler, and cheaper such implements are, the greater is the chance of their adoption by native agriculturists, and this the Department has ever sought to impress on all concerned.

Of experiments conducted under orders from the Department, or with its concurrence and encouragement, the following may be noticed:—

Trials have been made to establish the relative cost of growing wheat and oats, with reference to communications from the Military Department, suggesting the extended cultivation of oats for the feed of troop horses. It is believed that oats cost as much to grow as wheat, and that the crop is not nearly as remunerative, and the trials were intended to verify these points.

Trials have been made in the North-Western Provinces and the Punjab with a description of rice much grown in Sikkim, which requires no irrigation. Such rice would be very useful in many localities.

The value of poudrette, as a manure, has been made the subject of innumerable and most careful experiments. Other manures have also been tried from time to time, but it is unnecessary to refer to them, seeing that for a considerable time to come the principal manures within the reach of the agricultural population of India will be farm-yard manure, crushed bones, and poudrette, and against the use of the latter there are caste prejudices still to be overcome.

At one time a blight threatened the utter destruction of the opium crop of Behar. Appearing season after season over a constantly increasing area, grave apprehensions were entertained as to the prospects of the important revenue depending on this crop. A minute and searching scientific investigation into the blight was undertaken under the advice of this Department by a very competent observer, Mr. John Scott, of the Calcutta Botanic Gardens, and this investigation, carried on over a period of some five years, has resulted in proving that the "blight" is due to a vicious system of cultivation. The seed is never changed or selected, the soil has been exhausted, and the plants have degenerated and die from disease induced by exhaustion. The vices of the system of opium cultivation are, in fact, the vices which affect Indian agriculture generally.

In Port Blair, also under the advice, and in most cases at the instance, of this Department, experiments have been made with Sea-island cotton, tobacco, vanilla, coffee, and Manilla hemp, in every case with more or less success, although the existing condition of the settlement prevents the success being followed up on a large scale.

Experiments were tried with the sunflower, which is largely cultivated as an oil-producer in Russia, and which was reported (erroneously) to possess a malaria-destroying capacity; but, after a year or so of comparative failure, it was concluded that it was more to the purpose to increase and stimulate the production and improve the quality of articles already well known in the country than to grow crops of which the ultimate commercial success was doubtful. Amongst such articles may be instanced the ground nut (*Arachis hypogœa*), already referred to, and careful enquiries having been made, a paper has been circulated recommending it to the attention of cultivators and merchants.

Maluchra capitata is another indigenous article in which experiments

have been made expressly at the instance of the Department. This fibre has been pronounced to be equal to jute, and growing as it does without particular care and capable of cultivation at less cost than jute, it is a fibre which will probably prove of great economic importance to Bombay.

The improvement of the indigenous paper manufacture, and the provision of cheap fibres suitable for paper-making, has engaged much attention in this Department. A treatise on the subject has been for some years in course of preparation, and would long since have been published but for the necessity of awaiting the results of the experiments now being carried out in Bengal, Burma, &c. in regard to bamboos, at Mr. Routledge's instance, and on a variety of coarse reeds and grasses.

Other fibres, too, have engaged attention, such as the Agave, the wild plantain fibre of the Andamans, and the *Musa textilis*, producing what is known as Manilla hemp. But chief of all the fibres of India, the best fibre in the world in fact, is the rhea or ramie. This Department has, since 1871, perseveringly tried to obtain a machine adapted for the separation of the fibre from the bark, the existing manual process making the fibre too expensive for ordinary use. A reward of 50,000 rupees was offered for such a machine or process, and the best machine produced having been found, though meritorious in some respects, not adapted for ordinary use, the offer of a reward was renewed, further competition invited, and a public trial is to be held in September, at which it seems probable that the question at issue will be solved.

Besides sorgho, successful trials have been made of another valuable forage plant (*Reana luxurians*), which may be said to be now completely naturalised. The solid-stemmed comfrey, another capital cattle food introduced by this Department, seems to be doing admirably in the Himalayas at elevations of from 3,000 to 7,000 feet.

Great attention has been given to the cultivation of ipecacuanha (another invaluable specific for one of the most fatal of tropical diseases), the introduction of which into India this Department was the first to take vigorously in hand.

Tobacco, to which allusion has already been made, has been carefully tried in many places, and good exotic seed repeatedly imported from Havana, Manilla, and the United States, and widely distributed. Arrangements have also been made for a regular series of analyses of Indian tobacco by the Government Quinologist at Calcutta.

Cochineal was imported from Teneriffe, and tried at Bangalore, but failed, apparently in consequence of defects in the local management.

The experiments made in silk of the mulberry worm, as well as the tasar worm, are full of promise, and, as regards the latter, the only question now really remaining to be solved is whether cocoons can be procured in quantity sufficient to meet the demand within the limit of price which European reelers can afford to give.

The cultivation of cotton on the Egyptian system, and that of Liberian coffee, have both been tried with success.

Endeavours have been made, but as yet without success, to obtain efficient rice-hulling machines, which would be very useful in some parts of the country.

On the other hand, the attempts which have repeatedly been made to foist elaborate agricultural machinery on the people have been systematically discouraged. In a poor country like India, where the rate of wage is extremely low and the holdings much sub-divided, the labour-saving machinery, which is invaluable in England and the United States, would be utterly useless.

A system, not originating, however, with this Department, has been cordially supported and sanctioned as an experiment under which, in certain districts, the State will construct wells for agriculturists, the cost being repaid to the State by instalments.

Similarly, though not sanguine of success, this Department has supported sheep-breeding in Burma, experimental farms having been started at Thyet Myo and Rangoon, aided by a grant from imperial revenues of 6,000 rupees for five years. Cattle have also been bred on Diamond Island and Table Island. Cattle-breeding in Mysore and horse-breeding in the Punjab have been encouraged, and in Oudh, as also in Burma, a qualified veterinary surgeon was deputed for some time to train native salutris (veterinary practitioners) to treat cattle properly when attacked by disease. The experiment, considering the minute scale on which it was tried, has been very fairly successful.

The appointment of a Cattle Plague Commission to investigate and report upon the subject of cattle disease in India elicited a voluminous report from the Commission. The establishment of a Veterinary College, which project arose out of the proceedings of the Commission, was frustrated, as stated in another part of this paper, and there was no practical outcome of the work of the Commission, except a handy manual of the more deadly forms of cattle disease, of which this Department directed the preparation; a most useful work, which was widely distributed, and translations of which, into the vernaculars of the country, were circulated extensively amongst the agricultural community.

This manual describes the more deadly forms of plague so plainly and clearly that any man may recognise the form of disease from which his unhealthy stock is suffering; it also prescribes the treatment to be applied for cure as well as the measures necessary to prevent infection and to keep cattle in health.

In arboriculture the introduction or extended propagation of the following trees, some of which have been already noticed, has been effected or stimulated, in every case (except that of cork-oak, which is as yet doubtful) with more or less complete success: Mahogany, baobab, caoutchouc-yielding trees and plants, carob, *Eucalyptus globulus* and other Australian gums, prosopis of kinds, Spanish chestnut, cork-oak, algarroba, and the Arabian date palm.

In many of these cases the initiative came from elsewhere, but in every case this Department assisted and promoted every reasonable proposal so far as was possible without any machinery of its own, and with the very limited means at its disposal.

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