

# THE WEALTH OF INDIA.

A Monthly Magazine of Practical Information and Useful Discussions

EDITED BY MR. G. A. VAIDYARAMAN, B.A.

Vol. II.]

AUGUST 1913

[No. 8

## The Wealth of India.

The object of this Monthly is to publish the views of experts on the various problems bearing on material progress, specially agriculture, commerce, industry, economics, co-operation, banking, insurance, popular, scientific and technical education, to digest the notable articles appearing in the leading magazines and periodicals and generally to serve as a record of practical information, and useful discussions. It is believed such a publication is indispensable to statesman, publicists, businessmen, students of economics and all others interested in the material and moral advancement of the country.

### RATES OF SUBSCRIPTION POST FREE.

	<i>Inland.</i>		<i>Foreign.</i>	
	Rs. A. P.		s. d	
Per annum ...	5	0 0	...	12 0
Single copy ...	0	8 0	...	1 0
Sample copy ...	0	2 0	...	1 0

**Notice to Contributors.**—The Editor solicits contributions on subjects falling within the scope of the journal. Articles should not ordinarily exceed 2,000 words and should be written on one side of the paper only and on half margin. All articles which may be accepted will be paid for on publication. It will be understood that the publishers may at their discretion republish in any form or issue translations of, articles which have been paid for at the time of publication in the journal.

No money should be paid to any Agent. All remittances and letters should be addressed to the publishers, Messrs. G. A. VaidyaRaman & Co., 3 and 4, Sunkurama Chetty Street, G. rgetown, Madras.

## Current Topics

BY ECONOMICUS.

As the sittings of the Royal Commission on Indian Finance are not open to the public, one has no means to form an idea as to the evidence that is being tendered before it by the various witnesses on the important questions involved in the inquiry. The London correspondent of a contemporary observes that seldom has so much attention been paid to the subject of India's finance, especially in connection with its currency relations with England as at the present time. He thinks that the scheme of a gold mint for India 'which is officially expressed as coming from the people of India,' is not viewed with favour by leading business men in England who claim that they have the bulk of expert opinion in India on their side. This opposition of London business men to the proposed Indian gold mint is not to be wondered at. Their strong disapproval of the scheme is based upon the idea that with the enormous hoarding capacity of the Indian population, a gold mint may materially affect the visible supply of gold, while being unnecessary for convenient currency. It is, therefore, they say, more a matter of sentiment than of practical policy. The Government of India, in its despatch to the Secretary of State on this question, has made its ground as clear as it could be. When it says that without in any way acting detrimentally to the course of trade and ex-



change between England and India and without affecting the imports of gold into this country, a gold mint such as has been proposed will be highly approved of by the 'people of India,' we feel there is no reason why this presentation of the case should not meet with favour. There is ground to presume that the proposal of the Government of India must have been stoutly opposed by witnesses representing London business interests.

The splendid gift of ten lakhs of rupees made by Dr. Rash Behary Ghose to the Calcutta University for the promotion of scientific and technical education is an unmistakable sign of the practical appreciation by the educated Indian people of the importance of higher scientific education as an essential of the progress of this country. We have here a strong proof of the genuine desire of the leaders of educated India to further the advance of their country in the path of economic well-being by making ample provision for the only means that are calculated to contribute to that advance. They have not been only talkers and critics but they have put their hands deep into their pockets and given freely to the cause of education. Bengal may well feel proud of the princely donation given by Sir T. Patit only a short time back and of a similar gift now made by Dr. Rash Behary Ghose. Bombay took the lead in this matter and its merchant princes gave away lakhs towards the institution of the Royal Institute of Science and a Commercial College. In the matter of indigenous enterprise in commerce and industry, that Province has always been conspicuous but Calcutta lawyers would apparently not be outdone by Bombay merchant princes in the promotion of scientific and technical education. The country will feel profoundly grateful to the Calcutta donors for their laudable public spirit and liberality. Some of the conditions upon which Dr. Ghose's gift has been made are interesting as showing how the donor is keen upon the "promotion of scientific and technical education and the cultivation and advancement

of science, pure and applied, amongst my countrymen by and through indigenous agency. Four University professorships or chairs are to be established one for each of the following subjects (a) Applied Mathematics, (b) Physics, (c) Chemistry, (d) Botany, with special reference to Agriculture. It is noteworthy that the chairs mentioned are always to be filled by Indians, that is, persons born of Indian parents as contra-distinguished from persons who are called statutory natives of India. Every person elected to one of these chairs may be required, before he enters upon the execution of his duties, to receive special training abroad, the expenses of such training being defrayed out of the income from the fund. Each Professor is to carry on original research in his special subject with a view not only to extend the bounds of knowledge, but 'to improve, by the application of his researches, the arts, industries, manufacture and agriculture of this country.' Eight studentships will also be founded, each of the annual value of nine hundred rupees and will be annually awarded to distinguished graduates who have taken the degree of Master of Arts or Science. Adequate provision is to be made out of the fund for laboratories, museums, workshops, appliances and all other requisites for original investigation by the Professors and the students attached to them. Arrangements are thus to be made for post-graduate study in Science in the University College of Science at Calcutta. Bombay is having its Science Institute and the foresighted liberality of the late Mr. J. N. Tata has provided one in Bangalore. Other provinces ought to have similar institutions and Dr. Ghose's example ought to stimulate the moneyed men of other places to come forward with similar donations. The economic future of this country is bound up with the promotion of scientific and technical education and the cultivation of pure and applied science among Indians. This is the moral of the recent history of Japan and Germany and we are glad the lesson is being seriously taken to heart. All honour to Dr. Ghose for his latest act of splendid public spirit and generosity.

**Indian Budget  
in Parliament.**

Curiously enough, Mr. Montagu's speech in the House of Commons this year on the Indian Budget, covered almost all important topics excepting those relating to the Indian budget. He had been recently in India, had attempted to see things with his own eyes and felt called upon to give expression to opinions he had formed on the more urgent Indian problems in the light of the knowledge he had obtained first hand. In view of the fact that the budget debate in Parliament is ordinarily the only opportunity in the year for a full discussion of Indian affairs, Mr. Montagu proposed to introduce an innovation and say little about finance devoting the whole time to a discussion of matters of general public interest. Even ordinarily, a budget debate in Parliament after the budget has been passed in India four months previously, is useful as facilitating a general expression of view on a variety of questions relating to this country. The subjects of policy and so forth, dealt with by Mr. Montagu, however interesting in themselves, do not fall within the province of this journal and we shall have to refer only to one or two points that relate to Indian finance. Mr. Montagu felt precluded from offering any defence of the existing financial organization of the India Office by the inquiry which the Finance Commission is now conducting into that subject. He however referred to the proposal about the institution of a State Bank in India with approval. Such a bank, he thought, would relieve the India Office of an extremely large amount of financial work and would perhaps find a solution of many difficulties. "Lord Crewe is of opinion that the time is now come for a reconsideration of the proposals for the establishment of a bank which could act as a custodian for a large part of the Government balances, manage paper currency and participate in the sale of drafts on India. Mr. Lionel Abrahams, Assistant Under Secy. at the India Office, has discussed in a memorandum the whole subject of a State Bank in India and without committing himself in any way, Lord Crewe has directed Mr. Abra-

hams to present that memorandum for the consideration of the Royal Commission. From the favourable manner in which the idea of a Central State Bank has been generally received by Anglo-Indian mercantile opinion, and, by the Provincial Banks themselves, it appears likely that the Finance Commission will accord its support to it now that the attitude of the India Office has been given out as, on the whole, favourable to it. Not a little disappointment will be caused by Mr. Montagu's declaration that the general conclusion of the Nicholson Committee "proved undeniably that although we may get a better army for the money we now spend and although we may possibly be able to improve our existing defences, there is no chance of any reduction of expenditure either on the British army in India or on the Indian army." The public in India was prepared to see the existing strength of the army maintained but hoped that it was possible to introduce economy consistently with efficiency. The members who took part in the Budget debate followed Mr. Montagu in the discussion of a variety of subjects unconnected with Indian finances. Mr. Morrel's motion that the salary of the Secretary of State should be placed on the estimates in view of the need for increased parliamentary control of Indian affairs, was stoutly opposed by Mr. Montagu and was withdrawn.

For one reason or another, as we have hinted above, the proposal about a State Bank for India has attracted considerable attention in the British financial press. The *Statist* has written a number of articles on Banking in India.

It says that practically the banking accommodation of the Indian people consists of what can be afforded by the three 'great Presidency Banks.' The fifty-four branches of these three banks, spread widely over the country, dispose of resources a trifle under forty-six crores of rupees. The accommodation which the banks can give to the trade of India cannot exceed twenty-four crores and this is utterly and hopelessly insufficient. The *Statist* therefore

**The Proposed  
State Bank.**

says that the Presidency Banks should be amalgamated and as their resources even when lumped together, will not enable the new institution to accommodate the three hundred and fifteen million people of India, the three reserves of the Government of India now amounting to something like one hundred and twenty crores should be handed over to the new Bank. The large resources at its disposal will enable the new institution to lend and to discount over three times as much as the Presidency Banks now do. The writer in the *Statist* feels assured that this proposed bank is calculated to give an immense stimulus to trade, and to the employment of labour and that it will tend to raise wages.

Stress is also laid on the inadequacy of the present provision of capital to the small manufacturer and to the agriculturist owing to the lack of facilities for the same. The capitalist classes may be trusted to look after their own interests; it is the small man who has not the resources for furnishing himself with full banking accommodation that has to be cared for and supplied with the necessary capital. The paper then proceeds to show the ruinously wasteful character of the so-called Indian habits of hoarding and states that the only remedy for the disease is the establishment of people's bank liberally supported by a State Bank. The *Statist* observes that the time is most opportune for the institution of such a bank in the interests both of the commercial classes and the very poor among the Indian population. Though the general idea of a bank of the kind has met with the approval of the India Office and the public also, in the absence of particulars, one cannot pass any definite opinion on the proposal. The *Statist* suggests, as essential conditions, that the Bank should, without delay, open branches throughout the Indian Peninsula, that it should be an important condition that the bank ought to pay special attention to the interests of the small trader and the small agriculturist and that in collaboration with the Government, the State Bank should undertake the supervision of the people's banks.

"An expert correspondent" writing in the *Financial Times* has attempted to meet the objections that have been raised against the establishment of a State Bank. The establishment of a semi-official bank is naturally viewed with apprehension by the great Anglo Indian Exchange Banks which finance the export trade of the country. The correspondent lays stress upon the service rendered by these banks to the trade of India and lays it down that it must be a *sine quo non* that any central institution shall undertake no exchange business on its own account observing that it ought not to be beyond the wit of man to devise safeguards by which the legitimate rights of the Anglo-Indian Exchange Banks would be protected. It is feared that if the new bank competed in exchange operations, its preferential knowledge and position would endow it with a monopoly directly injurious to the great exchange banks. The new bank need not, therefore, have a branch in London as it would place in the hands of the Bank of England any business which it had to transact in that country. One great advantage from the Bank which has been emphasised as certain is that it is expected to meet one of the most pressing needs of the Indian peasant by assisting to free him from the money lender. It is calculated to be a boon to agriculture and to diminish the tendency to hoard in actual coin so peculiar in India. Whether this is too easy a picture or not, as we believe it is, the need of the expansion of credit and of the creation of greater facilities for the provision of capital, cannot be gainsaid, and, in fact, one of the essentials of Indian economic progress is the supply of adequate capital. We must, however, observe in passing that the alleged hoarding habit of the Indian people has been made rather too much of latterly and measures are being suggested with a view to stopping the inflow of gold to India in the interests of the whole world.

Sometime ago, the *Madras Mail* published a communication from Mr. Alfred Chatterton describing how modern methods are coming to be

**Industrial  
Progress in  
Madras.**

adopted in the industries of this Presidency. The demand for machinery to supplement or replace hand labour has been rapidly growing of late and this is an indication of the industrial progress the "benighted presidency" is steadily making. Mr. Chatterton could not but refer to the outcry roused by the local European mercantile community against the industrial policy definitely accepted by the Government for Madras at the Ootacamund Conference in 1908 and the restrictions placed by the Secretary of State on the programme of that Government. The Agricultural Conference held at Pusa two years ago felt deeply the disadvantage arising from such restriction, viz., the refusal to countenance the pioneering of new industrial operations by Government agency, with reference to the improvement of the indigenous sugar industry and passed a resolution requesting a reconsideration of the matter. The Government of Madras, however, has been wisely pursuing the policy of encouraging the use of machinery in every possible way, so that labour may be saved in

preparing the products of the country for the market. Mr. Chatterton quotes figures to show that the imports of machinery and mill work into this Presidency have been satisfactorily increasing. Thus while during the three years, 1910-11, 1911-12 and 1912-13 the value of the imported machinery and mill work in the whole of India excluding Madras, was Rs. 460.61, 406.76, and 483.62 lakhs respectively, it was for this Presidency and for the above three years, Rupees 43.26, 49.32 and 58.06 lakhs respectively. In the first case the increase over 1910-11 is one of 5 per cent. and in the latter case it works at 34 per cent. The imports of aluminium have also grown in value from Rs. 1 lakh in 1904-05 to Rs. 25.51 lakhs in 1912-13, the quantities in cwts. being respectively 890 and 35,809. Mr. Chatterton is of opinion that the use of aluminium in India will continue to extend and desires to draw the attention of the public to the fact that there is now in India a market sufficiently large to justify the establishment of an electrolytic factory for the manufacture of that metal.

## Special Articles.

### THE PROPOSED COMMERCIAL CONGRESS.

[The suggestion of Sir Fazulbhoy Currimbhoy to organise a Congress of Commerce and Industry does not appear to have elicited the opinions of persons entitled to speak on the subject. Sir Fazulbhoy has placed some outlines of his proposal before the committee of the Indian Chamber of Commerce in Bombay and that body has referred the question to a Sub-Committee of the following gentlemen for further consideration and drafting of the whole scheme :—

- (1) Hon'ble Mr. Munnimohandas Ramji.
- (2) Mr. Purushottamdas Thakurdas.
- (3) Hon'ble Sir Fazulbhoy Currimbhoy Ibrahim.
- (4) Sir Vithaldas D. Thackersey.

(5) Hon'ble Mr. Lallubhai Samaldas.

(6) Mr. D. E. Wacha.

When the Committee's report has been made, we understand that it will be circulated to all commercial men in India to enlist their sympathy and support. Meanwhile, the opinions given below of some of the foremost men in India will be read with interest.—Ed. W. I.]

DR. SIR S. SUBRAMANIA Aiyar, Kt., C I.E., LL.D.

As regards the proposal by Sir F. Currimbhoy with reference to an Indian Commercial Congress, I am inclined to think it is well worthy of serious consideration. The principal ground for this view is that it will tend to

unite into the movement the Mahomedan and the Indian Community and this at the present time will be no small advantage. It is impossible to conceal from oneself that the Industrial Conference now held about the time of the Indian National Congress has naturally enough come to be linked with that congress. As the leaders of the Mahomedan community generally keep aloof and will continue to keep aloof for a considerable time more from the Congress, the Industrial conference will not enlist the co-operation of the Mahomedan community. Moreover, Mahomedan merchants constitute a class next only to the Parsee and it is most desirable that Hindu merchants and they should unite in and co-operate with the movement. Again, it is necessary to dissociate this movement of merchants from professed politics specially such, as that would tend to disarm the bias which consciously or unconsciously exists with reference to every thing associated with the Indian National Congress in the minds of Anglo-Indians and those in England in sympathy with Anglo-Indians.

SIR R. N. MOOKHERJEE, Kt., C.I.E.

I had already read Sir Fazulbhai Currimbhoy's letter to the *Times of India*. In my opinion, his suggestion that an Indian Commercial Congress be formed deserves encouragement, especially as he says that, in course of time, the Industrial Conference could be merged into it. The Conference undoubtedly does good work on theoretical grounds, but the country has so far derived very little practical benefit from its energies. The active assistance of magnates such as Sir Fazulbhai in the advancement of India's industrial progress is very desirable and the question as the medium of their support is in my opinion a secondary matter.

DEWAN BAHADUR K. KRISHNASWAMY RAO,  
C.I.E.

The Industrial Congress, which is annually held, looks like a sitting of the National Congress, and does not, as a rule, attract commercial men of real merit. This is probably due to the fact that laymen are the soul of the

Industrial Conference as it is now constituted. If gentlemen like Sir Fazulbhai Currimbhoy who have made a name in the commercial world, initiate the movement, there may be a better chance of commercial men throughout India taking interest in it. I think that a congress of purely commercial men, will be a good step in the cause of the material prosperity of India. The proposed Commercial Congress should make it a rule not to invite to its deliberations gentlemen not in the exercise of any commercial profession, trade or industry. It need not be held annually. A triennial session will be more effective. On account of the heavy cost of each session and the shortness of the period of one year for any real and general improvement, I advocate a triennial session. The proposed congress should take stock of improvements and reforms effected during the preceding triennium, consider the difficulties that have arisen in different parts of India and suggest practical solutions. It should try to increase the number of the Chambers of Commerce. There should be no important centre of trade without a Chamber. The Congress must really be a gathering of all Chambers of Commerce in India. I need hardly add that with the local chambers working with intelligence, vigilance and zeal, an annual congress will be quite unnecessary.

Gradually, the work of the present Industrial Conference must pass to the proposed Congress of Commerce. Industry and Commerce are like the Siamese twins. One cannot exist without the other. It is for want of local industrial associations that the Industrial Conference has not been able to show much substantial results. Without efficient local Chambers of Commerce, the proposed commercial congress will not in my opinion be very successful. The first session of the Commercial Congress should take steps to organize local Chambers of Commerce.

DEWAN BAHADUR AMBALAL SAKARLAL  
DESAI, M.A., LL.B.

I have read Sir Fazulbhai Currimbhoy's letter about organizing an Indian Commercial Congress.



In the absence of details touching his suggestion, I should hesitate to recommend a new and separate organization. The basis of the present Industrial Congress is wide and plastic enough to serve all practical purpose. The time of holding it may have to be altered if a sufficiently large number of business men join it and desire the change. What is wanted is that men actually engaged in trade and industries should join the present Industrial Congress, and after reorganizing it on a broad and practical foundation, direct and lead the movement into national channels.

THE HON'BLE MR. G. K. PAREKH,  
B.A., LL.B.

There are several suggestions in Sir Fazalbhais' papers deserving of consideration.

I am however of opinion that if one wishes that a large number of our people should take part in the conference, it should remain an adjunct of the National Congress. It would be impossible to bring together a large mass of our people to discuss such questions as are brought forward before the Industrial Conference.

### THE WORLD'S COTTON INDUSTRY.

BY V. G. KALE, M.A., *Professor of Economics, Fergusson College, Poona.*

The cotton industry, all the world over, is undergoing a remarkably rapid expansion. Though it occupies an important position only in a few countries, the number of competitors in the world's market is increasing and even Japan and China promise to become serious rivals to the old manufacturing nations. The world's supply of the raw material is limited, and as the demand for it tends to grow, the anxiety of manufacturers to secure the necessary quantity of cotton at a reasonably cheap price becomes greater. England's dependence upon America for the high grade cotton which alone is consumed by the Lancashire Mills, has long set mill owners there thinking seriously over the problem of cotton supply. The British Cotton Growing Association is sparing no efforts to encourage and expand the cultivation of cotton in the Empire. In Africa, and Australia, experiments are being conducted with a view to discover the possibilities of these continents. Cotton production in any quantities and qualities in places other than America, will be a welcome relief to Lancashire as the tension upon the world's market will be proportionately reduced thereby. Of all countries, India offers to British mill owners the most hopeful source of a

growing supply and they have been casting wistful glances at her these many years. Deputations have waited upon the Secretary of State for India urging him to take steps to hasten the expansion of cotton-growing in this country. Among the resolutions passed by the cotton congress which was held some time ago, there was one to the effect that, India being the only country in the world where an immediate and large expansion of cotton growing could be expected, the Government of India should assist agriculture financially. Another resolution hoped that other countries would follow Britain's example in guaranteeing the Sudanese loan. Cotton manufacturers throughout the world are interested in increasing the supply of raw cotton and in keeping its price on a steady and cheap level. Two years ago, a shortage in the American crop sent up the price of the Indian staple and our mill-owners were hard put to it to square their accounts and clear their accumulated stocks. There can be no doubt that in spite of the expansion of the textile industry in England and India, the profits in both the countries are not as handsome to-day as they were only a few years back, and competition is bound to diminish them still further unless

demand for cotton fabrics keeps pace with production. The latter condition will probably be fulfilled on account of the present and prospective development of the eastern world.

The fact that Lancashire has maintained its position and still continues to tower head and shoulders over its competitors in spite of the difficulties it has to encounter speaks volumes for the resourcefulness, the ability and the wideawakeness of the British captains of industry. We are indebted to an article in the *Statist* dealing with the evolution of the cotton trade, for the following interesting figures showing how exports of cotton goods from the United Kingdom compare with those of certain other countries.

EXPORTS OF GOODS (INCLUDING YARNS) IN MILLION £.  
000's OMITTED.

5-Year Averages	From Eng-land	From Ger-many	From France	From U.S.A.	From England's Excess over Ger- France U.S.A.		
	land	many.			many		
1882-86...	72.2	5.1	4.0	2.6	67.1	68.2	69.6
1887-91...	71.9	8.6	4.5	2.5	63.3	67.4	69.4
1892-96...	65.5	8.8	4.6	2.8	56.7	60.9	52.7
1897-1901...	68.0	11.3	6.4	4.2	56.7	61.6	53.8
1902-06...	84.3	18.0	9.4	7.3	66.3	74.9	77.0
1907-11...	105.0	20.6	13.6	5.7	84.4	91.4	99.3

These figures show what a big stride the British industry took in the path of progress during the five years ended with 1911 and how England is further ahead of her competitors to-day than she was before. In the article referred to above, the *Statist* propounds the question, 'how is the comparatively moderate growth in the consumption of raw cotton in Great Britain during the last forty years—some 700 million lbs. as compared with 2,000 millions for the continent of Europe and nearly 2,000 millions again for the United States—to be reconciled with the huge increase in British exports of cotton manufacturers' and proceeds to quote figures illustrating its answer to the question. The paper holds that there 'is no mistaking the fact that the cotton trade is undergoing the same general transformation that has taken place in the iron trade. The Lancashire industry is applying itself

more and more to the production and shipment of goods of relatively high value, to the comparative neglect of fabrics of the lowest grade. That is to say, a given quantity of raw material now undergoes far more processes, and is given a far higher selling value in the finished goods than used to be the case a quarter of a century ago." The British exports of yarn in 1911 were valued at £15,664,732 and those of piece goods at £90,513,089, the corresponding figures for the previous year being £13,337,780 and £78,685,438. The aggregate value of the imports into India of cotton yarn and of woven and other cotton goods in the six years 1906-07 to 1911-12 was as follows, the unit being 1,000 :—

	Yarn	Woven and other goods.	Total	Proportion to total imports of merchandise per cent.
	£	£	£	
1906-07...	2,149	25,129	27,278	38
1907-08...	2,462	29,566	30,028	37
1908-09...	2,432	29,911	25,343	31
1909-10 ..	2,213	24,034	26,247	34
1910-11...	2,091	27,802	29,893	35
1911-12...	2,527	30,519	33,046	36

It is superfluous to add that the imports of cotton piece goods into British India are overwhelmingly British. And yet British mill-owners are alarmed at the comparatively slow progress the Indian industry is making!

It is amusing to notice that an article contributed to the *London Magazine* by Mr. Saint Nihtal Singh on India and Lancashire, a brief summary of which we gave in our May number, evoked a grave warning to Lancashire from the *Manchester City News* entitled 'The Menace of India'. The paper appears to have conjured up before the vision of its readers the danger of India ousting Lancashire from its market and crippling its foreign trade by the reduction of British cotton exports to the tune of forty-five crores of rupees every year. But the figures we have quoted above, and the view of the *Statist* we have given in connection with the evolution of the British cotton industry, demonstrate the groundlessness of this

apprehension. The alarmist forebodings of the *Manchester City News* led many of its correspondents to express their views on the subject of the article. While one of them confirms the fears of the paper and would like to emphasise one passage in it in particular, *viz.*, 'It is a more deadly blow to seize an opponent's shops than to seize his ships, to capture his commerce than his cannon,' others expose the exaggerated and fallacious nature of the case presented. One correspondent believes that the more prosperous the Indian mills are the better it is for the Lancashire factories. "Should the extension of textile productions in India bring the earnings of the Indian spinners and weavers into closer proximity to those of Lancashire, the purchasing power of Lancashire's largest customer will be proportionately increased, with the consequent greater demand for Lancashire goods as well as those of India and elsewhere." Another says that British trade with India in cotton piece goods was never larger than at present and that there is no fear that she will be able to compete successfully with Lancashire. A third correspondent feels that there is absolutely no peril from India and if there is any danger at all, it is too distant to disquiet British captains of industry. 'Years may pass before the struggle becomes acute, and in the meantime we must cultivate other markets which seem to promise in the near future profitable fields for energetic development.' That the indigenous textile industry is forging ahead in spite of all disadvantages, cannot be doubted. But that progress need not disturb the slumbers of Lancashire mill-owners. The cotton goods imported into India in 1896 were valued at 30 crores of rupees. The corresponding figure for last year was 60 crores. The *Times of India* publishes some very interesting figures in connection with the Indian mill industry and those relating to England and America supplied by a well informed correspondent. The profits of the Bombay mills in 1905, including commission came to 3.47 crores. but they

went on diminishing, in spite of Swadeshi, till they reached 52 lakhs in 1911. But last year matters suddenly improved and the profits came to 2.60 crores. The workmen in Bombay mills, about 1.10 lakh, received in 1912 Rs. 2.42 crores in wages, which means Rs. 220 per head per annum. The English workman gets Rs. 780 per annum and his American brother Rs. 1,050. In Great Britain, United States of America and India, there are 1,968, 1,777 and 268 mills respectively. The corresponding figures for spindles are 5.81 crores, 3 crores, and 65 lakhs; for looms 7.58 lakhs, 6.70 lakhs and 89,000. The number of hands employed in the three countries are 6.27 lakhs for Great Britain, 3.18 lakhs for America, and 2.44 lakhs for India. The cotton consumed in bales, 44.98 lakhs, 51 lakhs and 16 lakhs. The wages earned by the workmen of each country are :—England 48.90 crores per annum, America 33.40 crores, and India 6.53 crores. The value of the goods produced comes to about 225 crores for England, 225 crores for America and 37.50 crores for India. Out of her total production, England retains 20 per cent. for home consumption, America 94 per cent. and India 79 per cent. England has 39 per cent. of the world's spindles but she consumes only 19 per cent. of the total raw cotton consumed by the world. The above statistics provide further proof of the eminently sound and satisfactory condition of the Lancashire industry. Textile mill owners in India have likewise reason to congratulate themselves upon the advance which the indigenous industry has made during the past few years. In 1896, our excise duty came to a little over 11 lakhs. To-day it has reached 59 lakhs. The prospects of the industry for the current year are said to be fairly good though it is doubted if the profits will be as satisfactory as they were for last year. The correspondent of the *Times of India* points to labour as the weakest spot in the industry and it is represented as scarce and rebellious.

## CHEMISTRY AND THE ARTS.

By R. PALIT, late Editor, *The Indian Economist*.

The wants of civilization and the effects of competition require the effective application of increased power, with regard to economy both of labour and of time ; and, in the gratification of these wants, there is a constant aim to render objects, apparently of little value, useful and productive. The benefits conferred upon industry by mechanical science, are also afforded still more strikingly by her younger sister—chemistry. In examining the various applications of chemical science to manufactures, we find that they naturally divide themselves into the following three heads :—

(1) Chemical appliances, which have added to human power either by furnishing substitutes for mechanical contrivances, or by affording tools and methods for arriving at results formerly impossible.

(2) Methods of producing economy of time, generally resulting from a constant tendency to simplification.

(3) Methods of utilizing products apparently worthless, or of endowing bodies with properties which render them of increased value to industry.

When a manufacture is already established, the results of competition not only compel an increasing attention to the economy of power or of time, but also require an increase of the industrial value of the article offered for competition. He that can replace an expensive mechanical power by a cheap chemical process or can economize production by the happy adaptation of natural forces, must possess advantages over his less skilful competitors. Vulcan produced his works more economically than the more mortal blacksmiths of his time, by availing himself of the fires of Mount Etna for his forges. The possibility of doing what previously could not be done generally has a moral as well as physical result. The communication of a new power often occasions great social changes.

It has justly been said, that the discovery of the Greek fire projected from the walls of Constantinople " saved Europe from desolation by

the Saracens "; and it is equally true, that the personal animosity of warriors and the hostile spirit of nations have been much subdued by the new system of tactics introduced when a German Monk, in deflagrating a mixture of sulphur, nitre and charcoal, discovered gunpowder. Morality was improved and crime lessened, when the brilliant lighting of our streets by the introduction of gas made every passer-by a detective policeman.

In addition to the direct communication of power, the increased economy of time resulting from chemical appliances is of immense importance in manufactures. This sometimes follows the discovery of new bodies endowed with peculiar properties, but it far more commonly arises from the reduction of a complex to a simple process. It is with chemistry as with mechanics ; the progress of discovery is in the direction of simplification. The simplification of complex processes is the economy of labour, the husbanding of wealth. Industry, in its progress, continually finds more ready means of cultivating and reaping fields long in its possession. We believe many of our readers are familiar with the story of poor Ho-ti and the pig, told with such delightful vivacity by Charles Lamb. When Ho-ti's house, containing a litter of pigs was burned to the ground, it was natural, as a consequence of this discovery, that the inhabitants of Peking should introduce pigs into their houses, and burn them down, when they desired to participate in a dish so savoury ; but it was a great discovery when an ingenious person found that a common fire would equally do well, and that it was not absolutely necessary to burn down a house every time a pig had to be dressed. " By slow degrees," concludes the Chinese history, " do the most useful and seemingly the most obvious arts make their way among mankind." The moral of this well-known story is of everyday occurrence in the chemistry of arts. Not a year passes without the most mature processes of manufacture being further simplified and economized.

It is with industry as with nature; many of the lower animals have a repetition of organs, destined for the performance of functions similar to those exercised by single organs in the higher animals. Various stomachs and several eyes in the lower creatures are not more effective than one stomach and two eyes in man. The law of repetition of organs is like

the complex processes of manufactures, represented by fewer but more perfect methods as civilization advances. The industrial position of Europe has been gained by her perception of this truth, and by her constant endeavours to replace complex processes of manufacture by means more simple and perfect.

The third division, into which we would divide chemical applications to industry, is one peculiarly characteristic of advancing civilization. European nations, as their wants increase, examine every material, to see if it could be adapted to their needs. Using their heads for sublimer purposes, they observe and investigate the phenomena and properties of each body, so as to ascertain how far it may be made subservient to their desires. In these investigations chemistry offers vital aid; she, like a prudent house wife, economizes every scrap. The horse shoe nails, dropped in the streets during the daily traffic, are carefully collected by her, and reappear in the form of swords and guns. The bones of dead animals yield the chief constituent of lucifer matches. The dregs of port-wine, carefully rejected by the port-wine drinker in decanting his favourite beverage, are taken by him in the morning, in the form of Seidlitz powders, to remove the effects of his debauch. The offal of the streets and the washings of coal-gas reappear carefully preserved in the lady's smelling-bottle. This economy of the chemistry of art is only in imitation of what we observe in the chemistry of nature. Animals live and die; their dead bodies, passing into putridity, escape into the atmosphere, when plants again mould them into forms of organic life: and these plants, actually consisting of a past generation of ancestors, form our present food.

The manufacture of iron from the native ores has been greatly facilitated by the knowledge of chemical science. The mode of smelting iron consists in mixing the ore with lime and coal, the former producing a slag or glass with the impurities of the ore, while the coal reduces the oxide of iron to its metallic state. Much heat is spent in the process of smelting, but the cold air blown in, as the blast, lowers the temperature, and compels the addition of fuel, as a compensation for this reduction. Chemistry pointed to this loss, and now the air is heated before being introduced to the furnace. The quantity of coal is wonderfully economized by the application of science; for instead of seven tons of coal per one ton of iron-ores, three tons now suffice, and the amount produced in the same time is increased nearly sixty per cent. Assuredly this

was a great step in advance. Large quantities of ammonia, which were annually lost before the days of Chemistry, are now readily collected and utilized. So it is needless to state that the chemical science has added to human power, by increasing production and economizing to a great extent both the time and the materials employed.

Without the aid of chemistry, it would have been impossible for textile fabrics to have attained their present development. The bleaching of cotton and linen was not much practised until about 150 years ago; before that time they were sent to Holland, where the operation of bleaching consisted in steeping them in potash for a few days, afterwards for a week in butter milk, and then exposing them for several months on a meadow to the influence of the sun and the moisture. A great improvement was made in Scotland by substituting sulphuric acid for sour milk; and the immediate effect was to reduce the time from eight to four months. In 1785, a French chemist suggested the use of chlorine as a means of hastening the process, and in the last year of the eighteenth century, a compound of this gas with lime was introduced by Tennant of Glasgow. The development of cotton manufacture now became immense.

By a happy adaptation of other chemical processes, in conjunction with the bleaching power of chlorine, the time required for the whitening of cotton and linen fabrics was at once reduced from months to hours, while the miles of outstretched calico, defacing the verdure of country districts, disappeared, the whole operation being carried on within the small space of an ordinary factory. Our readers may well imagine what an impulse chemical science gave to a trade so important as this. The bleaching of calico now consists of a chemical operation of great precision.

We cannot but refer to the triumphs of chemistry in calico-printing—an art which has grown with its growth and become stronger with its strength. The knowledge of mordants and of colours are the results of chemical discoveries. Lapis lazuli long celebrated for its beautiful blue, almost ranked among the precious stones, and was sold at a price which put it quite out of the reach of the calico-printer. But chemists, ascertaining its composition by analysis, soon learned how to make it by synthesis.

The application of chemistry to dyeing deserves especial attention. Madder, the dye most commonly used for calico, after imparting its colour, was considered useless. The large



quantities of spent madder constantly accumulating were found exceedingly inconvenient. It was not valuable enough for the manure heap, and the rivers became polluted in carrying away the waste material. But chemistry has shown that actually one-third of the colouring matter is thus thrown away, and that simple treatment with a hot acid again renders it available as a dye. These waste-heaps are now sources of wealth, and the dyer no longer poisons the rivers with spent madder, but carefully collects it, in order that the chemist may make it again fit for his use.

Stannate of soda is a salt largely used by calico-printers. The usual mode of preparing it was, (1) tin was reduced from its ore; (2) this tin was dissolved in muriatic acid; (3) it was oxidized by nitric acid or chlorine; (4) the oxide thus formed was precipitated and re-dissolved by soda, this bulky, aqueous solution being furnished to calico-printers.

Mercer simplified the process, and obtained it in the solid state by two operations: (1) the tin was obtained as before; (2) this tin was fused with a mixture of nitrate of soda and caustic soda, the former oxidizing it, and the latter forming stannate of soda with the oxide thus formed. The common ore of tin is an oxide: why, then, was it necessary to reduce it to the metallic state merely to oxidize it again? He therefore fused the ore at once with soda, the impurities remaining undissolved, and the salt was made by one operation. We quote this instance as a remarkable example of the tendency of chemistry to simplify processes of manufacture.

We might refer to the important discoveries of yellow and red prussiate of potash, the former of Prussian blue: but this would only be to cite one out of innumerable appliances. We prefer, therefore, to finish this part of the subject, by alluding to the resists and discharges used in calico-printing. In order to preserve white patterns in the process of dyeing, in India, whence calico-printing originated, mechanical devices are still employed, each white spot being covered with sealing-wax, or by being tied up and protected from the dye. By the aid of chemistry, we either discharge the colour on the cloth, or we put upon it bodies which resist the action of the mordants and prevent the colour attaching to that particular part. Acids made from the lees of wine (tartaric acid) and from the lemon (citric acid) are now largely used in these operations, and hence come the beautiful patterns we enjoy in our dresses. It was found that, even when the whites were thus obtained, they be-

came soiled in washing off the excess of mordants from the other parts of cloth; and the only mode of preventing this was, to treat the cloth with a bath of cow-dung. So, nothing can be gainsaid against the triumphs of chemistry in the dyeing of textile fabrics, whether of cotton, wool and silk or their mixtures; and we endorse the dictum that without the application of chemical science to the dyeing of textile fabrics, we would not have obtained so cheaply the beautiful patterns we enjoy in our dresses.

Chemistry is the foundation of those arts which furnish us with saline substances—an order of bodies highly useful in the affairs of common life. The successful manufacture of glass and various kinds of pottery, matches, soaps, etc., requires chemical knowledge of the substances employed, of their possibility as affected by difference of proportion, or by the admixture of foreign substances, and of the means of measuring and regulating high degrees of heat. The successful manufacture of bricks and tiles requires a knowledge of chemistry.

Formerly the shavings of leather were treated as waste, scarcely fit for the manure-heap but chemistry has shown that they contain much nitrogen which renders them well-adapted for the formation of the beautiful colour, known as Prussian blue.

The manufacture of candles has been much improved by the aid of chemistry. Tallow candles or their more expensive substitute, wax, were used before. The tallow itself was very impure, containing cellular tissue, which was only partially removed in the form of a scum. This impurity rendered the light unsteady, and obstructed the wick. The old method of purification has been replaced by a new one in chemically treating the tallow with sulphuric acid and melting by steam. Much of the impurities is thus removed and purer tallow is obtained. But the researches of Chevreul proved that fats consists of fatty acids combined with a kind of sugar named glycerine, which required to be removed, and this glycerine, removed in candle-making, plays an important part in the world of drugs.

We thus see that a great transformation has, of late, taken place in the sphere of many of the useful arts that contribute to the comfort of man, and this has mainly been done by researches in the domain of chemistry. It is a hopeful sign of the times that many of our young men now betake themselves to this branch of science and are trying to help forward the industrial regeneration of India in a tangible way.

# The Agricultural World.

## Dominant Fertilisers.

CROPS generally have a predilection for one manurial substance, which varies with the crop, and this it is, which gave rise to the theory of "dominant fertilisers."

## Promoting Germination of Seed.

The *New York Cornell Station Bulletin* 312 calls attention to the fact that a certain percentage of seeds, though possessing vitality, delay or fail to germinate owing to "hardness," but that early germination could be effected by the aid of sulphuric acid. It is advisable, first to make a germination test to ascertain whether the percentage of germination of seeds, apparently alive, is low.

In the case of a small quantity of seed, it could be placed in a tube or other small glass vessel and a quantity of concentrated sulphuric acid, equal to about 5 or 6 times the quantity of seed, is poured over the seed. Stir the mixture thoroughly with a rod until all are completely coated with the acid. After standing for 15 to 45 minutes (according to the percentage of hard seed) wash with water until the seed is entirely free of acid.

For large quantities, a stone jar of 2 or 3 gallons capacity may be employed and a wooden stick used for stirring.

## Seed Growers' Association.

In Canada, an important Dominion organization is the Canadian Seed Growers' Association. This Association receives financial and other support from the Seed Branch. The main object of the Association is to encourage, through combined effort, the production and use on the farms of Canada of seed of superior quality and yielding power. To do this, a system of breeding has been adopted which recognizes certain fundamental laws in nature, but which is so simple in operation that any farmer of intelligence can follow it on his own farm and produce high-class seed for his own

use and for the trade. Seed grown under the direction and observation of the Association for a certain length of time is accepted for registration by the Association as pure bred or registered seed, provided the quality of the sample be such as to warrant such recognition. As a registration bureau for seed grown in Canada, it occupies a place corresponding very closely with the bureau of registration for animals. Good seed and an efficient business organization to supply it are great desiderata in India. The loss of crops due to the use of worthless seed in India is appalling. In England, the seedsmen scientifically test the seeds before putting them on the market.

## Bombay Cotton.

The textile supplement of the *London Times* recently issued gives interesting details regarding Bombay Cotton. The Bombay province accounts for a third of the total acreage and outturn, with Berar, United Provinces, Punjab, Central Provinces, Madras and Hyderabad producing from a quarter to a third of the cotton obtained from Bombay. "The staple grown in India," says *The Times*, "has degenerated from the fine long-staple cottons that once found a ready sale in Europe. A higher and more profitable yield was obtained from the inferior staples, and the Indian Mills for a long time specialized in low count yarns and inferior piece-goods, with the result that they veritably closed the Indian market to imported goods of this class." As a result of experiments initiated by the Bombay Government, 1,200 bales of fine staple cotton have been sold as compared with exactly a tenth last year. Japan now is the principal buyer of the cotton which India grows. It purchases almost 50 per cent. of the total export of raw cotton in 1911-12. Next after Japan comes Germany. Roughly stated, one-half of the cotton grown in India goes out

raw, a quarter is done into yarn and a quarter is consumed locally.

### Two Ways of Testing for Lime.

Take some blue litmus paper and a spade, go to the field, shove the spade down so as to separate the soil; then stick the paper down into moist soil; next, be sure to trample it tight with your heel. Leave the paper there fifteen minutes or longer, and do this in many places in the field. If the blue paper turns red, it is a sign of acidity, and on many limestone and heavy clay soils, it can be sweetened by ploughing deeper and getting hold of the lime in the subsoil. Farming for scores of years has used up the lime in the top soil. Where no lime is in the subsoil it must then be applied.

Another simple test for lime is made with muriatic acid. Take a bottle of muriatic acid and pour a little of it on some lime mortar, and see how it will bubble and make a hissing sound. Get thoroughly familiar with this bubbling and hissing sound. Next take a glass tumbler and spade and the bottle of acid, and go to the field. Put some soil in the glass and pour on some acid. If it bubbles and makes a hissing sound, there is lime enough in that soil to grow lucerne. Be sure to make the test at several points and varying depths and many times. It might be well to try both ways in testing soils, and if no lime is found, you must apply at least 4 tons of ground limestone or marl, or 2 tons of air-slaked lime to the acre.—*Hoard's Dairyman*.

### Wind and Plant-Growth.

Few think of wind as a factor of importance in the growth, health, and yield of plants, but extensive experiments recently conducted by Dr. Oscar Bernbeck of the Agricultural Academy of Bonn-Poppelsdorf, Germany, prove that wind pressure exerts a marked effect. Plants exposed to severe gales tend to take abnormal forms. They not only bend away from the wind, because of the pressure exerted on twigs and roots, but the sprouts on the side toward the wind are frequently broken or injured, and wounds cause a knotty growth. Moreover, the drying of the ground may

occasion serious injury to the plant and lasting damage to the soil itself in both its physical and its chemical qualities. Dr. Bernbeck has published a report of his investigations where we read that "The water-loss of the ground at a wind velocity of 33 feet per second was shown to be three or four times as great as on protected land. Also, the mechanical effect of the wind on the sprouts was to diminish the energy of growth, by reason of the increase of transpiration, injuries, and alteration of the hydrostatic conditions in those tissues wherein there is a circulation of water."

On some soils, experiments showed that the gain in growth varied in the ratio of three, two, and one, with wind velocities of zero, five, and ten, reckoned in meters per second. The lowering of the temperature of the plant and of the ground also enters into the question, and the degree of dampness of the ground affects the results and must therefore be considered a factor. When the ground was sufficiently damp, and the young sprouts were stiff and firmly bound, the wind was comparatively harmless.

"The figures quoted show clearly what great injury the national agriculture suffers in localities exposed to wind. A moderate wind velocity of 10 to 25 feet per second, such as is usual in Germany, may diminish the yield of exposed land by more than half.

"Remedies may be found in the use of artificial wind-shields, such as walls, hedges, etc., and especially in the forestation of outlying heights, by means of which the current of wind is directed into higher strata of the air and broken."

### Machinery on the Farm.

We gather from the *Scientific American* that on many farms in America little engines may be found that vary in size from one and two horse-power to forty and sixty horse-power, and they are used for almost every imaginable purpose.

Just how extensive is this application of engines it is difficult to state with any degree of certainty. No accurate statistics are available

to show the actual number of farm engines in use, but it is stated the number must be huge. For example, in 1911 three companies alone made upwards of 100,000 engines ranging in size from two to fifteen horse-power. Eighty-seven manufacturers reported that they had sold since starting in business, 655,000 engines; while seventy-six firms reported early in 1912 that their requirements for the year were at least 705,000 engines. There are about seven hundred and fifty manufacturers of gasoline and oil-engines in the United States, and fully five hundred of these make a speciality of farm engines. Their output must be at least half a million engines a year.

It is safe to assume that there are about two million gasoline and oil-engines on American farms at the present time—probably a conservative estimate. The number is being added to at the rate of about 500,000 annually. The average size of these engines is about seven horse-power.

Every one of the 6,361,000 farms in the United States needs one engine at least, and many of them need two or three engines. It appears that even under present conditions profitable use can be made of from thirty to forty million gas engine horse-power on the farms in America.

### The Growing of Dwarf Trees.

In China the art of making dwarf trees is a favourite pastime with the high class and wealthy people.

How gardeners manage to grow miniature pines, firs and oaks in flower-pots for half a century has always been more or less of a secret. It is the result chiefly of skilful, long-continued, root-pruning. They aim first and last at the seat of vigorous growth, endeavouring to weaken it just as far as possible without destroying the life of the tree. They begin with the young plant, say a seedling of a cedar or hemlock, when only two or three inches high, and cut off its tap-roots as soon as it has other rootlets enough to live up on, and replant it in shallow earthen pot or pan.

The end of the tap-root is generally made to rest on the bottom of the pan, or on a flat

stone within it. Alluvial clay is then put into the pot, much of it in bits the size of beans and just enough in kind and quantity to furnish a scanty nourishment to the plant. Just enough of water, light and heat is given to keep it alive, but not enough to excite a vigorous habit. Gardeners usually pride themselves on the shape of their miniature trees, and they use strings, wires, and pegs, and various other mechanical devices, to promote symmetry of habit, or to fashion their pots into odd fancy figures. Thus, by using very shallow pots, the development of the tap-roots is impossible, and by using poor soil and little of it, and little water, rapid growth is prevented. Then, too, the top and side roots, which are within easy reach of the gardener, are shortened by means of a pruning knife, or are seared with a hot iron. In this manner the little tree is headed off on every side and is allowed to grow just enough to live and look healthy. Accordingly, each new set of leaves becomes more and more stunted, the buds and rootlets are diminished in proportion, and at length a balance is established between every part of the tree, making it a dwarf in all respects. In some species this end is reached in three or four years, while in others ten or fifteen years are required.

### The Electrical Stimulation of Plant Growth.

The question of increasing the growth of plants by applying electricity in various ways is one which is being discussed at present. One of the principal workers in this direction in France is Lieut. Basty, who is now engaged in making some very interesting experiments upon the growth of crops. The excellent result which he obtained have attracted the attention of the Agricultural Department, and the Minister is now having the matter taken up from a scientific standpoint. Lieut. Basty is now proceeding in his experiments, upon the basis that the atmosphere is an inexhaustible source of electricity. On the other hand, physiologists assert that the electrical effect serves to hasten and also regularize the circulation of liquids in the capillary tubes, such as those of

plants. If we cause electricity to act on the stalks or roots of a plant, the circulation of sap is stimulated and made more regular, so that the growth of the plant is more rapid and the assimilation better carried out, hence the production from the plant will be more abundant. This idea seems to be borne out by an actual increase in the amount of crops which Lieut. Basty finds. He collects atmospheric electricity by small lightening rods which consists of simple iron rods ending in a non-rusting point. For vegetable gardens, the rods should be about 8 feet high, but for field crops such as wheat and other cereals, hemp and the like, the rods should have 6 feet height. The diameters are from  $\frac{1}{8}$  to  $\frac{1}{4}$  inch, and the rods are driven in the ground for 8 or 10 inches, according to the length of the roots of the plants. It is found that the action is exerted on a radius on the surface of the ground equal to the height of the rod. In practice, the cost of such rods and the labour in mounting them is very small. The following figures for the increase in the growth of certain crops may seem surprising, but they are given on good authority. For potatoes, instead of 100 pounds as before, he now obtains 173 pounds. Beets show 166 pounds. Hemp, for the stalk, 328 pounds, against 100 pounds in all these cases.

### Contagious Abortion in Cattle.

The experiments commenced in 1909, and described by Mr. W. J. Taylor in a *Bulletin of the Montana Agricultural College Experiment Station*, seem to warrant the following conclusions :

(1) Carbolic acid, either fed in solution or injected hypodermically, seems to be a specific against contagious abortion.

(2) Cows, as a rule, will eat with apparent relish as much as 750 cc. of a 4 per cent. solution of carbolic acid in feed daily.

(3) The hypodermic injection as a treatment in an affected herd involves less labour than feeding.

(4) In cases of impending abortion, carbolic acid can be injected in sufficient quantity to cause staggering gait and dilation of the

pupil of the eye (when it should be withheld for from ten to fifteen hours and repeated) with no apparent unsatisfactory after-effects.

(5) All males used for breeding purposes should be treated with carbolic acid either hypodermically or in the feed. The penis and sheath should be thoroughly disinfected both before and after service. Contagious abortion and granular vaginitis may be transmitted through the medium of the male, unless proper precautions are observed.

(6) Not all cows showing granular vaginitis abort.

(7) Heifers pregnant for the first time are more liable to abort than during subsequent periods of gestation and should be carefully watched and vigorously treated, if abortion exists in the herd.

### Possibilities of Indian Cotton.

In the course of an instructive article on "Cotton," in the *United Empire*, Dr. Watson Grice thus speaks of the possibilities of development of Indian cotton :—

"What may be expected from India? Two difficulties are at once met: one in the quantity, the other in the quality, of the supply. Roughly, nearly one-half of the native supply (of four to five million bales) is used by the Bombay mills and native looms. Of the remainder, large consignments go to Germany and Japan, smaller quantities satisfying the requirements of the smaller Continental States and our own manufacturers. More and more the short-fibred cotton grown has become unsuited for use by British firms. As Professor Wyndham Dunstan points out in his Report (1905), "the improvements of Lancashire machinery during the past century have all been in the direction of utilising the medium and long-stapled cottons characteristic of the United States and Egypt" so that, although no actual decline in production of Indian cotton has taken place, India now produces but little of the long-stapled varieties suited to the requirements of the British cotton manufacturers." Though much persistent effort has been directed to persuading the natives to persevere with the cultivation of the longer stapled



varieties of the Egyptian type, which is what our spinners want, it has been found a task of enormous difficulty to overcome the prejudice, fostered by centuries of conservative custom, in favour of the shorter varieties which generally yield a heavier crop. The difficulty, governed by world conditions, of maintaining high prices for the crop, and the additional uncertainty of the full benefit of higher values going to the cultivator has, so far, prevented any great extension of the areas devoted to imported varieties. These difficulties are well known to the Government of India, and in Sind, the Agricultural Department has rendered valuable aid in the supervision of seed selection and distribution: as a consequence, much of the cotton there is becoming of much better quality and attaining a wider market. As the result of a recent undertaking by the Bombay spinners, the persistent cultivator of the higher grades will in future be suitably rewarded. In course of time this progress may become cumulative, and India may again take its place as an important, if not the principal, contributor of raw material to the Mother Country. Careful seed selection and special cultivation will improve the native seed cotton, and distinct success is promised for experiments with imported varieties. The potentialities of the Malabar coastal districts have only been tapped: and its possibilities for the production of "calico" cotton are said to be unrivalled in our Eastern Empire. These speculations derive some support from the recollection that, in the earliest days of British cotton manufacture, as large a proportion of raw fibre was obtained from India as in later days from the West Indies, and now from the United States."

#### Agricultural Implements in Japan.

Mr. Uyeno (Hideza Buro), Professor of Agricultural Science at the Imperial University of Tokyo, contributes an article on "The Use of Agricultural Implements in Japan" to the May number of the *Monthly Bulletin of Agricultural Intelligence and Plant Diseases*.

The traveller in the country districts of Japan is struck with the smallness of the fields,

the steepness of the terraced hills, and the absence of pastures as well as of animals working on the farms. These conditions indicate that agricultural implements, such as those used in Europe and America, are rarely met with. The system of culture is intensive and good crops are obtained, so, as one would expect, the implements in use are well adapted to local conditions. Of these tools the hoe, or *kuwa* rather, is by far the most important. It is said that there are as many as a thousand different kinds which have been worked out to meet the demands of the various conditions of the soil and the different purposes for which they are used.

Next in importance to the hoe, as an agricultural implement, comes the plough or *suki*. The striking feature is that one never sees a pair of horses or a yoke of oxen attached to a plough, the animal used being always alone. After the rice field has been ploughed, it is flooded and the soil is thus easily mixed and broken up with the aid of the so-called "horse-hoe" or *Ma-kuwa*, which is, in fact, a kind of one-rowed harrow.

In weeding rice fields, an implement somewhat like the Norwegian harrow is used. In seeding, the work was done by hand only, until recent years, and great skill was attained. For harvesting grain, the sickle or *kama*, is used altogether. Scythes are coming into use in some parts of the country. When the sheaves of grain are ready for threshing, various simple devices are used.

Ordinarily, the heads of grain are pulled from a double handful of stalks by whipping these into a kind of comb and pulling the heads off between the teeth. The comb is fixed to an immovable bench, which is about half the height of a man, and is set at such an angle as to meet the descending stalks about a right angle. The teeth are about twenty in number and are of sizes suited to the grain to be threshed.

The hulls are next removed by grinding the grain between two light cylinders arranged like the upper and the nether millstone.

The grain is separated by a kind of winnowing machine, called *tomi*, which differs but little from the "Getreide centrifuge" with its arrangement of sloping vibrating sieves. For small quantities of grain, the separation is effected in the primitive way by taking advantage of a suitable wind. Considering the condition of the agricultural industry, the writer makes the following suggestions:—

(1) For cultivation, the use of farm animals should be increased.

(2) The advance in the co-operative system for threshing should make it possible to use animals and mechanical powers in this work.

(3) The use of ploughs and harrows constructed to suit the need should be encouraged. The "Hackpfluge" or vineyard plough would seem to be nearly adapted to the needs in dry fields.

(4) In the case of wet fields, special implements must be invented, since necessity has not called for the invention of such devices in other lands.

(5) The drills and dropping machines now in use should be improved.

(6) For harvesting there seems to be no possibility of using Western machinery, and the sickle should be so modified as to be made more effective.

(7) In the preparation of grain, however, it is most desirable that Western threshing machines should be brought into use.

(8) There is no special demand for agricultural implements used in connection with cattle raising.

New conditions seem to demand an increased use of machinery together with an increase in the use of farm animals or some mechanical motive power.

Nowadays, private enterprise is, on the one hand, bringing in imported implements such as experience shows to be in demand; and, on the other hand, is manufacturing such improved types of domestic implements as have been evolved in the new conditions of the country.

#### Points Affecting Milk Secretion.

A writer in the *Farm and Home* discourses

on some points that tend to influence the secretion of milk by cattle. Probably the most important is the breed of the cow. Next, the period of lactation is an all-important point. A cow usually attains her highest yield of milk in from the fourth to the seventh or eighth week after calving. From that time forward, the quantity decreases, whilst the total solids in the milk (chiefly the fat and casein) increase to the end of the lactation. The age of the cow is a point which must not be overlooked, a young cow giving richer milk than an old one, and improving in milking capacity up to the third or fourth calf.

The food given to a cow largely influences her milk yield in so far as quantity is concerned, but the composition of the milk itself remains practically unchanged. A notable point is that the churnability of the milk varies largely with the kind of food used. The most stimulating food for a cow in milk, is the young grass in spring and early summer. The individuality of the cow perhaps, governs her milk yield more than is generally acknowledged. The ideal milk cow must be neither too dull nor yet too highly-strung, but must be bright-looking and healthy, with good digestion and stomach capacity.

More depends on the milker than one is usually led to understand, quick and thorough milking producing a better flow and richer milk than lazy milking, which tends more than anything else, especially when the milker is a bad "stripper," to send the cow dry. A cow lends herself to quiet treatment, and readily responds with a better milk yield to the milker who treats her gently, while rough and brutal treatment only tends to make her hold up her milk. The period of oestrus affects cows variously, some cows giving practically no milk whilst the service heat is on them; others vary very little either in quantity or quality. The general tendency, however, is towards a falling off in both quantity and quality during this period, whilst so soon as it is past, the natural conditions reassert themselves. Cows, to give the maximum quantity and quality of milk, must be kept at a regular medium temperature, usually 50 deg.

to 60 deg. F. is best. A good system of ventilation obviating extremes of heat or cold is necessary for the maintenance of such a regular temperature. A good supply of pure water and air is necessary for the well-being of the cow as well as for the development and maintenance of her milk secreting qualities.

### The Production and Consumption of Chemical Fertilizers in the World.

The production, trade and consumption of chemical fertilizers have an eminently international character. Indeed none of the countries which use chemicals are in a position to meet the whole of their wants in respect of the three most necessary fertilizing elements: Phosphates, potash and nitrogen. But the international character of the fertilizer trade is rendered still more evident by the fact that the consumption of fertilizers is ever spreading in the cultivated regions of the globe, whilst the raw materials from which the fertilizers are manufactured are found only in a few localities.

Such being the case, it is difficult to follow exactly the circulation of fertilizers in the world.

Consequently a recent publication of the Bureau of Agricultural Intelligence and plant Diseases of the International Institute of Agriculture is very welcome, as thanks to the influential connections of the Institute it has been able to collect in a volume "Production et consommation des engrais chimiques dans le monde," the most complete and precise data on the subject.

The following are some data concerning the world's production:

	Production in metric tons.		
	1903	1910	1911
<i>Phosphatic fertilizers:—</i>			
Mineral phosphates	2,433,779	5,344,981	6,055,073
Basic slag	2,243,500	3,275,845	(3,485,500)
Superphosphates	5,130,900	9,604,260	—
Guanos	(56,000)	66,044	—
<i>Potash salts (for agriculture):—</i>			
Potash salts (calculated as pure potash)	301,144	766,583	(810,000)
Indian saltpetre	2,570	15,581	15,273
Other potash fertilizers (calculated as pure potash)	—	—	40,000

### Production in metric tons.

	1903	1910	1911
<i>Nitrogenous fertilizers:—</i>			
Nitrate of soda	1,466,993	2,432,949	2,487,000
Sulphate of ammonia	537,520	1,045,905	1,187,425
Cyanamide	—	30,000	52,000
Nitrate of lime	25	25,000	50,000
Total nitrog. fertil.	2,004,538	3,533,844	3,786,425

Among the questions of the day, the attempts which are being made in the United States to extract potash from seaweeds deserves to be mentioned. By this means it is reckoned that 1,000,000 metric tons of chloride of potash corresponding to 630,000 metric tons of pure potash could be produced yearly. It has also been proposed in the United States to use feldspars for the extraction of potash in a soluble form; a yield of 400,000 metric tons of pure potash could thus be obtained yearly.

As for the nitrogen question it is worthy of note that the production of sulphate of ammonia has increased five-fold in twenty years. Recently the Mond-Frank-Caro process has been devised for the utilization of the nitrogen contained in peat. It would allow of the manufacture of 88 to 176 lbs. of sulphate of ammonia per metric ton. On the basis of data referring to the present and preceding years and taking into account the most recent processes in the fertilizer industry, the production and probable consumption of synthetic nitrogenous fertilizers has been calculated for the years 1913 and 1914. The figures which have been estimated are enclosed in brackets.

	Calcium cyanamide.	Nitrate of Lime.
	Metric tons.	Metric tons.
1903	—	25
1904	—	550
1905	—	1,600
1906	500	1,600
1907	2,200	15,000
1908	8,300	15,000
1909	16,000	25,000
1910	30,000	25,000
1911	52,000	(50,000)
1912	95,000	(75,000)
	204,000	—
1913	(97,000)	(140,000)
1914	(208,000)	—

As for the *World's consumption* of fertilizers, the following quantities were used in 1911. They represent a value of about £80,000,000,

*World's consumption of fertilizers in 1911.*

	Metric tons.
Lime phosphates ... ..	5,669,000
Superphosphates ... ..	8,604,000
Basic slag ... ..	3,300,000
Guano ... ..	70,000
Potash salts ... ..	4,100,000
(Pure potash) ... ..	(848,400)
Nitrate of soda ... ..	2,313,450
Sulphate of ammonia ... ..	1,100,000
Synthetic nitrogenous fertilizers...	100,000

The data on the consumption of fertilizers per unit of area in the different countries are very interesting, being quite new. They are a first approximation to denote the tendencies of the actual consumption of fertilizers in the world. Every State is classified according to the intensity of consumption of fertilizers per acre, *i.e.*, per hectare. It thus appears that the States that use upwards of 278 lbs. per acre of cultivated area are Belgium, Mauritius and Luxemburg; from 89 to 178 lbs. per acre, Germany, and the Netherlands; from 45 to 89 lbs. per acre, Denmark, United States (Southern States), France, England, Australia, Italy, Switzerland; next follow the countries belonging to class IV (from 9 to 45 lbs. per acre of cultivated land): Austria, Hungary, Spain, United States (North-East), Norway, Dutch East Indies, Portugal, Sweden. All the remaining countries belong to classes V to VIII which consume less than 9 lbs. per acre or whose consumption is unknown.

### Pollination of Fruit Blooms by Bees.

It is not sufficiently realised how close is the connection between bees and fruit. To produce abundant fruit crops of all kinds, it is necessary to keep bees in the orchard or gardens. The blooms of fruit trees, such as apples and pears, cannot be fertilised by the aid of the wind, because the pollen is not produced profusely enough, nor is it of that consistency to be carried in the air. Therefore, insect agency is needful, and of all insects capable of doing the work, bees are the most

numerous at that period of the year. For this reason, it is necessary to draw the attention of the horticulturist to this matter in order that success may attend his efforts.

### Cultivation of Sweet Potatoes.

The *Bulletin* of the Department of Agriculture of Western Australia gives some interesting particulars as to the cultivation of sweet potatoes. A four-ton crop, our contemporary says, removes in the roots alone 30 lbs. of nitrogen, 13 lbs. of phosphoric acid and 64 lbs. of potash. The vines, which weigh more than half the weight of the crop, are rich in nitrogen. Heavy fertilising is therefore necessary to secure a good crop; humus is wanted and can be provided by growing a green crop before the sweet potatoes. A wider interval in the rotation is also desirable to guard against pests and disease.

### Rat Poisons.

A recent issue of the *Journal of the Jamaica Agricultural Society* says that the least successful poison for rats is arsenic. One of the cheapest, best and safest is Plaster of Paris, not a poison in the ordinary term but mixed with cornmeal or oatmeal most effective in rotation with Barium Carbonate. Extermino, a patent rat killer, has been usually successful. "We have always," remarks the *Journal*, "laid stress on variation of poisons and variation of traps; and the use of bamboo pots so that domestic animals may not take the poisons."

### The Mango.

At Saharanpur last year, a beginning was made with the preparation of diagrams and descriptions of the fruit of 82 out of the 100 or so varieties of the mango growing in the Government gardens. These were circulated for the observations of those who might be interested in the question and in response came eager enquiries, not only from India, but from the United States and the West Indies. Even as it is, the mango is a fairly profitable crop in India and if an export trade in it should become established, it is bound to be a most important source of income for the gardener in India.

# The Co-operative World.

## Productive Societies.

**P**RODUCTIVE Societies, observes Mr. Wolff, represent an extremely tough job, and one must be prepared for some failures. Still they are worth trying for, and one success will make up for a score of failures. Artisans resorting to co-operation for credit is a good beginning—"though I should not like to see them, as credit societies, developing and applying to one calling only. The more you blend different callings, the more likely are you to have money available when it is wanted." After credit, common purchase of raw materials should develop and this is almost a half way house to common sale.

## Agricultural Co-operation in Germany.

Agricultural co-operation in Germany made remarkable progress in 1912. There were no less than 1541 new agricultural co-operative societies founded and registered in the register of co-operative societies. As 227 ceased to exist during the year, the real increase was 1,314. This increase is far larger than those in the two preceding years, for, in 1911, it was 1,087 and in 1910, only 813. There was an increase in every class of co-operative societies, though in various degrees; it was distributed as follows:—

Loan and Savings Banks	...	683
Co-operative Societies for Purchase and sale	...	89
Co-operative Dairies (Co-operative Societies for sale of Milk)	...	62
Other Co-operative societies	...	480

The number of members among the co-operative societies was as follows:—

In 16,927 loan and savings banks	..	1,670,000	members
" 2,409 co-operative societies for sale and purchase	...	240,000	"
" 3,488 co-operative dairies	...	320,000	"
" 3,654 other co-operative societies	...	230,000	"

These figures show in a very significant manner the consolidation of the agricultural co-operative movement in Germany.

## The Revival of Rural Life.

We learn from *Farm and Home* that the visit of the American Agricultural Commission terminated in a conference in the Plunkett House, Dublin, at which a paper on the rural community was read by Mr. George Russell, who said that the economic disease with which America was threatened was discontent with rural life. It had often been assumed that stagnation was something inherent in rural life which made the countryman slow in mind, but there was no reason why as intense and intellectually progressive a life should not be possible in the country as in the towns. The real reason was that the country population was not organised. There were true rural communities in ancient Ireland. The members of a clan had common interest. They owned the land, it was a common interest to preserve it intact, and to have a numerous membership to make it less liable to attack.

In the North-West of Donegal, owing to the establishment of a co-operative society, the reign of the gombeen man was now over. "The farmers control their own buying and selling, market their eggs and poultry, procure seeds, fertilisers and domestic requirements, turn their pigs into bacon, and have a village hall, and a women's organisation, a co-operative band. Social gatherings and concerts have spread into the surrounding country.

Dr. Butterfield said the Commissioners recognised that the co-operative idealists in Ireland were not dreamers, but practical workers. They also had learned the fundamental division of function between State assistance to agriculture and voluntary effort and the importance of trained leadership through properly qualified organisers.



### An Agricultural Co-operative Transport Society.

The agricultural co-operative transport society of May in France was founded by twenty farmers under the form of a civil society for the period of fifteen years. The initial capital was 88,500 francs in 295 shares of 300 francs, bearing interest at 4 per cent. per annum. The society is managed by a Board consisting of a President, a treasurer and a secretary, who do not receive salaries. Every year, from the surplus credit remaining after deduction of the general expenses, a sufficient amount is taken to pay the interest on loans and on the capital. Three-fourths of the balance is paid into a fund for extinction of the debt and one-fourth to a thrift fund.

The capital which was originally, as we have seen, 88,500 frs., is now, through the admission of new members, 108,600 frs. The society received a subvention of 9,100 frs. from the Agricultural Improvement Department and a State loan of 180,000 frs. The Lizy refinery has also advanced it an amount of 34,540.80 frs. at 2 per cent.

The revenue consisted of:

Capital ... ..	108,600
Subvention from the Agricultural Improvement Dept. ...	9,100
State Advances ... ..	180,000
Advance from the Lizy Sugar Refinery ... ..	34,540.80
<b>Total ... ..</b>	<b>332,240.80</b>

The expenditure was:	
For Rolling Stock (Engines, Trucks) ... ..	101,163.35
Railway Construction ... ..	189,063.99
Furniture, Implements ... ..	8,990.25
Notarial Expenses, Registration ... ..	1,537.—
<b>Total ... ..</b>	<b>300,754.59</b>

The uninvested capital serves as working capital.

At the end of the first working year, April 30th, 1911, the Profit and Loss Account was as follows:

#### Revenue.

Carriage ... ..	36,806
Subventions ... ..	1,800
<b>Total ... ..</b>	<b>38,606</b>

#### Expenditure—

General Expenditure ...	3,402.66
Working Expenses ...	14,471.80
Cost of Maintenance ...	3,116.30
Interest and Discount ...	113.65
<b>Total ... ..</b>	<b>21,103.41</b>
<b>Balance ... ..</b>	<b>17,502.59</b>

The Co-operative Transport Society is of the greatest service to the farmers, who not only by its means quickly get rid of their produce but also reap considerable indirect advantages.

### Co-operative Publications.

With the encouraging development of the co-operative movement in India and the increasing interest which this subject is evoking, inquiries as to the best and most authentic sources of knowledge in regard to the working of the movement in various parts of the world are naturally becoming numerous. Literature on this subject is nowhere so numerous or important as in Germany and Italy. But so far no serious attempts have been made to translate German, Italian and French Co-operative works into English. Statements and accounts of progress of the movement in those countries and others in the continent of Europe have indeed been collated and given in certain English publications. There are, however, a number of books written in English the existence of which, it is desirable, should be more widely known in India. The following list compiled by the editor of the *Madras Bulletin of Co-operation* will doubtless be read with interest.

#### 1. BIBLIOGRAPHY.

The International Co-operative Alliance has published in 1906 a most valuable Bibliography, *The International Co-operative Bibliography*, (published by the International Co-operative Alliance, 22, Red Lion Square, London, W.C. Price 8s.), of Co-operative books relating to the various aspects of the movement published in the various countries. It is in three languages, French, English and

German and has in all 5,761 entries. There has been, however, since that time a very large output of co-operative literature throughout the world and some of these are mentioned in the *Bulletin of the Bureau of Economic and Social Intelligence*, Rome. The Manchester Co-operative Union has also published a leaflet containing the names of the best books on the subject.

## 2. PERIODICALS.

Among Co-operative periodicals, the *Monthly Bulletin of the Bureau of Economic and Social Intelligence*, published at Rome, under the authority of the International Institute of Agriculture occupies a unique and unrivalled position. It is published monthly in five languages, viz., French, German, English, Spanish and Italian and is a valuable record of the progress made from time to time in various parts of the world. Every Co-operator and every Co-operative Society that can afford it should subscribe for this Journal. *The Irish Homestead* is a weekly and is a powerful organ of Irish societies. *The Co-operative News* is a well known weekly journal devoted wholly to the interests of distributive societies in England. *The Millgate Monthly* is also an instructive organ. *The International Co-operative Bulletin* published by the International Co-operative Alliance in England will be found to be very useful by all those who wish to know the progress of the movement in all parts of the world. There are, besides these, other periodicals, the annual report of the *International Co-operative Congress*, the annual report of the *British Co-operative Congress*; and also the *Year Book of International Co-operation* published by the International Co-operative Alliance. The last is a story of the movement in statistics. Here is a list of periodicals:—

1. "Monthly Bulletin of the Bureau of Economic and Social Intelligence," International Institute of Agriculture, Rome.
2. "The Co-operative News," (Weekly), Long Millgate, Manchester.
3. "Scottish Co-operator," (Weekly), 263, Wallace Street, Kingston.

4. "Irish Homestead," (Weekly), 34, Lower Abbey Street, Dublin.

5. "International Co-operative Bulletin," (Monthly), International Co-operative Alliance, 146, St. Stephan's House, Westminster, W.C.

6. "Year Book of International Co-operation," (Annual), Do. do. do.

7. "Co-operation in Agriculture" (Monthly), Queen Anne's Chambers, Tothill Street, Westminster, S.W.

8. "The Millgate Monthly," Long Millgate, Manchester.

9. "Our Circle" (Monthly), Do. do.

10. "Report of Co-operative Congress," (Annual), Co-operative Union, Holyoake House, Hanover Street, Manchester.

11. "Co-operative Wholesale Societies, Annual," Balloon Street, Manchester.

12. "Co-operator's Year Book," Alliance Chambers, Horsfair Street, Leicester.

13. "Report of Irish Agricultural Organisation Society," (Annual), Plunkett House, Merriam Square, Dublin.

14. "Report of Agricultural Organisation Society," (Annual), Queen Anne's Chambers, Tothill Street, Westminster, S. W.

15. "Report of Scottish Agricultural Organisation Society" (Annual), 5, St. Andrew Square, Edinburgh.

16. "Report of Scottish Co-operative Women's Guild," (Annual), University Lodge, Dumbarton Road, Glasgow.

## 3. BIOGRAPHY.

Besides the lives of Holyoake and Robert Owen which have been published separately, there do not appear to be biographies of other founders of Co-operation in England and the continent, such as Plunkett, Neale, Luzzatti, Raiffeisen, Schulze-Delitzsch and others except as may be found in Co-operative text books. The lives of famous Co-operators is a worthy theme for an enterprising writer.

s. d.

- |  |     |     |     |
|--|-----|-----|-----|
| 1. Life of Holyoake, Co-operative Union Ltd., Manchester                   | ... | 2   | 6   |
| 2. Life of Robert Owen, by L. Jones, Swan Sonnenschein & Co., Ltd., London | ... | ... | 2 6 |

## 4. GENERAL.

Fay's *Co-operation at Home and Abroad* (published by King and Sons, price 10s. 6d.) appears to be the only book extant which attempts to give a history of all aspects of the movement in all countries.

## 5. DISTRIBUTIVE AND PRODUCTIVE CO-OPERATION.

There are many books under this head. Holyoake's *Rochdale Pioneers* is about the most inspiring and we cannot recommend a better book to the intending Co-operator. Holyoake's other books relating to the movement are fairly well known and are given in the list below. We would specially recommend Pizzamiglio's book for a succinct, clear description of the principles underlying distributive Co-operation. *The Report on Industrial and Agricultural Co-operative Societies in the United Kingdom* with statistical tables for ten years from 1900-1909 published last year by the Board of Trade, Labour Department, contains an authentic exposition of the actual working of English societies.

s. d.

1. History of Rochdale Pioneers, by G. J. Holyoake, Swan Sonnenschein & Co., New York & London 2 6
2. Co-operative movement of to-day, by Holyoake, Methuen & Co. 36, Essex Street, London I.W.C. ... 2 6
3. History of Co-operation 2 vols, by Holyoake, T. Fisher Unwin No. 1, Adelphi Terrace, London ... 10 6
4. History of Co-operation, by G. J. Holyoake, Do. do ... 7 6
5. Distributive Co-operative Societies, by Pizzamiglio, Swan Sonnenschein & Co., New York & London... 2 6
6. Industrial Co-operation by Catherine Webb, The Co-operative Union, Ltd., Manchester ...
7. Co-operative Movement, by Potter, Swan Sonnenschein & Co., New York & London ... 2 6
8. Our Story by Isa Nicholson, The Co-operative Union, Manchester.
9. Co-operation by Joseph Clayton, T. C. & E. C. Jack, 67, Long Acre, W. C., London ... 0 6

s. d.

10. Consumer in Revolt ... 1 0
11. Report of Select Committee on Co-operative Stores ... 3 6
12. Report on Industrial and Agricultural Co-operative Societies in the United Kingdom with Statistical tables, Labour Department, Board of Trade, London ... 1 8
13. Co-operative Production, 2 vols, by Benjamin Jones, Clarendon Press, Oxford ... 4 0

## 6. CO-OPERATION IN AGRICULTURE.

Much attention is now being directed in India to the question of the application of Co-operative principles to agriculture. Co-operation in agriculture takes the form of manure, implements and raw material societies which buy wholesale and sell in retail to the members. There is a great variety of such societies and Germany is noted for its possessing agricultural societies of a diversified kind. The best book on the subject is of course Wolff's *viz.*, *Co-operation in Agriculture* which was published quite recently. It is disconcerting to know from Mr. Wolff that his book has not been taken up as enthusiastically in India as it has been in other countries, especially in the United States of America. Mr. Wolff has taken subject by subject and has given an admirably lucid account of the progress made in various countries under each head. The next book one could recommend is the *Monographs on Agricultural Co-operation in Various Countries*, published by the International Institute of Agriculture at Rome, the 2nd part of which is still to be issued. Each country is taken and an interesting account is given of the progress of the movement. Pratt's books including his latest on *Agricultural Co-operation* are well-known, all of them having been written specially with a view to instruct English farmers. His *Organisation in Agriculture* is a famous book and contains everything connected with agriculture such as, Railway rates, Co-operative and other credit, and co-operative and other organisations among farmers, etc., which are discussed with appropriate

foreign examples. His *Transition in Agriculture* gives an account of the possibilities of small holdings and of a better organisation in dealing with egg, fruits and other products of agricultural industry. His *Agricultural Organisation* mentioned before gives the history of the Agricultural Organisation Society of England and the work it has been doing and is expected to do. Denmark is now a by-word for agricultural co-operation, where it has attained enormous proportions. Rider Haggard has placed the Co-operative movement under great obligation to him by his entertaining account of Dutch societies in his book on *Rural Denmark and its Lessons*, the 2nd edition of which has already been published. A similar attempt has been made by J. W. Robertson Scott in regard to Holland in his book styled *A Free Farmer in a Free State*. Radford's *Agricultural Co-operation* will serve as a useful introduction to Wolff's book. Smith's *Monograph* and also Montgomery's *Notes on Agricultural Co-operation and Co-operative Agricultural Credit in Germany* referred to in the list below will be found interesting reading:—

s. d.

1. Co-operation in Agriculture, by H. W. Wolff, P. S. King & Son, Orchard House Westminster, London. 6 0
2. Agricultural Co-operation, by G. Radford. Do. do. ... 1 0
3. Rural Denmark and its lessons, 2nd Edn., by Rider Haggard, Longmans, Green & Co. Paternoster Row, London ... 6 6
4. A Free Farmer in a Free State, by J. W. Robertson Scott, William Heinmann, London ... 6 0
5. Agricultural Organisation, by E. A. Pratt, P. S. King & Son, London. 3 6
6. Organisation in Agriculture, by E. A. Pratt John Murray, London ... 1 0
7. Transition in Agriculture, by E. A. Pratt, Do. do. ... 5 0
8. The best methods of Organisation for Agricultural Co-operation and credit by Smith, Department of Agriculture & Technical Instruc-

s. d.

tion for Ireland. Printed by Alex. Thom & Co., Abbey St., Dublin. ...

9. Notes on Agricultural Co-operation and Co-operative Agricultural Credit in Germany, by H. D. F. Montgomery, D. L., Do. do. ...
10. Monographs on Agricultural Co-operation in various countries, Bureau of Economic and Social Intelligence, Institute of Agriculture, Rome ... 3 fr, 50 c.

#### 7. CO-OPERATIVE BANKING.

On the subject of Co-operative banking there are numerous publications. Books by Nicholson, Wolff and Dupernex are well-known and are indispensable to a proper study of the subject. *Co-operative Banking*, by H. W. Wolff, gives the rationale of Co-operative banking, while his *People's Banks* is devoted to a most valuable history of the movement in various countries. For a clear and useful study of Co-operative banking in Germany, including the famous *Land Banks*, we would recommend a Blue-book under the title of *Report to the Board of Agriculture and Fisheries of an Enquiry in Germany with some Notes in German Live Stock Insurance*, by J. R. Cahill, published quite recently. It is a very valuable publication.

1. Report on Agricultural Banks, 2 vols s. d.  
by Nicholson (Sir Frederic), Superintendent, Government Press, Madras (price Rs. 3-12-0)
2. People's Banks by Dupernex, Thacker Spink & Co. Calcutta (price Rs. 4)
3. Co-operative Banking by H. W. Wolff, P. S. King & Son, London 7 6
4. People's Banks, by H. W. Wolff, Do. ... 6 0
5. Co-operative Credit Banks, by H. W. Wolff, Do. ... 1 0
6. Agricultural Banks by H. W. Wolff, Do. ... 1 0
7. Village Banks, by H. W. Wolff, Do. 0 6
8. People's Co-operative Banks, by H. C. Devine, Cassel & Co., Limited, London ... 1 0

9. Banks & People, by Thomas Farrow, Chapman & Hall, Ltd., London...	s. d. 1 0
10. An Enquiry into European Credit Systems, Wymen & Sons, Ltd., Fetter Lane, London, E.C. ....	...
11. Select Committee's Report on Thrift and Credit Bank's Bill, Do.	0 6
12. Report to the Board of Agriculture and Fisheries of an Enquiry into Agricultural Credit and Agricul- tural Co-operation in Germany with some notes on German Live Stock Insurance, by J. R. C.	...
Do. do ... ..	0

### Co-operation in the Madras Panchayats.

In the course of a letter to the Registrar, Co-operative Societies, Madras, on the Administration Report for 1911-1912, Mr. H. W. Wolff observes :—

#### MORTGAGES.

"What you say about real security inspired me with serious alarm. Whatever form your societies take, mortgages are not at all a proper security for them to accept. You want a distinct form of society for them. Mortgages lock up your money, which you want to keep fluid and expose you to risks such as have brought more than one European society to grief. One cannot altogether forbid mortgages, but the figure ought to be kept down and in any case they ought to take the shape of collateral or additional, precautionary, security. To have to foreclose would be most inconvenient to the banks."

#### REGISTER OF SECURITY VALUE.

"The register of security value of members that you propose to introduce—in Agra and Oudh they call it "haisiyat"—is likely to prove useful, but ought to be employed only as a temporary expedient. All such mechanical devices portend danger. As Raiffeisen puts it, such societies can only answer, so long as the Committee, being fully aware of their responsibility and liability, watch over every loan and inquire into the merits of each case. To enable them to do so is why these societies are kept small. If your panchayats have given

credit for Rs. 1,000 when only Rs. 500 should have been allowed, they have failed to do their duty and if there had been a council, as sooner or later there ought to be, that council would have found them out.

#### LIABILITY OF ADMINISTRATIVE UNIONS.

In "administrative" Unions you require no "liability" whatever. What should they engage in it for? They are not to carry on finance but inspection etc. For this they require contributions from the constituent societies, but no cash or credit of their own, except a cash balance to go on with.

#### LIMITED OR UNLIMITED.

"In urban societies it is wholly for the members to decide whether along with their shares, they will have limited or unlimited liability. In England unlimited liability would be out of the question; it is even illegal. But if in India members of some societies prefer unlimited liability as securing them—which it undoubtedly does—larger credit, there is no reason why they should not. Only they ought to be steadily reminded that they are bound by it, as there may be unpleasant surprises. In Germany and Austria the best—which I call "share banks"—have unlimited liability and do well with it.

#### NECESSITY OF INSPECTION.

"You do well to dwell so much upon the necessity of inspection and the duty of societies to provide for it, where they can, out of their own means, as securing them a direct benefit. Only when they pay for it, they ought to carry it out themselves. That is what wants working up to. Government inspection of some sort there will always have to be, to make sure that the law is obeyed. But the inspection upon which you rely for safety ought in the end to be carried out by unions and that will be of greater value—also to creditors—than Government inspection. It is a great relief to find that you are independent of Government assistance in the matter of funds.

#### RENEWALS OF LOANS.

In the matter of renewals or extensions you touch upon a rather important point. It is



not to the advantage of societies that *banks* should ever appear to have long arrears outstanding. You might very well introduce an additional column into your accounts showing what loans were renewed during the year, so as to have the two things distinct: fresh loans and renewals. Re-loans as you call them, there will have to be, though they should be kept down. Your principle of making renewal dependent upon part repayment is very good, so far as it is practicable."

### A Lesson in Co-operation.

A recent issue of the *Round Table* contains a very interesting description of the wonderful progress achieved by "The Grain Growers' Movement in Western Canada," and shows the tremendous power possessed by any body of citizens animated by self interest. Faced by the neglect of politicians and the apparently unassailable position of the monopolists, they have created an organisation making themselves independent of both:—

It may be assumed, therefore, that a large part of the grain trade in Western Canada will be controlled by a co-operative organisation of the farmers themselves. But the officers of the Grain Growers' Grain Company, finding that success has followed these schemes, decline to confine their attention to the handling of grain. They have bought a large tract of timber in British Columbia, from which they intend to develop a lumber business with a view to defeating the lumber combines, which are admitted to operate in the prairie provinces. In Manitoba, they have established a flour-selling business in connection with their elevators, and have already reduced the price to the consumer. They propose to extend the system gradually to other supplies, and it is by no means improbable that they will enter upon the flour-milling business in the near future. They look forward, also, to establishing co-operative manufactories of agricultural machinery, such as the Labour Ministry is preparing to build up in Western Australia, and, if the Government of the prairie provinces do not create a system of State loans, they meditate entering upon the mortgage business.

The writer of the article says:—

There may be many faults to find with the Grain Growers, but they must be regarded as the main hope of democracy in Canada, and the spear-head of the reforming forces whose aspiration ought to be to save Canada from the harrowing experiences of her southern neighbour at the hands of an organised and selfish capitalism. They have a clear idea of the goal which they seek, a vast co-operative agricultural community freed from the tyranny of corporations, railways, and the manufacturers' associations, enjoying continuous prosperity under the British flag, and evolving a free, contented yeomanry as a backbone for the population of the Dominion and a saving strength for the British Empire. There can be no greater bulwark for the British connection in Western Canada than the establishment of such a co-operative system in pleasing contrast to the individualistic scramble of the United States.

### Egg Co-operative Societies in France.

The first egg co-operative society was founded in Denmark in 1894. The results were so satisfactory that there are now in that country over 8,000 similar associations with a membership of over 70,000 farmers.

The example of Denmark was followed by France in 1904, when the Co-operative Dairy of Tennie (Sarthe) began to undertake the collection and sale of eggs. Another egg society was started at Echire (Deux Sevres) in 1909, and there are now existing similar societies at St. Hilaire-la-Palud, Mauze, and St. Loup sur-Thonnet in Deux Sevres; at Bois-Hardi and Chailli in Charente-Inferieure, and at Perignac in Charente.

Each member is bound to consign to his society his whole supply of eggs, except such as are required for household consumption. He must not sell any to dealers. The eggs are collected at least once a week. A member must mark all the eggs supplied by him with his number, each egg must be above a certain size, and only fresh eggs collected since the last consignment must be delivered. Eggs recognised as not fresh, when tested, and

those below the prescribed size are returned to the farmer; in the case of a second offence a fine is inflicted, and if the offence is again repeated the member may be expelled from the society.

The eggs, after being tested and sorted, are arranged in layers, and placed one above another in boxes which are forwarded to the Paris central markets. As the eggs are sorted and guaranteed fresh their prices are generally considerably higher than the quotations on the local markets.

In the St. Hilaire-la-Palud Society, the number of eggs collected per month varies from 65,000 (in March) to 50,000 (in November). The annual revenue amounts to 40,000 francs, whilst before its foundation the members would only have received from 25,000 to 30,000 francs for the same number of eggs.

### Co-operative Credit in Egypt.

Some co-operative societies exist in certain of the provinces, says a Cairo correspondent, but their mode of operation is extremely unsatisfactory. They are quite independent institutions, and whilst on the one hand they have not been financially sound, on the other hand they have been a formidable weapon in the hands of the Nationalist party. Indeed, it was because of the fear that they might become a political force in the country, owing to their peculiar relation to the fellahen classes that the Government has steadfastly refused to sanction the creation of any more of these private co-operative societies. Now, however, that Egyptian Nationalism is dead, this danger no longer exists, but in order to guard against any fear in the future, the Government has decided to retain control in its own hands and is at present studying a scheme of State co-operative credit.

Although the exact details are naturally not known yet, the main lines are the institution in each district, at first, and later in each village, of local commissions, whose task will be to examine every application for a loan, give an

opinion thereon, see that the instalments are paid, assist the cultivators to market their crops, arrange to obtain for them seed, and cattle for ploughing, etc. This may not be "co-operation" as it is known in other countries, but it is co-operative in so far as each commission will be responsible for all the business transacted and each village will have to answer to it for the commercial transactions of its inhabitants. Since loans will be more economically negotiated and seed will be obtained in bulk at cheaper rates whilst the crops will be marketed under more advantageous conditions one may certainly call the system co-operative: it will have one advantage in that there will be no working expenses. The recent legislation introduced by Lord Kitchener for the benefit of the cultivating classes has to a certain extent upset the system of agriculture credit which has been in force hitherto and which has been of a distinctly unsound and oppressive nature.

### State Aid to Co-operation.

It is against the principles of Co-operation that Societies should be formed carelessly and without the necessary precautions in the expectation that the State will intervene to make up for the errors committed by means of subventions.

*State action on behalf of Co-operation is not intended to take the place of, but only to awake and revive, the free energies and economic forces of the organised farmers leaving them all the responsibility.* Therefore the subventions granted by the State must never form the financial basis of the society. The members must arrange for that by contributing the necessary capital.

### The C. P. Co-operative Conference.

The Second Provincial Co-operative Conference for the Central Provinces and Berar will be held in Jubbulpore on the 15th and 16th September 1913. The proceedings will be opened by the Hon'ble the Chief Commissioner, Sir Benjamin Robertson, K.C.S.I., C.I.E.

# The Industrial World.

## Salt in the Brass Melting Pot.

"[F common salt is not used in brass melting, then it will be found that the castings, whether made in metal moulds, or in sand, will be dirty, lack strength and ductility, and the metal will run sluggishly. If common salt is used, the brass will be cleaner, have more strength and ductility and run sharper and better." This statement in *The Brass World* summarises a rather discursive article on the subject. Copper when melted with zinc to make brass, forms an oxide. This oxide is reduced by the zinc. That is to say, the zinc absorbs the oxygen and sets free the copper, but forms zinc oxide, which remains suspended in the mass of molten brass and does not readily come to the surface. It acts like so much dirt and weakens the metal. The use of salt prevents the formation of oxide or reduces it if it has been formed and thus removes the disease. Throw a handful of salt on the copper as soon as it begins to melt and is well covered with charcoal. Stir it in. When all has been melted, add a little more. When the right amount has been added it should produce a pasty slag, easily removed in a lump by the skimmer. From one to two handfuls of salt per 100 lbs of brass will give this condition.

## Coal Tar Products.

Coal tar, as may be generally known to our readers, is a bye-product of the coke and gas industries. In Germany 90 per cent. of the industrial works are made to yield this bye-product.

Foremost among these coal tar products are benzol, toluol, xylol, solvent-naphtha, ammonia, and the cyanides; next come pitch, anthracene, pyridin, naphthalene, the light, medium, and heavy oils, and in further development etheric oils, perfumes, drugs, and dyes. The work involved gives employment to an army of people of every grade, from the highly trained scientific expert and investigator, through

the ranks of merchants, clerks, and skilled mechanics, down to day-labourers. We read in a contemporary:—

"Of surpassing importance is the recovery of ammonia from the gases in the form of the sulphate and of sal ammoniac. . . . To-day Germany controls the world-market with an output of more than 410,000 tons [of the ammoniac salts], having a selling value of over 25,000,000 dollars. Besides many chemical applications—as in the manufacture of explosives—ammonium is especially employed as a fertilizer. . . .

"Benzol is the mother-substance of a large number of important aromatic compounds and of artificial dye-stuffs, besides its use as a solvent and purifier for numerous organic bodies, such as caoutchouc and gum. . . .

"Purified toluol yields many dyes, and is used in making explosives, medicinal preparations, perfumes, and so forth. . . . Cyanide has long been used in gold-washing, and is at present used in making 'Berlin blue.' . . . These manifold constituents of coal-tar are separated out by means of the process known as fractional distillation, based on the fact that the various components possess specific boiling-points. From a fifth to a fourth of the coal-tar produced is used raw, the rest being subject to development by fractional distillation. The raw tar and such derivatives as pitch, tar-oil and creosote find extensive utility as preservatives of wood and iron from dampness, decay, and attacks of insects.

## Dried Mango.

Mr. Howard Newport, Instructor in Tropical Agriculture, Cairns, Queensland, Australia, thus describes a process for the drying of mangoes:—The mango is picked just before turning colour. On being peeled, the flesh is found to be firm and of a pale-yellow colour. This is cut off with a large knife in chips or small slices some 2 in. in length, 1 in. or so wide,

and perhaps  $\frac{1}{8}$  in. thick. These slices are laid in the sun to dry, and become dry enough to store in three or four days.

One turning is required. The fully dried "chips" are of a very pale-yellow or brownish-white colour, and if only cut into similar shapes could hardly be distinguished in appearance from the best dried apples.

These chips, when thoroughly dry, are stored in air-tight receptacles, and may be packed quite tightly in them. Large glass jars and wide-mouthed bottles are used, but the best receptacles are the large earthenware jars in which the Chinese import liquor, preserves, or sauces. Hermetical sealing is very necessary, and is generally done with ordinary beeswax.

In this manner the mango keeps perfectly and apparently indefinitely, without any preservative whatever.

#### Preserved Ginger from China.

There has been a general increase in the export of preserved and candied ginger from China during the past few years, the United States particularly showing a growing demand for this sweetmeat. The exports during the past three years have averaged in value about £25,000 per annum, practically all of which has been shipped through Hongkong. Of these total exports about 25 per cent. on an average come from the country about Shanghai and through that port, about 6 per cent. through Swatow, and nearly all the rest through Canton. Hongkong has always been the centre of the export trade in this commodity since the trade was first inaugurated, and for that reason that port draws all Chinese ginger to its market. The root is exported from China in considerable quantities, in no other form than as preserved or candied root, known respectively as "in syrup" or "dry ginger." The preserved form includes not only ginger itself which has been peeled, boiled, and preserved in sugar syrup, but also mixed preserves of ginger, kumquats (very small oranges), melon, rind and the like, which are prepared in substantially the same manner, according to the United States

Consul-General at Hongkong, as ordinary fruit preserves are prepared in America. "Dry" or candied ginger is merely the root, which resembles a small somewhat gnarled sweet potato in appearance, prepared by being peeled and preserved in strong syrup, and then dried in the sun. Of the ginger exported from Hongkong both in syrup and as dry ginger, two general grades are known in the trade—"stem" ginger and "cargo" ginger. The former is a young and tender root, free from fibres, and not so hot; the "cargo" grade is the ordinary run of ginger, the older, tougher roots, stringy in quality, hot in flavour, and otherwise not of the better grade. The ginger in syrup is packed in jars made by the Chinese especially for the purpose, in sizes which contain from one to five pounds when packed commercially, though ginger is sometimes packed in larger fancy jars for use as gifts among the Chinese, the usual form having given the name of "ginger jar" to a covered vase-like jar well known to collectors of Chinese porcelain. The jars packed commercially are generally shipped in cases of six, five-pound jars, twelve two-pound jars, or twenty four one-pound jars. A good deal of ginger in syrup is now being shipped in tins. The dry or candied "stem" or high-grade ginger is generally packed in tins and then cased. The dry "cargo" grade is generally packed without tinning in close cases containing a half-picul, or  $66\frac{2}{3}$  pounds. The export trade in Hongkong generally recognises three brands of both the stem and the cargo root, known respectively as "Chy Loong," "Man Loong," and "Sun Sing Loong."

#### Non-rusting Treatment for Tools.

All iron tools, such as squares, wrenches, pliers, dividers, screw-drivers, etc., have the unwelcome property of rusting. In damp shops the tendency is even more marked. For all such cases as arise with plain iron tools (those not plated or painted) the following treatment described by Mr. Philip Edelman in the *Scientific American* will be found to be an efficient preventive measure. Obtain some potassium bichromate (five or ten cents worth

will be sufficient for a gallon of solution) and some sodium hydroxide (lye). The water used as a solvent should be distilled and warm or hot if possible. To a gallon of water add about one or two tablespoons of the hydroxide (lye) and after it is dissolved add the bichromate. Make the solution saturated, *i.e.*, put in as much of the bichromate as will dissolve. Since the crystals do not dissolve very fast, the solution should be stirred. Now clean the tools, utensils, or the like which are to be treated. They should be smoothed and polished if possible. Sandpaper or emery paper or cloth will be found serviceable for this purpose. Then submerge the tools in the solution. When several pieces are treated at the same time they should not touch or interfere with one another. The treatment should last as long as possible. This may be for one, two, or more days, or even for several weeks. The tools may be taken out of the solution and used as needed and then reinserted in the solution. In such cases, care should be taken to keep the tools clean or else to reclean them. Some tools, as screw-drivers, squares, dividers, etc., can be left in the solution continually, day in and day out, and be taken from the solution as needed. This method will keep them bright indefinitely. If the solution evaporates, it can be replaced with more water or bichromate and lye as needed. Ordinary tools can be washed and wiped with a cloth after treatment without destroying the non-rusting effect. This treatment should be very valuable about the shop, and since it does not injure the tool in any way, it is applicable to fine tools as well as the common ones. The action is due to the combined influence of the hydroxide and bichromate, which tends to inhibit and prevent the iron from corroding. The effect wears off in time, of course, but it can be renewed by a further treatment. In fact, occasional treatment at given intervals should render the tools practically permanently immune. The cause of the action is not definitely known. It is thought that the hydroxide acts on account of the OH ions which are freed, and that the bichromate acts to form a

protective coat of some sort on the iron, which keeps it from corrosion. This coat cannot be seen, however, even by the aid of powerful microscopes. Since the average worker is more concerned with how it works rather than why, discussion of the theory is unnecessary. The potassium bichromate and the lye can be obtained at any drug store and should be handled with care, since both are poisonous, and one causes burns while the other causes unsightly flesh stains under the condition of moisture on the flesh.

### The Nuremberg Toy-making Industry.

Children's toys of every description have been made from time immemorial at Nuremberg, where this industry appears to have been carried on in some families for centuries, and handed down from father to son for generations. During the Middle Ages, Nuremberg was probably the only place in Europe where toys—chiefly dolls—were made, and supplied to the travelling dealers who penetrated into far distant countries with their wares. Hence the popular saying, *Nuremberges Tand geht durch alles Land* (Nuremberg's toys go through every land). Until 1875, toy-making in this district was essentially a home industry, then a complete revolution in the methods took place, and the factory system was introduced. This grew rapidly, and large establishments employing many work people soon sprang into existence, not only at Nuremberg but also at Furth, Erlangen, Zimdorf, Wendelstein, Weissenberg, Lichtenfels, Burgfarnbach, and other places. These factories turn out immense quantities of toys of every description, such as toy soldiers, swords, trumpets, boxes of bricks, games, animals. Some of the mechanical toys, such as steam boats, railway trains, aeroplanes, etc., are very complete, and cost at wholesale prices as much as forty marks (£2) each. Immense quantities of soft wood, metal, felt, and other materials are consumed annually in these establishments. Dolls are now chiefly made in Saxony and Thuringia. It is impossible, remarks a writer in the *Journal of the Royal Society of Arts*, to estimate the amount of



capital employed in this industry. The wages paid vary from twenty to forty-five marks per week for men, whilst girls and women earn on the average from seven to twenty marks. The working hours are generally ten hours per day for adults, and eight hours for children. In some cases, piece-work has been introduced for making some description of toys. Several associations are in existence amongst the work-people for insurance against death, accident, and unemployment. Amongst the principal of these the "Metallverband," or association of the metal-workers, established about a year ago, appears to be working satisfactorily. The value of the toys exported annually from this district has been estimated at twenty million of marks (one million sterling).

### The World's Sugar Industries.

In the course of a review of Mr. H. C. Prinzen Geerlig's volume "The World's Sugar Cane Industry," the *Investors Chronicle* writes:—At one time the sugar cane flourished in Europe. All countries round the Mediterranean were cane-sugar-producing in the thirteenth and fourteenth centuries, but Spain is now the only part of Europe in which the sugar-cane is cultivated on a commercial scale, and there only to the extent of about 18,000 tons annually, or less than a fifth of the sugar consumed in the country. In Europe, in the United States (outside the cane sugar territory round the Gulf of Mexico), in Canada, and in Asia—in the far north-east—the sugar beet is grown in increasing areas. The only country in Europe which produces no sugar is Norway, if we include ourselves in the sugar-producing countries. We consume more sugar per head than any other country, four-fifths of this being the beet variety. The production of Germany is the largest in Europe, roughly about two million and a half tons, but Russia has lately been creeping to the front, and in Asia and Europe may grow bigger crops yet. It is said that the production in the western countries cannot be greatly extended; sugar beet has to keep its proper place in the rotation of crops. In England, where our farmers have made headway with well-grown crops of other

roots than sugar beet, the sugar root has naturally some difficulty in making any kind of place for itself.

Is the future with beet or cane sugar? Sixty years ago it was predicted by one eminent authority that beet sugar had no future. At that time, the world's annual production was 250,000 tons. Last year it was 8,572,000. Sixty years back the output of sugar-cane was a million tons per annum greater than that of beet. In 1907-8 the cane output was only 40% of the world's total, but for 1911-12 it will probably be one half. Mr. Geerligs shows that whereas before the Brussels Convention (1902) "the much privileged and protected beet sugar industry towered over the suffering and unprotected cane sugar cultivation, on which full import duties had to be paid when exported to foreign markets, with the exception of Russia and the United States, hardly any beet sugar producing country of any importance now subsidises its home industry, whereas a great many cane-sugar producing countries now support their industry by differential import duties, surtaxes, and direct Governmental assistance. The cane sugar industry, in its turn, is now going ahead. Neither industry is now inferior to the other, a state of equilibrium 'which is not likely to cease.'" The cane yields four or five tons of sugar to the acre to the beet's ton and a half or two tons, and the cane stalk after being crushed can be used to boil the sugar obtained from it; but tropical agriculture involves "cheap" labour, which is often very dear and means production a long way from the most profitable markets.

The sugar cane did not get as far West even as Madeira till 1419. Then it crept out to the Azores and down the West African Coast. It was when sugar reached the New World that it seems to have become an article of common consumption instead of a medicine and a luxury. Guinea slaves were the means by which sugar attained to a place in the food supplies of the world. As late as 1712 the import of slaves into America for the plantations was 74,000, of whom our own people brought over half. Mr. Geerligs thinks it was

the driving out of 20,000 Dutchmen from Brazil in 1665 that set up the West Indies in a substantial way in the sugar business. Columbus's attempt to establish cane cultivation in San Domingo had been a failure. The last regions of the Western world to grow sugar were Peru, Argentina, Chile, Mexico, and Louisiana. Sugar is obtained to-day from other plants than cane and beet, but they are not serious rivals. When Napoleon was inciting the French to produce a substitute for cane sugar, attempts were made to obtain sugar not only from beet but from grapes, apples, pears, plums, quinces, mulberries, chestnuts, figs sorghum and maize stalks, and from the sap of nut and maple trees. In 1812-13 Napoleon had caused sufficient beet to be grown and had encouraged the erection of sufficient factories for 7,000,000 lbs. of sugar to be produced. With the amazing political and commercial history of beet sugar in Europe from that day to this, Mr. Geerligs deals at length, and admits that the cane sugar industry has benighted economically and technically from the competition to which it has been subjected. His close acquaintance with Java enables him to demonstrate strikingly the advantages her sugar industry gained by the adoption of modern methods, an example that has been followed, with the result that experiment stations and testing grounds and laboratories for the benefit of planters and manufacturers are now to be found in every sugar-producing country.

Java has doubled her production since 1899, and more than quadrupled it since 1889. "The production per unit of area is ever rising. . . . Great things are to be expected when the cross-fertilisation of cane varieties for the sake of new species of cane is successfully accomplished. . . . Energy, enterprise, knowledge, and science are all to the fore in Java." *Formosa* will, Mr. Geerligs thinks, after this year, supply enough sugar to meet the wants of Japan. In *China* sugar production is a home industry. The *Philippines* may have a sugar future "such as we dare not yet put down in figures." In the *Straits Settlements* "rubber

yields far more profit than sugar will ever do." *India*, in spite of its gigantic production, "will remain for some time to come a sugar-importing country, to whose markets beet as well as cane sugar will continue to be taken." In the *West Indies*, "though the condition of the sugar industry is far from brilliant, the feeling of despondency belongs to the past." In the *United States* the industry "is not likely to undergo any great changes." The country is considered capable of absorbing the increased production of Cuba, Porto Rico, Hawaii, and the Philippines. Labour is a difficulty in Cuba, but may not be so serious in the future. In *Porto Rico* "an important extension" of the industry is to be expected. *Mexico* is equal to increasing her production, given favourable political conditions. In *South America* Mr. Geerligs is disposed to expect great things from *Peru's* sugar production. In *Egypt*, as cotton has not been the success it was expected to be, the farmers will take up cane cultivation once more. The *Natal* industry, he believes, "is likely to flourish before long." In *Mauritius* the industry "is not likely to expand." As to *Australia*, Mr. Geerligs is inclined to wait for the report of the Commission; "the prospect as it is looks far from promising."

### The Canning Industry.

Babu Haridas Haldar of Calighat, Calcutta, writing in a recent issue of the *Hindu Review* points out that the art of preserving food in vacuum within hermetically sealed receptacles by means of heat first evolved from the studious and observant brains of an humble Frenchman Nicholas Appert, whose sole occupation in life had been connected with brewing, wine-making, pickling and the making of confectionary.

### HISTORY.

In 1810 he first introduced the process of heating provisions in vessels which could be hermetically closed, so that the steam should drive out the air and a vacuum be produced. The French Government, under Napoleon the Great, awarded him the prize of 12,000 francs, which long before had been

offered for a method that would preserve alimentary substances without robbing them of their natural qualities and juices. This method of preservation, although invented by a Frenchman, did not make much progress in France. And it was reserved for the go-ahead people of America to seize on the same and make it, as they have indeed done, a great industry, now so well known under the generic title of canning, which enables us today to secure and consume the good things of life which Heaven sends us and genius preserves for us in all climates and all seasons. With the separation of country from town, the development of manufacturing nations as distinct from agricultural and food-producing peoples, the spreading of civilized man from Torrid to Arctic Zones, the needs of travellers on land and sea and of armies on the march, the problem of the prevention of the natural decomposition of food substances became increasingly urgent, and it has now been satisfactorily solved by the industry of canning. For, by this means, we can now store the plenitude of one season or one place against the need of other seasons or other places.

There is almost no limit to the possibilities of canned food if it is properly packed and placed before the people. The various methods and improvements which tend to raise the standard of quality and at the same time lower the price are gradually bringing it within the reach of all classes. The rate at which the world's demand for these goods has increased during the last ten years is almost incredible. There are at present in the United States alone between two to three thousands of canneries packing principally tomatoes, corn, milk, oysters, corned beef, salmon, sardines, peaches, peas, beans, apples, pears, pineapples, small fruits and pumpkins. There the total out-put of canned goods is computed to have been about 7,00,000,000 cans of all sizes and kinds. The annual aggregate value of these goods amount in an average year to over Rs. 2,46,000,000. The introduction of labour-saving machinery has revolutionized this industry. It has, while banishing to a consider-

able extent the use of manual labour, greatly reduced the price of goods and increased the out-put. The tests which canned food has successfully undergone during the past twenty-five years is wonderful; only improved health has followed its use, and its keeping qualities have been demonstrated by long expeditions in various parts of the world.

#### A PROMISING INDUSTRY IN INDIA.

India is pre-eminently the country of splendid luscious fruits, varied green vegetables and famous fresh-water fishes. The prospect of this industry in this country is therefore immense. In Bengal, at any rate, we may with advantage pack pine-apples, bael, mangoes, liches, nakats, shabedass, kharbujahs, jack-fruits, jambruls, cabbages, cauliflowers, green-peas, parwals, beans, hilsa fish, mango fish, vekties, magoors, koies, fresh-water lobsters, prawns and what not. The beneficial effects of good ripe sound fruits in purifying the system and toning up the general health are well known and are being increasingly recognized by physicians, who advise the judicious use of fruits in preference to nauseous drugs much more than they did formerly. In the first class canned article, we have something better than similar goods in their so-called fresh state in the bazaar, where the stall keepers too often palm off stale unsound fruit on their customers, while the least unsound fruit if canned will not keep at all. But probably the best argument of all in favour of canned fruits is that these can be had in all seasons and all places where fresh fruits cannot be obtained. All fruits should be packed in glass jars instead of tin cans. Tin is slowly acted upon by the malic acid, the natural acid of fruits, and the mailate of tin, thus formed, imparts a metallic distaste to the tinned fruits, the prejudice against their use being solely due to this cause. Dr. S. Rideal says, "If the inside of the tin be much discoloured, or tinned fruits show a strongly marked crystalline appearance on the interior surface, they are unsafe to be eaten." When fruits are packed in glass jars, no such deterioration is possible, and they retain their natural taste and aroma for a long period.

## RATIONALE OF CANNING.

The *rationale* of canning is rather a simple one. All decomposition of food is due to the development, within the food, of living organisms. Under conditions under which living organisms cannot enter or cannot develop, food keeps undecomposed for an indefinite length of time. The problem of food preservation resolves itself, therefore, into that of keeping out or killing off all living things that might feed upon and thus alter the food, and as these organisms mainly belong to the family of moulds, yeasts, and bacteria, modern food preservation is strictly a subject for the bacteriologist. At boiling point of water, all living cells perish, but some spores of bacteria may survive for about three hours. Few adult bacteria can live beyond 75°C., in the presence of water. To preserve food in a permanent manner and on a commercial scale, it has to be cooked or processed in a receptacle which must be sufficiently strong for transport, cheap, light and unattacked by the material in contact with it. None of the receptacles at present in use quite fulfils all of these conditions: glass and China are heavy and fragile, and their carriage is expensive; tin-plate is rarely quite unaffected by food materials, but owing to its strength, tenacity and cheapness it is used on an extensive scale. Tin itself is slightly attacked by all acid juices of vegetable and animal substances. With the exception of milk, all human food is slightly acid, and consequently all food that has been preserved in tin canisters contains variable traces of dissolved tin. Happily, salts of tin have little physiological action. A good many kitchens in every country are well supplied with tin vessels for all sorts of uses, and no poisoning ever results. Nevertheless, the employment of tin cans for very acid materials, such as acid fruits, is very objectionable.

## PROCESS.

The process of preservation in canisters is carried out as follows:—The canister, which has been made either by the use of solder on the outside or by folding machinery only, is packed

with the material to be preserved, and a little water having been added to fill the interstices, the lid is secured by soldering or folding, generally the former. Sterilization is effected by placing the tins in pressure chambers, which are heated by steam to 120°C., or more. The tins are exposed to that temperature so long as experience has shown to be necessary; or they may be placed in open baths of boiling water or some heavier liquid as may be required. This is known as processing. Sometimes a small aperture is pierced through the lid, to allow the escape of the expanding air such holes before cooling being closed by a drop of solder. The processing of provisions in glass bottles is also conducted in a similar way. The degree and mode of processing of different food materials constitute the trade secret. Care should be taken to ascertain that the contents do not get over cooked on the one hand, nor should the ferments and the bacteria left alive on the other. Imperfect sterilization shows itself in many cases by gas development within the tin which causes the ends to become convex and drummy. Were it not for the fact that sterilization is rarely quite perfect, and that the food attacks the tin, the contents of tin canisters ought to keep for an indefinite length of time. Under existing circumstances, however, there is a distinct limit to the age of soundness of canned goods. The use of lacquered tins, having the inner surface covered with a heat resisting varnish, is gradually extending. But bottled goods are decidedly superior to canned goods, and in England, the former command an ever increasing sale.

## PLANT REQUIRED.

A moderate sized plant for canning all kinds of provisions should consist of a suitable boiler with pipings and fittings for furnishing steam, for heating the open bath or the pressure chamber; a scalding tank for scalding or blanching those vegetables requiring it; an exhaust tank for exhausting the cans in order to force the cold air out of them after they have been packed and capped; a process tank or pressure chamber for processing the cans after exhaustion; a few scalding baskets made



of galvanized wire; a number of crates made of strap iron; a couple of cranes for lowering or hoisting the crates holding the cans into the tank and the pressure chamber; some perforated steam coils or crosses supplying the tanks; a syrup holder and a syrup gauze for holding the syrup and ascertaining its density, as syrup is used in canning fruit; a blast furnace for heating capping steels and tipping coppers; besides peeling tables, packing tables, capping tables, thermometers, scales, can tongs, hammers, buckets, etc. A building of two storeys, 25×45 ft., with some grounds attached to it, would be a suitable one for this outfit. The first floor can be used for manufacturing purposes, and the second for the storage of empties and stock. To successfully operate such a factory would require at least a dozen hands. Outside of processor, capper and tipper, the help will compose mostly of women and children and other unskilled labour. The art of processing, as well as that of capping and tipping, is easily acquired.

In a big commercial city, ready made tin cans and glass jars can perhaps be had from the market in any number, and the packer there need not set up a separate cane-making plant in his own factory. Otherwise he will have to make his own cans and order his glass bottles from elsewhere. It is more costly and tedious to pack provisions in glass jars than in tin cans. Hence the price of bottled goods is higher than that of tinned goods. But where the buyer can afford to pay for them, he should prefer the former to the latter. It would be advisable to pack fruits solely in glass bottles, tin cans being reserved for packing vegetables, fishes and meat, which should generally require re-cooking in this country in order to obviate the risk of ptomaine poisoning, as all soluble ptomaines are destroyed at 80°C. The question of labelling the cans is not an insignificant one. Much progress has been made of late in the art of designing and turning out handsome

labels, and modern cans are covered with fine specimens of the lithographic art. These attractive labels are among the best paying advertisers of canned good. The writer of this article will be glad to correspond with any patriotic Indian capitalist who may be willing to start a factory for canning Indian provisions.

### Sunflower Seed.

Great interest is centred in Hull commercial circles in a discovery which has recently been made of the possibilities of the sunflower seed in the manufacture of feeding cakes, and an article from which valuable oil can be extracted. Hull is the most extensive seed crushing centre in England, and now another seed has been added to those with which its mills deal. The sunflower seed is cultivated in large quantities in South Russia, and heavy consignments have recently arrived at Hull from Odessa. The valuable property of the new flower seed is contained in the fact that when crushed it yields on the average 30 per cent. of oil, whilst the yield of soy bean oil is 18 per cent. The oil is limpid and pale yellow in colour, and it is a valuable asset used in soap-making, the manufacture of carbishes, and for culinary purposes. The residue from the crushed sunflower seeds has been manufactured into cakes at Hull Mills, and experiments are being made to find out whether the cake thus made is suitable for feeding purposes. There is already not the slightest doubt that the meal derived from the pressing of these seeds would be a very valuable ingredient in the manufacture of compound feed cakes. As a matter of fact, Hull crushers have already manufactured a small quantity of cakes from sunflower seeds, and shipped them abroad to the Continent. There is every reason to believe up to the present that this new cake will prove a distinct agricultural asset.



# The Commercial World.

## Commercial Enterprise in India.

THE commercial enterprise of India in the month of May 1913 is shown by the following abstract of companies registered in that month—

	Rs.
13 Banking and Loan Companies ...	72,29,998
3 Insurance Companies ...	90,000
6 Trading Companies ...	13,04,500
2 Flour Mills Companies ...	9,00,000
4 Tea Planting Companies ...	7,25,000
1 Planting Company (other than specified above) ...	32,900
1 Coal Mining Company ...	9,00,000
1 Mining and Quarrying Company (other than specified above) ...	2,00,000
31 Grand total ...	1,13,82,398

## Indian Trade.

The following table shows India's trade with each 'principal' country in order of importance in 1912-13 :—

Country.	Thousands of rupees	Per cent.
The United Kingdom ...	1,63,20,61	40.1
Germany ...	34,72,33	8.5
The United States ...	24,08,28	5.9
China ...	23,52,81	5.8
Japan ...	22,60,66	5.6
France ...	17,84,90	4.4
Belgium ...	16,16,60	4.0
Java ...	12,82,03	3.1
Straits Settlements ...	12,27,85	3.0
Austria-Hungary ...	10,64,12	2.6
Ceylon ...	9,91,19	2.4
Italy ...	8,48,56	2.1
Holland ...	4,64,62	1.1
Mauritius ...	4,62,55	1.1
South America ...	4,60,99	1.1
Egypt ...	3,95,92	1.0
Australia ...	3,89,14	1.0
Asiatic Turkey ...	2,88,29	.7
Russia ...	2,64,64	.6
Aden ...	2,00,89	.5
Spain ...	1,92,02	.5
Arabia ...	1,88,24	.5
Persia ...	1,82,81	.5

## Indian Railways.

The main statistical results of all the Indian railways, taken as one system, are lucidly summarised by the *Economist*. Ten years ago, the mileage of Indian railways was 25,930 miles, whereas at the end of last year, the total mileage was 33,484, or an average progress of 755 miles per annum. The gross earnings increased from Rs. 336 lakhs to Rs. 616½ lakhs, and the working expenses from Rs. 157½ lakhs to Rs. 301½ lakhs. That is to say, the working expenses have increased much less than gross earnings, the proportion per cent. of expenses to gross earnings being 46.79 in 1901 as compared with 48.92 in 1912. The percentage of net earnings on capital outlay reached the highest figure of 6.77 last year, as compared with 5.27 in 1901. The total number of passengers carried was 417 millions or 27 millions more than in 1911 and 45 millions more than in 1909—the increase being mainly in third class passengers. Prosperity has caused all the chief branches of receipts to increase, while there has been a substantial reduction in the rates of expenses to receipts on most lines, combined with substantial increases in the net revenue. The dividends earned are steadily increasing. The Southern Punjab pays 11 per cent. and the Bengal and North-Western which paid 8 per cent. in 1911, paid 9 per cent. in 1912. The Bengal-Nagpur which paid 6 per cent. in 1910 paid 9 per cent. last year. The East Indian paid, respectively, 6.1 and 6.5 per cent. while the Rohilkund and Kumaon paid 7 and 8 per cent.

## Indian Weights and Measures.

The following is the statement referred to last month as showing, under each of the more prevalent *sers* for weighing and measuring grains, the number of people using them in the several provinces.

It is perhaps superfluous to explain that

usage in the matter of local weights and measures is not necessarily uniform as regards any single administrative area. In very many districts, there must be large enclaves in the matter of such usages. But it is probable that the

figures in the statement indicate with sufficient exactness the relative prevalence of the several principal *seers* specified. It will be seen that the *ser* of 80 tolas ('933 kilos or 32'912 oz.) enormously preponderates :—

Statement showing the total population of the Districts in India\* using the principal *seers* for weighing and measuring grains :—

Province.	Tolas 40 =kilos .466 =oz. 16.456	Tolas 80 =kilos .933 =oz. 32.912	Tolas 82 =kilos .956 =oz. 33.735	Tolas 84 =kilos .979 =oz. 34.558	Tolas 88 =kilos 1.026 =oz. 36.203	Tolas 90 =kilos 1.049 =oz. 37.026	Tolas 96 =kilos 1.119 =oz. 39.494	Tolas 100 =kilos 1.166 =oz. 41.14
	Population.	Population.	Population.	Population.	Population.	Population.	Population.	Population.
Burma ...	Nil	12,115,217	Nil	Nil	Nil	Nil	Nil	Nil
E. B. & Assam.	Nil	14,655,824	8,490,983	667,828	1,004,159	3,287,990	5,120,933	4,395,
Bengal ...	1,387,516	49,873,166	10,110,976	4,986,785	4,919,319	6,708,795	1,908,385	5,420,
United Provin- ces ...	4,235,032	14,623,387	897,035	803,636	Nil	465,223	Nil	9,812,865
Rajputana ...	221,896	3,577,797	Nil	Nil	Nil	Nil	1,293,776	1,293,776
Punjab ...	Nil	2,861,693	Nil	519,273	Nil	519,273	519,273	841,237
N. W. F. Pro- vince ...	Nil	603,028	603,028	Nil	Nil	Nil	603,028	506,206
Sind ...	Nil	2,852,556	Nil	Nil	Nil	Nil	Nil	Nil
Baluchistan ...	Nil	477,797	Nil	63,367	952,989	Nil	Nil	63,367
Bombay ...	1,826,270	3,865,667	430,548	913,820	1,081,278	Nil	Nil	Nil
C. P. & Berar.	875,904	7,881,291	Nil	809,409	Nil	Nil	Nil	Nil
Madras ...	Nil	9,412,649	Nil	Nil	6,312,163	6,204,940	Nil	Nil
Mysore ...	Nil	2,084,775	679,162	2,437,959	679,192	Nil	Nil	Nil
Coorg ...	Nil	174,976	Nil	Nil	Nil	Nil	Nil	Nil
Total ...	8,546,618	125,064,805	21,211,732	11,232,127	14,949,070	17,185,221	9,445,395	22,833,210

The committee appointed by the Government of India to go into the question of weights and measures consists of the Hon. Mr. S. R. Arthur, I.C.S., Commissioner of the Central Division, Bombay (President), Mr. A. Y.G. Campbell, I.C.S., Collector and Magistrate of Chittoor, Mr. C. A. Silherard, I.C.S., Magistrate and Collector of Jhansi, and Mr. Rustomji Faridoonji, Commissioner of Excise, Central Provinces.

### The Trade of the British Empire

The July number of the *Journal of the Royal Statistical Society* contains the paper read by Mr. R. S. Rosenbaum on "The trade of the British Empire." Mr. Rosenbaum explained that his paper was the first of a series, in the others of which he intended to discuss

the trade problems of the Empire from the point of view of tariffs, investment, shipping, emigration, its character, and its relation to Imperial food supplies and natural resources. The present investigation was mainly concerned with the measurement of the actual volume of the trade of the Empire and the effects of proximity and Imperial sentiment on the amount and growth of mutual trade.

The following is a brief summary of the facts established :—

1. The aggregate external trade (imports and exports) of all the constituent parts of the Empire amounted in 1910 to 1,807.1 millions; of this 688.7 millions, or 38 per cent., represented inter-Imperial trade.

2. The total imports into the Empire

amounted to 956l. millions, of which 612l. millions, or 64 per cent., come from foreign countries.

3. The total exports from all parts of the Empire amounted to 846l. millions; of this 502l. millions, or 59 per cent., went to foreign countries.

4. Inter-Imperial imports are growing more rapidly than imports from foreign countries. Between 1905 and 1910 the former increased by 32 per cent., and the latter by 22 per cent.

5. On the other hand, exports to foreign countries are growing more rapidly than inter-Imperial exports. The former showed an increase of 35½ per cent. in the years 1905 to 1910, against 32 per cent. in the latter.

6. The "special" imports from foreign countries into the United Kingdom are growing less rapidly than into the rest of the Empire. The former increased in five years from 396l. to 454l. millions, or 15 per cent.; the latter increased from 104l. to 158l. millions, or by 50 per cent.

7. Similarly, the domestic exports from the United Kingdom to foreign countries are growing less rapidly than from the rest of the Empire. In the former case the increase was from 216l. to 283l. millions, or 31 per cent.; in the latter from 155l. to 219l. millions, or 41 per cent.

8. Hence in both cases—imports and exports—the volume of the trade, and the intimacy of which this might be regarded as a measure, with foreign countries is growing rapidly both in the case of the United Kingdom and the rest of the Empire, but appreciably more rapidly in the latter than in the former case.

9. Dependence on foreign countries means, in general, dependence on foreign Europe. British Europe, Africa and Oceania respectively depend upon foreign Europe for their supplies more than on any other foreign parts.

10. There is some tendency for the largest part of the foreign trade of British countries to be derived from foreign countries in the

same continent; this may be due to the advantages of contiguity.

### Promissory Note by an Agent.

Their Lordships of the Madras High Court, the Chief Justice, Mr. Justice Ayling, and Mr. Justice Oldfield delivered judgment recently in a Letters Patent Appeal from Madura where the question was whether, when an agent signed a promissory note in his own name, but described himself in the body of the note as the agent of some person, it could be said that the agent signed as agent, within the meaning of Section 28 of the Negotiable Instruments Act, and was, therefore, not personally liable. Both the District Munsiff of Madura, and the District Judge held that the latter was personally liable. In the second appeal, their Lordships Mr. Justice Sundara Iyer and Mr. Justice Sadasiva Iyer differed. Mr. Justice Sundara Iyer pointed out the difference in language between Section 26 of the English Act and Section 28 of the Indian Act, and held that all that was required by the latter Act was that there should be indication in the note that he signed as agent. Having regard to the customs and habits of the people in this country, His Lordship held that when a man described himself as agent of so and so in the body of the document, he did so because he was executing the document as agent, and, therefore, such description was sufficient under Section 28 of the Negotiable Instruments Act to exclude personal liability.

Mr. Justice Sadasiva Iyer, on the other hand, held that there was no difference between the Indian and the English Law on this matter, and the certainty and uniformity of the Merchant Law required that the law should be the same both in England and India. On the construction of the document also, His Lordship held that there was no indication that he was signing as an agent.

On appeal, the Chief Justice held that there was no difference between the English and Indian Law. The difference in language was only a difference in drafting and did not indicate a change of policy. On the construction also, His Lordship agreed with Mr. Justice

Sadasiva Iyer. Mr. Justice Ayling and Mr. Justice Oldfield agreed.

In the result, the Letters Patent Appeal was dismissed with costs.

### Shares in Companies.

The ordinary shareholder in India is still ignorant of his rights and liabilities as shareholder in a Joint Stock Company. There are some who are innocent enough to believe that when the concern is closed, the share money paid by them will be returned to them intact. Others there are who are appointed to posts in a Company, the security for such appointments being their holding a number of shares in the Company. Then there are several kinds of shares. For example, there may be (1) Cumulative 5 per cent. Preference shares, (2) 5 per cent. Preference shares, (3) Non-cumulative 5 per cent. Preference shares, (4) Participating Preference shares, and (5) Pre-preference shares. The privileges appertaining to each of these may vary as regards the dividends payable and capital.

(a) As regards dividends. In the case of a 5 per cent. Cumulative Preference share, if the dividend is not paid in any one year, it is carried forward to the next year (*i.e., it accumulates*) as a contingent liability which has to be met before any dividend can be paid to the Ordinary or Deferred classes of shares. Thus if the dividend is passed in 1913, 10 per cent. will be payable in 1914, and so on. In the case of a 5 per cent. Preference share, this also is regarded as cumulative, but the memorandum, articles, or terms of issue may state that the dividends are payable only out of the profits in each year. In that event the dividend is non-cumulative and the rights of a holder would be to receive 5 per cent. out of the profits in any one year, before any Ordinary or Deferred dividend is paid; but if the dividend is not paid, it does not "accumulate," and the arrears cannot be paid out of the profits of any subsequent year. They would in fact be (3) Non-cumulative 5 per cent. preference shares. As regards (4) Participating Preference shares, these entitle the holder both to a preferential dividend and also to participate in the surplus profits with the

ordinary shareholders, after the latter have received their dividend. (5) Pre-preference (or First Preference) shares are shares issued by way of new capital and rank in front of existing Preference issues.

(b) As regards capital. The memorandum or articles may and usually do provide for preferential rights in the return of capital in a winding-up. These rights must be expressly stated, as a preferential right to dividends does not imply a preferential right to a return of capital. If there is this preference, the Preference shareholders are paid back their capital before the other shareholders. Otherwise they are non-preferential as to capital, and are in the position of Ordinary shareholders.

Those who intend to take shares in companies would do well to make a study of the memorandum and articles of association and also acquaint themselves generally with the provisions of the Indian Companies Act.

### Japan and the Indian Market.

An expert attached to the Japanese Department of Agriculture and Commerce was recently on a visit to India for the purpose of investigating the Indian market. On returning to Tokio, the expert submitted a report reviewing his experiences. The report advises Japanese exporters to advertise their goods in the Indian newspapers and to be content with small profits in order to develop large sales. Both these suggestions are eminently sensible, and our own countrymen would do well to lay them to heart. It is interesting to find, by the way, that in the opinion of the expert, the competitor whom exporters have to watch most closely in the Indian market is Germany, because her goods are of common quality, while those of other European countries are high-class. Japanese competition in India, he added, had been greatly strengthened by the help of Government-subsidised shipping services. These services have enabled Japanese exporters to sell their goods cheaper than they could otherwise have done. The whole thing shows the oneness of mind with which the Government

and the people of Japan are endeavouring to exploit the world's market for Japan's benefit. And the policy of Japan is the policy of Europe and America. It is only in India, says the *Bengalee*, that the doctrine of State-interference in the matter of industrial development is regarded as a heresy. This sort of thing cannot go on for ever. The Government and the people of India will before long have to make up their minds to pursue a far more aggressive policy than they have so far done.

### Joint-Stock Companies.

The total number of Joint-Stock Companies, which have been registered in India under the law from the time it was passed, amounts to 6,247. Of these, 2,463 were working at the end of 1911-12, most of the others having been either wound up or otherwise discontinued or never having commenced business, so that about 61 per cent. of the companies started have been failures. The companies that have ceased to

work include a number of speculative gold-mining companies formed in Bengal some years ago and a considerable number of "provident" associations formed in the last few years in the same province. Some companies have also been taken off the Indian register, to be reconstructed as companies under the English law with their head offices in London.

During the year, 334 new companies with a nominal, issued nominal, and issued paid-up capital of Rs. 9,02,88,275, Rs. 35,99,244 and Rs. 24,44,227 respectively, were registered, and 175 companies with a nominal, issued nominal, and issued paid-up capital of Rs. 4,93,95,071, Rs. 1,94,57,372, and Rs. 1,50,91,234 respectively, ceased to work. The "issued paid up capital" includes vendors' and other shares issued otherwise than for cash, but considered as paid-up.

In 1911-12 there was a net increase of 159 in the number of companies, of Rs. 4,74,33,672 in the nominal capital and of Rs. 5,32,71,903 in

	CAPITAL (Rs.), INCREASE				CAPITAL (Rs.), DECREASE			
	Number of Cos.	Nominal Amount.	ISSUED		Number of Cos.	Nominal Amount.	ISSUED	
			Nominal.	Paid-up.			Nominal.	Paid-up.
Burma ...	37	6,00,000	77,33,882	33,00,954	12	50,000	13,37,492	201,201
Assam ...	22	...	38,961	50,484	...	...	...	...
Bengal ...	137	14,30,000	1,20,50,252	97,27,866	4	6,50,000	2,99,860	2,99,860
Behar and Orissa ...	17	...	99,692	79,873	...	...	...	...
United Provinces ...	61	5,00,000	40,78,264	40,22,569	4	...	84,375	200
Ajmer-Merwara ...	6	10,000	28,825	39,234	...	...	...	...
Punjab ...	78	4,70,000	13,67,865	8,27,646	3	...	59,040	483
N. W. F. Province ...	6	...	32,720	10,650	...	...	...	...
Baluchistan ...	2	...	3,430	1,759	...	...	...	...
Bombay ...	148	31,50,000	4,21,02,940	4,38,58,776	17	8,50,000	3,25,070	73,305
Central Provinces and Berar ...	9	...	19,900	31,006	...	...	...	...
Madras ...	263	17,30,468	1,11,90,096	47,79,549	42	...	...	3,80,628
Bangalore (Civil and Military Station) ...	5	...	...	49,892	6	...	...	1,33,685
<hr/>								
TOTAL BRITISH INDIA ...	791	78,90,468	7,87,46,827	6,67,80,258	88	15,50,000	21,05,837	10,89,362
<hr/>								
Mysore State ...	15	...	...	1,85,011	16	...	...	19,756
<hr/>								
TOTAL INDIA ..	806	78,90,468	7,87,46,827	6,69,65,269	104	15,50,000	21,05,837	11,09,118



the paid-up capital. There was a sudden and remarkable increase in the number of insurance companies from 80 to 182, mainly in Bengal and the Punjab, which is attributed to the introduction in Council of the Insurance Companies Bill. It is believed that to avoid for some time the payment of deposit money, as stipulated in the Bill, a large number of insurance companies were registered just before the passing of the Indian Life Assurance Act (VI of 1912). The nominal capital of 49 companies was increased by Rs. 78,90,468, the issued nominal capital of 553 companies by Rs. 7,87,46,827 and the paid-up capital of 740 companies by Rs. 6,69,65,269. The nominal capital of 7 companies was reduced by Rs. 15,50,000 the issued nominal capital of 19 companies by Rs. 21,05,837, and the paid-up capital of 79 companies by Rs. 11,09,118, as shown in page 553 above.

At the close of 1911-12 the companies at work had an issued paid-up capital of Rs. 69,37,68,729, this was more by Rs. 5,32,71,903 than that of the preceding year. There has been an increase of 82.2 per cent. in the paid-up capital in the last ten years.

#### LOCATION.

About 77 per cent. of the capital invested in joint-stock enterprise is concentrated in companies registered in Bengal and Bombay. Bengal has Rs. 26,66,32,634 being 38.4 per cent. and Bombay Rs. 26,78,52,519 being 38.6 per cent. of the whole. Thereafter but a long way behind comes Madras with a capital of Rs. 4,84,23,041 being 7 per cent. of the whole.

#### MILLS AND PRESSES.

Nearly half—about Rs. 28,00,00,000—of the aggregate capital is invested in mills and presses, chiefly for working or pressing cotton, jute, wool and silk. This capital has increased 45 per cent. in the last ten years. A great number of the mills and presses are registered in Bombay, that Presidency representing about 50 per cent of this sum, most of it invested in cotton mills and presses. Mills and presses (mainly jute) registered in Bengal represent two-thirds of the capital invested in mills and presses in Bombay.

#### TRADING COMPANIES.

Trading companies account for nearly Rs. 15,93,00,000, of which nearly a third (Rs. 6,00,94,118 or 38 per cent) is invested in railways and tramways. The companies for the working of these lines are mainly the creation of the last fifteen years.

#### PLANTATIONS.

In tea, coffee, and other plantations, Rs. 4,00,09,000 are invested, of which nearly 89 per cent is held in Bengal, most of the tea companies being registered in Calcutta. The capital invested in tea (over Rs. 3,62,00,000) increased by 4 per cent. in the last decade. This rupee capital is about one-sixth of the sterling capital invested in this industry.

#### BANKING, LOAN AND INSURANCE.

Banking, loan, and insurance companies account for Rs. 8,22,00,000, of which 35 per cent. is in companies registered in Bengal and 23 per cent. in Madras. The capital of banking and loan companies has increased by nearly 113 per cent. in the last ten years.

#### MINING.

The capital of mining and quarrying companies is Rs. 10,50,00,000, of which 56 per cent. is invested in companies registered in Bengal, most of it representing capital invested in coal mines. The capital invested in coal companies has nearly trebled in the decade.

#### AVERAGE CAPITAL.

The average capital of each company is highest in Bombay, where it amounts to Rs. 4,65,830, the average of Bengal being Rs. 3,57,896. The average of the 437 companies registered in Madras is only Rs. 1,10,808, the reason being found in the extremely large application of the Companies Act to the business of small money lenders, for no less than 239 out of the 491 "banking and loan" companies in all India are registered in Madras with a paid up capital of Rs. 1,81,42,867.

#### DEBENTURES.

It should be noted that the capital stated above represents share capital only, while several companies have issued debentures, the total value of which at the close of the half

year ending December 1912 amounted to Rs. 9,00,72,900, of which Rs. 5,21,00,000 belongs to Bengal, Rs. 3,33,00,000 to Bombay, and Rs. 23,50,000 to Madras. The value of cotton mill debentures was Rs. 2,39,72,091, of jute mill debentures Rs. 3,84,60,870 and of paper mill debentures Rs. 15,07,650.

#### COMPANIES LIMITED BY GUARANTEE.

There were 350 companies limited by guarantee at the close of the year 1910-11. Of these 64 ceased to work, and 12 new companies were registered during the year 1911-12, giving a net total of 298 companies at work on the 31st March 1912.

The fees realised during 1911-12 were Rs. 78,450, and the expenditure was Rs. 4,381.

In this connection, the following information extracted from the *Board of Trade Journal* in regard to the companies registered in the United Kingdom during 1912 will be read with interest:—

Classification.	England.		Scotland.		Ireland.		Total.	
	Number of Companies.	Nominal Capital.	Number of Companies.	Nominal Capital.	Number of Companies.	Nominal Capital.	Number of Companies.	Nominal Capital.
		£		£		£		£
Coal, Iron, and Steel ...	168	5,526,820	52	2,444,700	3	20,000	223	7,991,520
Mining (other than Coal and Iron) ...	345	22,351,404	8	260,675	...	...	353	22,612,079
Textiles ...	254	4,441,050	19	355,550	8	100,000	281	4,896,600
Brewers and Distillers ...	36	1,514,000	7	115,000	...	...	43	1,629,000
Rubber and Oil ...	198	21,117,370	5	298,000	...	...	203	21,415,370
Transit and Transport by Land and Water ...	268	17,496,220	30	667,000	7	135,500	305	18,298,720
Gas, Water, Electric Light and Power, Drainages, &c. ...	66	3,109,225	8	57,180	2	42,000	76	3,208,405
Land ...	273	7,507,549	6	149,000	2	22,490	281	7,679,039
Finance, Banking, Discount and Interest and Insurance ...	536	22,036,802	30	1,591,800	21	38,700	587	23,667,302
Others ...	4,652	59,871,013	236	1,696,140	127	1,039,649	5,015	62,606,802
Total ...	6,796	164,971,453	401	7,635,045	170	1,398,339	7,367	174,004,837

#### STERLING COMPANIES.

The total number of companies registered elsewhere than in India, but which carry on work exclusively, or nearly so, in India, mostly with sterling capital, is 373, and the paid up capital amounts to £77,979,044 besides £45,352,911 as debentures. The Railways represent £35,905,906 paid-up capital and £40,370,978 debentures. Of the rest, the sterling share capital invested in the tea industry is £14,964,574, in jute mills £2,453,894, in cotton mills £772,274, and in rice mills £2,106,475. The gold fields in Southern India are mostly worked by companies formed in the United Kingdom, the paid-up sterling capital being £2,885,511.

It is rather remarkable that the number of companies registered is greater than that recorded in any previous year, 1910, the rubber boom year, when 7,184 Companies were registered, having held the record until last year. In 1910, however, the nominal capital of the 7,184 companies was

£212,975,689, so that in 1912 the average company was smaller. Probably it will be found that a very large number of small private companies were registered in 1912, as indicated by the preponderance of unclassified concerns in the Board of Trade's summary.

### Openings for Business.

[For particulars, address the Director-General of Commercial Intelligence, New Imperial Secretariat, 1, Council House Street, Calcutta, mentioning the *Wealth of India*. Firms that may like to follow up any enquiry should give proper references and restrict themselves to those enquiries only which they are fully and seriously qualified to handle.]

#### YARNS AND CORDAGES.

A London merchant is desirous of getting into touch with manufacturers of Indian hemp-made yarns and cordages. (C19)

#### CHILLIES.

A firm in England is desirous of communicating with sellers of chillies (*Capsicum minimum*), known as "Birdseye chillies. (C24)

#### BONE OIL.

A soap manufacturer in Meerut is desirous of communicating with sellers of bone oil. (C28)

#### BOOT WEBS, SADDLERY WEBS AND TAPES.

A firm in Belgium is desirous of communicating with wholesale buyers of boot webs, saddlery webs and tapes. (C29)

#### SOAP-STONE.

A Calcutta merchant is desirous of communicating with local buyers of soap-stone. (C30)

#### SCRAP BRASS AND COPPER.

A Birmingham merchant is desirous of communicating with importers of scrap brass and copper. (C31)

#### PNEUMATIC CLEANER.

A firm of manufacturers in England is desirous of communicating with buyers of vacuum pneumatic cleaners. (C32)

#### ELECTRIC TRAMWAYS.

The President of a District Board, which is considering a project for the establishment of an electric tramway, desires to hear from such British or Foreign firms of good position as would furnish a rough estimate for construction and working. (C34)

#### GUANO, SARDINE OIL AND SARDINE MANURE.

A merchant at Cannanore, Madras Presidency, is desirous of communicating with buyers or exporters of guano, sardine oil and sardine manure. (C35)

#### MAGNESITE.

A Manchester firm is desirous of communicating with exporters of magnesite, known also as Magnesium Carbonate. (C36)

#### PAPER GOODS.

A firm in Cincinnati, United States of America, is desirous of appointing agents for the sale of paper goods (envelopes, bags, folding boxes, etc.) in Delhi, Calcutta, Madras, Bombay and Lahore. (C37)

#### OLD METAL SCRAPS.

A firm in Marseilles is desirous of communicating with exporters of scraps of old metals, such as copper, brass, spelter and lead. (C40)

#### FOOT-WEAR.

A London merchant is desirous of appointing a sole agent for the sale of plain, covered and jewelled heels (metallic or silk), and brocade of every description for shoe-making and shoe slides and ornaments. (C42)

#### FISHING RODS.

A firm in New York is desirous of communicating with sellers of bamboo fishing rods or poles. (C43)

#### RICE BRAN.

A firm in Bremen, Germany, is desirous of communicating with Calcutta exporters of rice bran. (C44)

#### FISHING NETS AND YARN.

A firm in Japan is desirous of communicating with Calcutta importers of fishing nets and yarn. (C45)

#### FRUIT.

An official in India is desirous of communicating with firms that supply apparatus for bottling and canning fruit. (C46)

#### HIDES, OIL-SEEDS AND INDIGO.

A joint-stock company in Trieste, wishes to correspond with responsible shippers from India of (1) hides and skins; (2) oilseeds and groundnuts; (3) indigo. (C47)

#### PRESS PHOTOGRAPHS.

A New York firm of Photographic Illustrators of newspapers and magazines desires to communicate with leading firms of Press Photographers in the principal Indian cities with a view to reciprocal representation. (C48)

# The Economic World.

## Volume of Traffic and Density of population

IT is evident *a priori*, observes the *Scientific American*, that there must be a relation between the volume of urban traffic and the population. What this relation is has been shown by observations collected by H. Parodi and presented by him at a joint meeting of the Institution of Electrical Engineers and the Societe Internationale des Electriciens, at Paris. When the logarithms of the receipts by street railway companies are plotted as ordinates, and the population as abscissæ, curves are obtained which are nearly straight lines, and whose equation is  $\log(\text{receipts}) = 2 \log(\text{population}) + \text{constant}$ . In other words, the traffic is proportional to the square of the population. The question naturally arises why the law should take this form. We may say that the number of people travelling is in the first place proportional to the population, and perhaps we may surmise that, secondly, the number of trips made by each person are also proportional to the population. Hence the product, number of people travelling  $\times$  trips made by each, which gives the total number of trips made, is proportional to the square of the population. Whether this argument be correct or not, its conclusion agrees with the observed facts.

## Free Trade and Food Prices.

A leaflet of the Liberal Publication Department gives some figures of the rise in prices in London, Berlin and New York.

Food which cost the workers of London 20 shillings in 1900, cost them 21s. 2d. in 1907.

Food which cost the workers of Berlin 20 shillings in 1900, cost them 23s. 5d. in 1907.

Food which cost the workers in New York 20 shillings in 1900, cost them 23s. 9d. in 1907.

Two things about these figures are:—

(1) The cost of living has increased in all three cities, but

(2) Free Trade London had a big advantage over tariff-taxed Berlin and tariff-taxed New York.

For London, the increase had continued until last year (1912) the 20 shillings of 1900 had become 23 shillings. There are no official figures for Germany, but the latest official figures for America are astounding, for they show that food which cost the American worker 20 shillings in 1900 cost him 30 shillings in 1912.

All available figures prove that the cost of living has increased in England, in Germany, and in America, but that it has increased least in Free Trade England. And the reason is clear.

This world-wide rise in food-prices is due to many causes, most of which no Government can influence in the slightest degree. But there is one cause of increased food-prices which Governments can avoid, if they wish, but which has only been avoided by one of them, the English Free Trade Government. If bread and meat are getting dear owing to natural causes, to tax them makes them dearer still—dearer, that is, than they need be under the circumstances.

## The Scarcity of Capital.

The following quotation from the *New York Evening Sun* is well worthy of the consideration of all those who take an intelligent scientific interest in economics and particularly in the prevailing economic conditions:

"The amount of capital available in the world to be borrowed and spent is at any given time a definite quantity which cannot be increased by any scheme to reform currency or promote the efficiency of banking.

"Therefore if a lot of capital is borrowed and spent in unproductive ways there will be not only less for other uses, but the natural growth of capital will be arrested in proportion as the uses to which it is devoted are

unproductive. When you put \$10,000,000 of capital into an industry or a railroad it multiplies itself; when you put capital into armament, meaning warship and standing armies, as has been done on so vast a scale in Europe, or when you spend it on monuments which in themselves have no earning power, as has been done widely in this country, the capital is, in the economic sense, lost. It cannot multiply. The enormous expenditure of capital all over the world in unproductive ways is the fundamental explanation of the present scarcity of capital."

### **The Small Farm and Agricultural Progress.**

But is it really proved that it is the small farm that has blocked economic or agricultural progress, and not the ryotwari tenure on which it is held? Can the Government at all claim that they have given absolute fixity of property to the ryotwari holders? If so, would it be consistent with the assertion of a right to assess at the Government's discretion, and to participate in the unearned increment every twenty or thirty years, each settlement involving an unsettlement of rights and expectations and inquisitorial enquiries? The truth is, as long as the State chooses to consider the land revenue, not as a source of taxation, but as a share in the yield of properties in which, at the least it claims a joint ownership, and so long as assessments and settlements proceed without any limits being placed on enhancements for increased yields, improvement in general conditions and rise in prices, so long is no substantial improvement in the economic conditions of the agricultural classes, due to better cultivation with greater resources and capital, likely to take place. The permanent settlement with Zamindars made the Zamindars prosperous, but not their tenants whose holdings were for long much more precarious than those of ryotwari holders. The Zamindar is not the man who directly cultivates the land and cannot be looked to aid or stimulate agricultural progress unless he takes special interest. But the bestowal of a permanent tenure and a permanent settlement on the

actual ryotwari holder who cultivates his land should obviously lead to an enormous progress in agriculture, if we are to judge of the experience of agricultural communities, from the days of Arthur Young to the present time.  
—Hindu.

### **Export Duty on Grains.**

In a country like India, whose resources afford scope for many fresh combinations and "new departures," it is a serious disadvantage, according to the *Indian Trade Journal*, that a sense of proportion should enter so little into the ordinary conception of the problems presented by her economics, her trade and her transport. Many of the merchants who have believed themselves to know all about the Indian trade in grain, for example, express surprise when it is proved to them that the exports, which occupy all their thoughts, represent less than one-eighth of India's wheat and less than one-sixteenth of her rice. In other words, two important facts escape recognition. The first is that in such staples India exports only her surplus and the second is that the great mass of the produce has to be stored and distributed within the country. The first of these facts should give pause to the persons who would impose an export duty in the hope of restricting shipment and so arresting the rise in the internal price of food stuffs. They do not realise that in many parts of India such a measure would ruin her principal industry. They have no practical knowledge of the advantages of a dumping ground for surplus products. They forget that if there were no dumping ground there would be no surplus. They do not know that in some parts of India, agriculture could not prosper without such a dumping ground. They have not noticed that the production of rice, for example, is in certain tracts entirely out of proportion to the population. In Bengal the area under rice is less than half an acre per head of the population. In Madras it is less than a quarter. But in Burma it is more than four-fifths of an acre. And while Burma exports far more rice than any other Province in India and supplies large quantities to India



proper, she also retains much more in proportion to her population.

### What to Do with our Boys.

There is no more troublesome problem before the Indian father than what to do with his boys, says *The Leader*. The middle-class parent gives to his boys an education which, though dubbed cheap by people of a richer country where they can afford to spend much, is to him a costly one which dries up his resources by the time the boys have come to the end of their scholastic life. Well, at the end of the boy's college education, what does the father find? His troubles really begin then. The army and navy do not offer careers for the subject people of India. Most of the tempting offices under Government are the virtual monopoly of the Briton. In the comparatively better paid of the lower posts, in several departments, the non-Christian Indian has a formidable competitor in the new-fangled Anglo-Indian whose pretensions to kinship with the governing caste, though not recognised in the domestic and social life of the pure-bred European, are respected by the Government in affairs public to the detriment of the Indian of unmixed descent. The legal profession is over-crowded. The country stands in need of more teachers, doctors and engineers, but the prospects are not inviting. Journalism in India is little developed and offers meagre prospects. The need, which is urgent and hourly felt, for competent editors and managers, sub-editors and reporters, remains unsatisfied because in this very exacting profession in India one gets more kicks than coppers. Of manufacturing industries in the hands of Indians there are few worth mentioning outside the textile industry of Bombay, and European firms refuse to give scope to talented Indians. What then is to be done? Well, there is no royal remedy. The best has to be made of the situation as it is found to exist. The middle-class people should organise their little capital, give their sons practical education in agriculture, industries and commerce in an increasing measure, and turn them to wealth-producing

in preference to wealth-consuming occupations. Manual labour should not be looked down upon, and quill-driving should cease to be foolishly regarded as the most honourable of occupations.

### Social Unrest.

Mr. J. H. Jones, M.A., has an article on "Social Unrest," in the July number of the *Accountants' Magazine*. After pointing out that the present activity in the trade union world is not a new thing, he discusses the various causes of the present state of things. He inclines to the belief that the economic cause of the present unrest is the recent rise in prices. He concludes by saying that the present unrest in England has nothing to do with syndicalism in France. The following is a summary of the article:—

The present feeling of social unrest is a healthy sign, for without it, social progress would probably be delayed. The causes of the present unrest are many. The social psychologist may regard the series of strikes which have recently taken place as an "epidemic." While there is probably a good deal of truth in this, it can scarcely be regarded as a full explanation of recent events. Others, again, find the cause in the existing inequalities of distribution of wealth. Other observers believe the present agitation to be the result of disappointment. Some of us suspect that recent events are not unconnected with the political ambitions of some trade union leaders.

"The remedy is not difficult to find. Purified ambitions and a wise selection of political candidates would enable the remainder to devote themselves entirely to the no less important work of making trade unions more effective than they have ever been in the past."

But undoubtedly the main underlying economic cause of the present unrest is the recent rise in prices. The average working man's *real wages* have fallen slightly during the past decade. Between the periods 1895—99 and 1905—09, there was an increase in prices of about 20 per cent. The increase in gold production during the past fifteen years seems to be out of all proportion to the increase in

prices. The effects of the former are mitigated by the enormous drain of gold to India during the last decade.

In 1910, real wages were 5·2 per cent. below the level of 1896, and 16 per cent. below the level of 1901, while a comparison of the two periods 1895—9 and 1905—9 shows a fall of about 5·3 per cent. The general conclusion is that a period of rising prices, indicating industrial prosperity, generally results in a fall in real wages.

The unrest in England has nothing to do with the Syndicalist movement in France. The strike for higher wages in this country assumes, if not the permanence, at least the continued existence for an indefinite period of present industrial arrangements. To the syndicalist, however, the strike is something totally different. It is the means by which the existing social order is to be destroyed. The fight in France is not so much for higher wages as for freedom conceived in a particular way. The syndicalist policy is essentially destructive—it is based upon the assumption of class warfare.

### High Prices and Low Wages.

Mr. Holcombe Ingleby, M.P., contributes an article on "High Prices and Low Wages" to the May number of *The Empire Review*. The following is a summary of the same. Mr. Philip Snowden in his amendment to the address from the throne at the commencement of the present Parliamentary Session referred to "the deplorable insufficiency of wages" and pointed out that there were large masses of His Majesty's subjects who were getting no share in the trade prosperity which the country as a whole was then enjoying. The stagnation, he said, was due to the fact that capital was now *federated*. But here he failed to note two important particulars: (1) He failed to note that in the country where federation is at high watermark, higher wages are paid than in any other country in the world. (2) The party with which he is connected, is apt to treat the question of the relation of capital to labour in Great Britain as a local problem,

The level of wages in a country should bear some relation to the wealth of the country. It may bear relation also to other things, such as the conditions under which the work is carried on or to the profits of a particular industry. For instance we find in the United States of America great wealth and high wages. So also in a poor country we shall naturally find little wealth and low wages. But when we turn to Great Britain we are straightway faced with the anomaly of great wealth existing side by side with miserable wages. To this state of things the exceptions are few and are generally to be found in trade monopolies only. "We are taking and have for years past been taking, the standard of wages in the poorest countries as standard of wages in this rich country. It is the poor country that sets the price the moment that the rich country receives a larger supply than it can readily absorb, and it thereby determines the level of wages in the corresponding industry. By an inevitable law, the price immediately falls, and falls to the level at which the poor country can still make a profit, but kills the industry in the rich country, unless the wages are practically reduced to the same prices. Here we have in a nut-shell the reason for our low wages." The surviving industry that has been hardest hit in this unfortunate encounter is agriculture.

Turning to the question of high prices, the scarcity of supplies has been the main factor in starting the rise in prices. Had all been able to share in the boom, the pinch of these would not have been felt. But unhappily many large industries and many small ones too are outside the area of prosperity.

The workers in many of the industries which were revelling in the luxury of the boom were not content. Here and there wages were raised. Higher wages necessitated larger profits, and these could only be obtained by increased charges.

In many businesses, the price quoted for an order is made up by calculating the cost of materials, the wages and the establishment charges and adding 5 per cent. or 10 per cent.

as the case may be for the firm's profit. It is obvious therefore that on this basis any rise in establishment charges will not only increase the cost of the article but the firm's profits as well.

From a consideration of these circumstances the following conclusions may be drawn.

The first is that the workers are placed at a disadvantage because wages do not immediately respond to an increase of profits. The second is that taxation imposed upon an industry must necessarily be followed by a rise in prices. The third conclusion is that low wages in certain industries may be traced to the system of free imports.

Mr. Ingleby concludes thus :—The last conclusion I would draw is that, so soon as the boom in trade ceases, we shall be subjected to severer competition than ever, especially from the U.S.A. We have at any rate the power of preserving our home markets for our own people, if we choose to do so, and we may also if we are wise enough to turn our attention to Preference within the four walls of the British Empire, obtain a strong position in the markets of our Dominions and Dependencies by falling into line with the rest of the Empire."

#### Cottage Industries.

In his article on "The Relative claims of the Factory, the workshop and the cottage industry in the economic life of India," in the June and July issues of the *Modern Review*, Prof. Radhakamal Mukerjee, M. A., describes how in the West 'the disparity of wealth, the luxury of the few capitalists and the appalling poverty of the labourers and the consequent social unrest present a striking contrast with the spirit of co-operation which pervades the Indian industrial organisation; and how there the excesses of a crass individualism have threatened the very foundations of social life and also how the very roots of Western Industrialism are now sapped by the criticisms directed against it by the economists and social philosophers of Europe. He then very justly and sensibly asks. "Should India adopt the Western economic institutions in

order to repeat in her own soil the social evils of the West? Should the Indian industrial system be a feeble echo of the Western organisation with its trade-union disputes, strikes, lock-outs and social crises? Should India introduce into her country the conflicts of labour and capital and thus destroy for ever the communal spirit which dominates her economic life even in the present day? Should she not, on the other hand, develop her own economic system, the product of centuries of past evolution, and adapt it to the needs of the times?

"The problem before India is, therefore, this. How should India modify her own economic institutions to withstand the economic disintegration that is going on throughout the land?"

The decline of agriculture, our national industry, shows the extent of our economic dependence. Whereas the total value of exports in 1911 was Rs. 238.1 crores, that of imports was Rs. 197.51 crores. On a survey of the articles of import it is seen that they are mostly manufactured commodities made out of raw materials which are the products of our country. The reasons for following such a line of action which involves twofold disadvantages, *viz.*, loss of wages and profits which have to be paid to foreign labourers and entrepreneurs and loss of money due to freights is that our industrial organisation cannot efficiently utilise the natural resources of our country. Moreover our artisans with their few implements and small capital and no regular sale organisation go to the wall before the capitalists and manufacturers with their organising and commercial instincts. Thus it is no wonder our markets are flooded with the manufactured products of the West. The question arises if matters will not be set right by founding industrial organisations similar to those in the West. This necessitates the establishment of technical institutions and the training of young men. Even then, for our industries to successfully compete with those of the West, support from the Indian Government by means of high import duties, and bounties

is absolutely necessary. Hence arises the question what kind of industries are to be started and on this matter opinions differ.

The time has now come when we have to consider seriously the question what will be the place of the cottage industry in India's economic evolution? It seems reasonable to expect that, on the whole, machinery will retain and even strengthen and expand its hold of those industries engaged in supplying the primitive needs of man. In the mining industries, local production on a small scale was doomed. But in the cotton and jute mill industries, we find that they have made most progress, because there is little or no competition with the indigenous industries of the country.

The absence of technical skill, business capacity, commercial enterprise, and want of sufficient capital have been the causes of ruin of our industries; so our aim should be to choose such of the industries in which we could be almost sure of success; for failures in the initial stage of industrial progress create widespread pessimism which ruins it. It therefore behoves us to organise industries so that our resources and commercial acumen may be most profitably employed.

Iron and steel works, glass-blowing, textile fabrics, dyeing, paper-making, alkali works are too big to be generally attempted with our present resources. It is better to take up these industries in some of their understages, *e.g.*, cutlery, nails, bottles, bangles, fibres, chintz, soda, nitre, etc.

The small industries may be classed under (1) the workshop, (2) the cottage industry. The workshop is attached to an artisan house where the family members and at times hired labourers work. There is no reason to suppose that the number of these workshops will decrease as factory organisation is more developed. On the other hand, it is probable that their number will increase in future.

In the big factories in England which manufacture products on a large scale, the number of hands employed do not count more than that employed in small factories in which 270,000 people work. Small industries play as

important a part in the industrial life of a country as the big industries. Moreover the smaller industries will on account of certain monopoly advantages surely live and continue to thrive side by side with big ones. The ownership and control being combined in a single man in small industrial concerns, the owner shows a zeal in the business which is absent in the director of a large establishment. Again, the owner has the distinctive advantage in that he has a greater opportunity to know the personal wants of his markets and thus is enabled to satisfy the individual tastes of the consumers. Again, side by side with the independent smaller industries, there also grow up many small industries which are more or less subsidiary to the big factories. Such smaller industries are economically indispensable.

Industries like jewellery, the burnishing and enamelling of metals, lithography, book-binding and stationery, basket-making, making of hats and umbrellas, machine-made lace and mechanical knitting, making of ready-made clothing—and the fabrication of a thousand more little things in leather, paper, wood, metal and so on, are carried on successfully in small establishments. As very small capital is required for the establishment of these industries, they ought to afford an opening for the middle classes who have realised that Government service and the learned professions cannot give employment to all. Some branches of industry and manufacture are entirely or almost entirely monopolised by the Indian community; *e.g.*, they own all or nearly all the rope-works, timber-yards, type-foundries, brass-foundries, oil mills, soap-factories, chemical works, flour-mills, rice-mills, sugar-factories, umbrella-manufactories, sugar-factories, etc. They also own the greater number of the iron-foundries and iron and steel works, jute presses and printing presses, and have a considerable interest in chemical works, but they have no share in such important concerns as jute mills and very little in machinery and engineering works.

There is a rich field for the investment of capital for our middle class in these industries.

If the small workshops are controlled by our educated youths who receive commercial training and know of the art of business-pushing, they will show much greater vitality and strength than they do now.

The use of capital on the individual proprietary basis will carry with it something of the magic of property and will help the growth and accumulation of wealth in the hands of the middle classes, awaiting in their hands the best possible utilisation. The workers in the small workshops being drawn from the hereditary craftsmen, their mechanical ability and hereditary skill will be best utilised, and there will be no repetition of examples of failures of industrial concerns witnessed a few years ago on account of too much reliance being placed on the literate classes or unskilled labour.

#### Land Revenue in Ancient India.

"An Indian Economist" contributes an informing article on "The Hindu System of Land Revenue" to the July number of the *Hindustan Review*.

It has been recognized at all times, and under all Rajas and Emperors of India, that the ruler of a territory is entitled to a share of the produce of all cultivated land. There is practical unanimity in the opinions of all authorities concerned, that the right of private property in land was generally recognized by the Hindu Rajas, who thus claimed to receive from the cultivators of the soil, not a land-rent due to a land-owner but a land-tax due to the government of the country. The land revenue of the Hindu States was therefore a sort of tax on the income derivable from land.

Under the Hindus, the Revenue organisation was characterised by exceptional simplicity. The dominion over which a Hindu Raja ruled was partitioned into two main divisions—the Royal Domain in which the cultivators were under the direct control of the State and the possessions of the various chiefs who recognised the Raja as their suzerain and held their lands on a sort of military tenure.

The Royal territory was divided into large 'districts' consisting generally of 1,000 villages.

Each district was under a revenue officer who later on came to be styled *Sirdeshmukh*. But this territorial division was not so important a part of the organization as the next one, which theoretically consisted of 100 villages but in a large majority of cases, of only 84 and was called '*des*' or later on '*pargana*.' At its head was a *Des Adikar*. An accountant or registrar, called *Des Lekhak*, was attached to each *pargana*.

Indian villages form two distinct kinds which have important differences—the Ryotwari village and the Landlord village.

Each *pargana* consisted of 84 villages, mostly of the Ryotwari type. Each of these villages was under the control of a head inhabitant or headman, who was termed *Gram Adikar*. The village accountant was called *Gram Lekhak*. "The *Gram Adikar* or village mayor, originally elected by the people was at the same time, the representative of the inhabitants and of the Government. He decided disputes either personally or by convening a court of arbitration or *panchayat*; he was the head of the police.....The most minute details of the transfer and sale of land of rents and contracts, as well as of receipts and disbursements were recorded by the village clerk or *Gram Lekhak*, under authority of the *Gram Adikar*, whose accounts were always open to inspection." "It is the business of the *koolkurni* (the modern equivalent for the *Gram Lekhak* in some parts of India) to keep all public accounts which are made up annually. In his general account the whole of the land is first stated, then the commons, roads, the site of the village, and all waste lands incapable of cultivation are deducted. The arable land is next shown and alienations of every description specified. The remainder is the land on which the Government assessment is fixed." "The *Des Adikar*, the head of a *des* or *pargana* superintended all the villages of his department and the *Des Lekhak* received from the village clerks their accounts and presented an abstract to the Government." All these State officials were paid for their services either by assignments of rent-free lands or by a grant of



a percentage of the land revenue they collected. "Let the lord of ten villages," says Manu, "enjoy the produce of two ploughlands (or as much ground as can be tilled with two ploughs); the lord of 20 villages that of ten ploughs; the lord of 100, that of a village, the lord of 1,000, that of a large village." The holding of land which the village official was granted in lieu of his services to the State came later on to be called his '*watan*.'

The demand of the Government was assessed on each individual estate in the village and was regulated not by the area of the land cultivated, but by the amount of corn reaped by the cultivator. There was hence no survey or measurement of holdings under the Hindu rule. The share of the Government was fixed and mostly payable in kind.

There was another method employed to assess the revenue and that was called *kankut*. The Government officer, the *Patel*, i.e., the *Gram Adikar* and the owner of the holding met and by a look round the whole field, made an approximate estimate of the amount of produce which that particular field would yield. The share of the king is thus easily known and collected. If the decision arrived at, as regards the total yield of the field is disputed by the owner, a small area of known dimensions is reaped and the grain thus collected, weighed. Taking this amount as an average of the produce of all areas of equal dimensions, the total produce and thence the king's share were easily calculated. We thus see that the assessment and the collection of land revenue under the Hindus were effected by a single operation performed on the spot.

As regards the portion of land produce due to the king, Manu says that "a king is entitled to an eighth part, a sixth or a twelfth, according to the difference of the soil and the labour necessary to cultivate it." In a large majority of cases one-sixth or less than 17 per cent. came to be recognized as the standard share of the gross produce of cultivated land, which a king can justly claim. Abul Fazl in

his *Ain-i-Akbari* also regards one-sixth as the share appropriated by the State under the Hindus. Although this proportion was not fixed by any 'law' in the true sense of the word, yet the force of custom, so potent in all Eastern countries, was sufficient to make a departure from the established rule most improvable.

Latterly, however, owing to the rapacity of some Hindu Rajas or the increasing needs of the State, the State demand rose to almost one-half of the gross produce.

In this connection, we may note that in the course of the debate raised on a resolution moved in the Bombay Council at Poona by the Hon. Mr. Godbole recommending the reduction of the interests on *lacavi* loans advanced by the Government to the Deccan agriculturists, the mover remarked that the State was the owner of all land in the country. Sir Pheroze Shah Mehta promptly took exception to this statement. Whatever may be the case in other countries, in India, observed Sir Pheroze Shah, the State was not the owner of all land in the olden days, though in recent times all landowners have been styled landholders.

In Bengal in the cadastral survey papers, too, the name of the State is now being entered as the proprietor of all lands. Commenting on this last procedure of the Government, the *Indian World* observes, "Some practical questions may crop up in all likelihood in this connection. Whether they do or not, it is undoubtedly too late for the Government to revive the question and treat it in the way as it has done. The Government has, in Regulation I of 1793, recognised the Zemindars and independent Talukdars as proprietors of the soil, and this proprietary right has also been recognised in Oudh and the whole of Northern India. In view of this emphatic declaration, the present action of the Government to register the lands as being owned by the King-Emperor seems to be quite improper and unjustifiable."

# The Financial World.

## Indian Investments.

SIR HENRY S. KING, presiding on the 19th June, at the Meeting of the Indian and General Investment Trust, said that there was a difficulty in obtaining suitable investments in India. It was one of the curious features of the time that, whereas the rate of interest was rising in almost all other countries, in India it was still tending downward. Why that should be so it was impossible for him to explain, but he presumed that it was partly due to the ever-increasing prosperity of the people of India and, consequently, to the growth of local capital. But whatever the reason, they could not find there investments to return the rate of interest on their money which they felt they were entitled to get.

## Theft of Endorsed Deposit Receipt.

Wood sent a registered packet to his brother, containing a deposit receipt for £100 with the Clydesdale Bank, endorsed by him, and a letter addressed to the Bank, asking them to pay £60 to his brother. At the same time he posted a letter to the bank, asking them to pay £60 out of the £100 deposited with them to his brother. The registered packet was stolen, and the deposit receipt and the letter which it contained were presented at the bank by some one who represented himself as Wood's brother, and who, at the request of the bank, endorsed the deposit receipt by forging the name of Wood's brother. The bank thereupon paid him the £60, and handed him a deposit receipt for the balance in the name of Wood. Wood raised an action against the bank for £100, being the amount in the deposit receipt. Lord Hunter gave decree for the sum sued for. He said that it was a case where one of two innocent parties must suffer for the fraud of a third party. Here the loss must fall upon the bank. A deposit receipt was not a negotiable instrument. The bank

had come under an obligation to pay to the person named therein, or according to his instructions. The fact that a person was in possession of the endorsed deposit receipt did not necessarily mean that he had a right to receive payment of its contents. If the bank chose to make payment to him, it must take the risk of having to pay over again, not only in a case where the signature was forged, but also in a case where it was proved that the holder of the deposit receipt was not entitled to payment, unless it could be shown that the depositor had contributed to the mistake by his own negligence. Here the bank could only maintain its defence by showing that the payee was really Wood's brother.

## Currency Reform.

Our readers are doubtless aware that in the United States, they have taken on hand not only the reform of the tariff but the reform of the Currency as well. President Wilson's message on these topics is valuable to us in India just now but want of space forbids our giving any lengthy quotation. We do not know under what conditions the proposed State Bank in India will be constituted, if at all, it is brought into existence. We trust however that every one interested in the currency and banking of India will bear these words of President Wilson, in his message on currency reform in the United States. He said :—"We must have a currency, not rigid as now, but readily, elastically responsive to sound credit, the expanding and contracting of credits of everyday transactions, the normal ebb and flow of personal and corporate dealings. *Our banking laws must mobilize reserves ; must not permit the concentration anywhere in a few hands of the monetary resources of the country or their use for speculative purposes in such volume as to hinder or impede or stand in the way of other more legitimate, more fruitful uses. And*

*the control of the system of banking and of issue which our new laws are to set up must be public, not private, must be vested in the Government itself, so that the banks may be the instruments, not the masters, of business and of individual enterprise and initiative."* The one great objection to a Central Bank in India is that it is likely to become a huge financial monopoly.

### **Agriculturists and Banking.**

Mr. H. M. P. Eckardt communicates an interesting note on banking in Western Canada to the *Canadian News*, a weekly paper, recently established in London. Referring to the provision to be included in the new Bank Act, a Bill for which will be introduced shortly in the Dominion Parliament, authorising advances to farmers on the security of grain and cattle, he observes:—This prospective change in the Canadian law relating to farmers' loans should improve the position both of banks and agriculturists, and it should have an important effect in promoting the development of the prairie provinces. At the present time the banks are very energetic in competing for the business of the Western Canadian farmer. Even now they lend him money on the security of wheat lying in his own granary, but the loans on that security are under a certain disability, because the Bank Act does not recognise the farmer's pledge as a banking security. The section of the Act which deals with the matter authorises the banks to lend on pledges given by any wholesale dealer in or shipper of grain, cattle and other products. When a wholesale dealer in grain procures from a bank a loan of so many thousand dollars, and gives as security his pledge or assignment of wheat lying in his own warehouse or elevator, the bank has good title to the wheat while so stored, even in defiance of the claim of an unpaid vendor. But a similar pledge or assignment given by a farmer—on wheat in his granary—has not the same virtue; it does not give the bank a good title to the grain. The proposed change in the law will place the farmer's pledge on an equality with the grain dealer's pledge, and no doubt it will serve to enable agriculturists who are in good credit to

borrow from the banks on better terms for their reasonable requirements.

### **Geographical Distribution of Capital.**

*Chamber's Journal* for May contains an instructive article dealing with the broad outlines of the theory of Geographical Distribution of Capital. "A great deal of misunderstanding exists," declares the writer of this article, "regarding the real object of the distribution of capital geographically. There is a general assumption that to urge the adoption of 'geographical distribution' is only another way of saying, 'Do not put all your eggs in one basket,' which has become an accepted axiom among all who are concerned in the investment of capital. But geographical distribution of capital goes a step further. It not only says, 'Do not put all your eggs in one basket,' but it adds, 'and do not send the baskets to market in one cart.' It is good to put your capital into more than one security, but it is still better to see that the securities are not all in one country." In the same article we also read: "The millionaire who possesses sufficient capital to invest money in every trading centre of the world cannot fail to benefit, and does benefit, from the automatic increase in the value of his investments, owing to the world's perpetual trade expansion. The investor who widely distributes his capital over the earth's surface establishes an equilibrium of capital, because the effect of trade depression in one quarter of the world will be counterbalanced by trade activity in another quarter. And here it is perhaps as well to explain that I am writing of the investment of capital—that is, in Government bonds, etc.—yielding from 3%, to 5%, and not of gambling with capital in speculative counters, such as mining and oil companies' shares. Only the teaching of experience will ultimately protect the individual against loss in these directions."

### **Investors Who Live on Their Capital.**

The Investment critic of *The Financial Review of Reviews* contributes an article on "Investors who live on their Capital" to the July number of that Journal. He warns in-

vestors that their capital, even while invested in guilt-edged securities, is subject to a kind of subtle theft and suggests remedies to prevent the same. The following is a brief summary of the article.

Every investor is liable to use up his capital without being aware of the fact that he is steadily approaching a time when a valuation of his securities may disclose their capital value diminished by even so much as 25 per cent or more. Among the companies with wasting assets are, for example, those owning and working coal mines, nitrate fields, quarries etc., or holding leasehold properties or concessions terminable upon the lapse of a definite period.

At the outset of what we may call his investment career, the capitalist often selects his investments injudiciously and haphazardly. Now the false position in which such an investor has placed himself can be clearly seen. The rule of prudence enjoins that a man should live on his income only, and never encroach upon his capital for that purpose. The investor in question has perhaps drawn his income uninterruptedly for years, but when he comes to realise his invested capital he finds, say, a quarter of it gone. Clearly no inconsiderable part of the annual income he has been receiving must be regarded as tantamount to withdrawals from the capital sum. Some of the securities he originally purchased were, in fact, "wasting assets," and his failure to recognise this has led to the entire extinction of part of his capital.

The investor, if he wants to protect himself against loss, must realize that "as the life of the company's property nears its term these shares must necessarily fall to a low price; therefore to secure himself against loss, the investor who holds them should have set aside annually an adequate proportion of the dividends he has been receiving on the shares. A similar plan should be adopted by the investor who holds stocks whereon the interest will be reduced in due course to a lower rate; a proportion of the income received when the stock is bearing the higher interest should be set

aside against the fall which must occur in capital value when the interest is reduced."

If investors would follow this course, they would avoid that unconscious thriftlessness in dealing with their investments which we have shown is so dangerous to the safety of their capital.

### Indian Banking.

What is the banking accommodation provided for this vast country with a population nearly equal to one-fifth of that of the whole globe? Putting aside the exchange banks which are intended to provide only for the foreign trade—that is to say, mainly for the trade between India and Europe; putting aside also the native banks which, though well managed and important in their way, still have not the command of the resources which so great a country requires; and, lastly putting aside the native money lenders, we may say that practically the banking accommodation of the Indian people consists of what can be afforded by the three great Presidency banks—the Bank of Bengal the Bank of Bombay, and the Bank of Madras. It is unnecessary to remind readers of the *Statsl* that credit is the very breath of trade, and that no trade can really flourish unless it is provided with ample credit. But the three Presidency Banks, while they have 54 branches spread widely over the Peninsula, dispose of resources a trifle under 31 millions sterling distributed as under:—

	No. of Branches	Capital. £	Reserve. £	Deposits. £
Bank of Bengal.	24	1,383,333	1,233,333	12,329,150
Bank of Bombay.	14	666,666	706,666	7,581,924
Bank of Madras.	16	500,000	473,333	6,085,864
Aggregate	54	2,499,999	2,413,332	25,996,938
				£
Aggregate capital	...	...	2,499,999	
" reserve	...	...	2,413,332	
" deposits	...	...	25,996,938	
				Total ... 30,910,269

As a matter of course, these banks with their numerous branches working in so vast

an area exposed to bad monsoons, droughts, famines and other adverse circumstances, are bound to keep a large part of their resources in such a form that they can meet sudden and unforeseen demands coming upon them. Probably we shall not err much if we assume that the three banks cannot safely venture to lend and discount more than half their resources. A portion they evidently must keep in a liquid form—that is, as real reserves, and a portion they must keep in such a form, say, in investments, as can be turned into cash quickly if necessary. But if the whole accommodation which at any one time the three great Presidency Banks can give to the trade of an Empire with 315 millions of people does not exceed, or at any rate does not largely exceed 15 or 16 millions sterling, we leave it to our readers to judge for themselves whether such accommodation is not utterly and hopelessly insufficient. The British Government has taken upon itself the Government of India. In honour and conscience, therefore, it is bound to do what it can to raise the condition of the people in the scale of living, and to afford them the means of bettering their condition.

If so, and no reader of the *Statist*, we feel sure, will dispute the assertion, then the Presidency Banks ought to be put in a position to give adequate accommodation to the Indian public unless, indeed, it is decided to be better to substitute something else for the Presidency Banks. We ourselves are not in favour of substitution. On the contrary, we think that it is always wise to utilise the institutions which are ready to hand; partly because the very fact that they have existed so long makes them known to the community and trusted; and partly because they have had an experience which it cannot be hoped a new institution, or institutions could quickly accumulate. We conclude, therefore, that the true policy is to enable the Presidency Banks to give adequate accommodation to Indian trade. Those banks, as already said, have fifty-four branches scattered widely over the Peninsula. It has been suggested and we of this Journal think wisely, that the true policy is to amalgamate

the three banks and thereby form some thing similar to the Bank of England, or rather the Bank of France, for the Bank of England has too few branches; while the Bank of France is under obligation to cater for the entire Republic. Some persons object that the country is too large to permit of one institution properly catering for so vast a community. We ourselves fail to see the force of the argument. These Banks at present control and supervise with very respectable success all the branches spread over the Peninsula. Does it not stand to reason that it would be easier to form a really strong and competent directorate for one single great Bank than to do the same for three different banks having their headquarters in three different great cities in the Peninsula? Furthermore, we would ask: Is it beyond the capacity of British Bankers to supervise and control fifty-four branches scattered over the Empire?

It will be necessary no doubt largely to increase the number of branches. But is it not manifest that if the right kind of man is chosen with a competent board of directors to assist him, with able managers carefully selected, and a sufficient staff of visiting inspectors, he will be able to guide safely fifty-four branches, or, for that matter, twice as many? If anybody is disposed to answer the latter question in the negative, he would do well first to make himself acquainted with the number of branches of some of the largest of our English Banks, which now work harmoniously and safely under a single board of directors or, if he prefers it, the number of branches of the Bank of France. But if it is proved by experience in England and France, and we may add, in Germany likewise, that a single board is capable of directing safely not merely a very large number of branches in the same country but very many branches also in foreign countries, surely it follows that it is better to replace three comparatively small institutions by one great bank with very much larger resources.

It may here be objected that lumping together the resources of three banks will not



enable the new institution to accommodate 815 millions of people. That is perfectly true. Accordingly, there is another proposal which has been put forward on high authority, and which seems to us eminently deserving of most careful consideration. It is to take out of the hands of politicians the whole management of the banking and currency of the country, and to vest it in those who have given their whole lives to the practice of banking. In round figures, the three reserves now held by the Indian Government are as follows:—Cash in the Currency Reserve, 38 million sterling; cash and securities in the Gold Standard Reserve, 22 millions; and the cash balances of the Indian Government, which now amount to 30 millions, though previously the average was about 20 millions sterling; making altogether between 80 and 90 millions sterling. If these reserves were handed over to the new Bank they would give, when added to the resources of the three Presidency Banks, total resources amounting to over 110 millions sterling. The sum would enable immediately the new institution to lend and to discount over three times as much as the Presidency Banks do now: and, therefore, to give such accommodation to trade in India as could not fail to impart a great impetus to enterprise of every kind. As a matter of course, as soon as it became plain that the new Bank disposed of such vast resources, its deposits would rapidly increase. The present writer holds that the Government of India cannot by any conceivable policy forward the interests of its people more efficaciously than by inducing them to drop hoarding and to employ their savings in the development of the resources of their native land. If then, there were no other important prospect except that the new Bank would be in a position to impress the imagination of the natives, to bring home to them its vast power and its unshakeable credit and so induce them gradually to desposit with it instead of hiding away their savings, it would do an incalculable benefit to India, and would begin a new era full of promise. But as we have just been pointing out, it

would give an immense stimulus to trade, and therefore to the employment of labour; and, consequently, would tend to raise wages.—*Statist.*

### The Free Coinage of Gold by India.

The Hon'ble Mr. DeP. Webb, C.I.E., writes—The recent publication of the correspondence that passed between the India Office, the Treasury, and the Government of India in 1899—1902 on the subject of the opening of an Indian Mint to the free coinage of gold, brings to light three very interesting and important facts, namely, (1) that the India Office and the Government of India both endeavoured to give effect to the recommendation of the Indian Currency Committee that an open, free, gold mint should be established in India as soon as possible; (2) that the Mint authorities in London by a report that was in parts historically inaccurate and economically unsound misled the Treasury and the India office: with the result (3) that the Government of India eventually decided to drop the scheme for reasons and upon grounds that will not bear examination. India has in consequence lacked for eleven years what, rightly considered, can only be regarded as the keystone and centre of her currency system. Lest a similar mishap occur again, it is of the utmost importance to India, now that the question of establishing a Gold Mint in Bombay is once more under consideration, that the whole ground should be carefully re-examined so that a correct path may be selected without further delay.

Where the Deputy Master of the Mint in London went astray in his report of the 15th August 1899, can be gathered from the following extracts. After reciting and explaining with lawyer-like precision the various Acts, proclamations and precedents that had, or might have, a bearing on the subject, Mr. Seymour went on to say:—

"It must be borne in mind that the establishment of branch mint in Australia was due solely to the discoveries of large gold deposits in New South Wales and Victoria, and latterly in Western Australia. These mints were not

and are not required for the purpose of supplying the gold coinage needed for currency purposes in the Australian Colonies, but in order to meet the wants of the mining community... The production of gold in Australasia for the year 1898 amounted to 3,547,079 ounces, whereas that for India did not probably exceed one-tenth of this amount... The reasons which led to the establishment of mints in Australia, therefore, do not hold good in India.....It appears to me that the *early* establishment of a mint in India to coin sovereigns is not necessary."

This entirely gratuitous expression of opinion was ignored by the Treasury, the India Office, and the Government of India, and preparations for the opening of a gold mint in Bombay proceeded rapidly. By the 22nd February 1900 the draft proclamation by the Queen had been prepared and pronounced correct by all the Officials concerned; and only the merest details of the exact location of the new bricks and mortar in the compound of the Bombay Mint remained to be settled. Unfortunately, a difference of opinion arose between the Bombay experts and Mr. Seymour's department regarding the size and position in the compound of the new mint building. The correspondence went backwards and forwards for over a year. Then suddenly, in May 1901, Mr. Seymour "felt it his duty even at that late stage" to raise again the question as to whether a branch mint for the coinage of sovereigns in India was really needed. The India Office immediately replied (18th June) that the establishment of a mint for the coinage of gold in India....."is the clearest outward sign that can be given of the consummation of the new currency system... His Lordship is not inclined to abandon the scheme at the stage it has now reached"... Here, however, the Treasury unexpectedly backed up Mr. Seymour and retorted that "my Lords are disposed to think that recent experience has shown that it is quite unnecessary to provide facilities for the coinage of gold in India." The correspondence was accordingly shuttlecocked back to India. By this

time, the gold mining companies of Southern India, despairing of ever making any satisfactory arrangement for the conversion of their gold into money at the Bombay Mint, had made new, long-term contracts with London bullion dealers. The Government of India having learnt this fact, then took a very despondent view of the situation, and replied to the India Office that....."In the absence of an assurance that a steady and permanent supply of gold of local production will be available for coinage in this country, we prefer to drop the scheme for the present, leaving its revival to the existence or revival of conditions which cannot at present be foreseen." [Government of India's 385 of 25th (sic) December, 1902.] Thus, Mr. Seymour triumphed, for the moment.

It will be noticed that the consideration which determined the Government of India to abandon for the time being the opening of a Gold Mint in Bombay, was the fact that the gold mining companies of Southern India would not undertake—in the autumn of 1902,—to send their surplus gold to the proposed Mint for conversion into coin. This desire on the part of the Government of India for a "steady and permanent supply of gold of local production," and the importance which the Government of India then attached to this supply of gold from the Indian mines, were clearly the outcome of Mr. Seymour and the Treasury's argument that without large supplies of gold *from the mines of India*, a Gold Mint in India was unnecessary. Had not Mr. Seymour pointed out that the Australian mints were not, and are not, required for the purpose of supplying the gold coinage for currency purpose in the Australian Colonies but *in order to meet the wants of the Australian mining community!* And had not the Treasury concurred in this view? Seeing, then, that the Indian mining community were not demanding a Gold Mint in Bombay, and knowing that the Indian mines would not for some time to come send their gold to the Bombay Mint to be coined even if that Mint were established forthwith, we can understand how the Govern-

ment of India came to the conclusion that they had better drop the scheme for the time being,

But the conclusion was nevertheless wrong because it was based on an imperfect appreciation of the meaning and use of a modern mint, as we now propose to show. In the first place, whilst it is no doubt true to say that the Australian Mints "meet the wants of the mining community" it is both untrue and misleading to assert that the Australian Mints "were not, and are not required for supplying the gold coinage needed for currency purposes in the Australian Colonies." Before the opening of the Sydney and Melbourne Mints, the settlers were greatly inconvenienced owing to insufficiency of metallic currency. So scarce were legal tender coins at one time that *Indian gold pagodas were made legal tender in New South Wales!* The Australian Mints do most certainly supply the gold coins needed for local purposes in Australia at the present day, and to suggest that, except for Australia's present gold supplies, open mints in Australia would be unnecessary (because Australia could obtain such currency as was required from London or Ottawa, or some other gold mint in some other part of the world), is to reveal a currency outlook more appropriate to the Middle Ages than to the Twentieth Century.

The truth is that the whole idea which Mr. Seymour (and the Home Treasury) endeavoured to establish, namely, that without a large *local* production of gold, a gold mint is unnecessary, is based on an imperfect understanding of the subject. The gold unearthed annually in Great Britain is only about one thousandth of that mined every year in India. Yet London enjoys one of the largest and best equipped mints in the world! How is that? If Mr. Seymour's argument be a sound one, then the mint in London of which he himself was Deputy Master, ought to have been abolished long ago as a costly and altogether unnecessary luxury. The principal British Mint ought to be established in South Africa, say at Pretoria. Such a mint could probably turn out all the sovereigns required by the whole of the British Empire!

It cannot be too frequently or strongly emphasised that a modern mint is *not* merely a miners' convenience. It is the *automatic State mechanism* which by permitting the free inflow and creation of legal tender money as required by the public, enables prices, discounts and the foreign exchanges to adjust themselves *automatically* to the levels of foreign countries and *not artificially* in response to the "management" of some Government Department. In the absence of an open mint in India at the present day, the Secretary of State by his weekly sales of rupees at *prices which he himself manipulates*, affects (1) imports of gold and silver into India, (2) the sterling value of the rupee, (3) the rates of discount in India, and (4) the general level of prices, in India—a state of affairs that in principle has been universally condemned by currency experts, economists and statesmen all the world over, and that can now only be found in operation outside India in such poor, backward countries as Persia and China.

Without an open mint in London, foreign nations might conceivably have to pay their debts to the United Kingdom in francs, dollars, rupees, roubles or some other coins that are not legal tender in England. But with an open gold mint in London that coins sovereigns free of charge, everybody and anybody can obtain as many sovereigns as are required by the simple process of tendering the equivalent amount of gold to the London Mint. India ought to be equipped with an exactly similar mint, and the weekly manipulation—accidental or intentional—of India's foreign exchanges etc., under the auspices of a Committee of London bankers, put an end to forthwith. There is not the slightest necessity to ask the Indian gold mining companies or any other gold owners in or out of India for an assurance of a steady supply of gold. The fact that the foreign trade of India generally results in a substantial balance in India's favour is the best possible guarantee that gold will flow into India, *unless Government deliberately checks it, as is now being done by the offer and sale every week, of large volumes of rupees at prices that are lower than gold import point.* Exactly where the

gold will come from, must depend on the circumstances of the moment. It may be that the gold reserves (ornaments) of the Indian public will first pass through the new Gold Mint. (Let us pray, not.) It may be that some of India's "light" sovereigns, millions of which Government have already been shipped Home in the absence of a Gold Mint in this country, may be treated at the new Bombay Gold Mint. Or it may be gold from the Indian mines, or the Australian mines, or the South African mines that Bombay banks and bullion dealers will tender for conversion into Indian legal tender money. The gold will have to come from somewhere in settlement of India's favourable balance of trade,—that much is quite certain. And whatever gold it is,—British or Foreign, coined or in bars, the Indian Gold Mint must be ready, with the very best appliances and the most skilled workmen, to assay, refine, and coin that gold into good British sovereigns free of charge, and with the minimum of delay.

A safety valve is not ordinarily considered worthless or unnecessary unless steam be always rushing through it. In the same way, India's Gold Mint will be none the less essential even if its stamps be silent for some periods of the year. As for the expense (which seemed to weigh so much on the London Mint Master's conscience), the cost will be nothing compared with the benefits to India,—the regaining of a Right of which this country was temporarily deprived in 1893,—the Right of Free Coinage,—the Right to an *automatic* adjustment of prices, discounts and the foreign exchanges,—the Right to be free from constant interference and withdrawal of financial strength by a secret committee of London financiers whose own interests are of necessity frequently opposed to the interests of India,—the Right to manufacture and use India's money in India, for India: and not outside India, for the benefit of strangers.

#### Banks and Their Clients.

In "The Story of a Bank," written by the Hon'ble George E. Roberts, Director of the

United States Mint, he says :—"The lending power of the banks exists for the most part in the credits left with them by their customers, subject to withdrawal at their pleasure. It is a mistake to suppose that these credits, temporary and shifting as they usually are, may be used by bankers at will. Bank patrons, as a rule, are both depositors and borrowers, and no bank can hold its business unless it meets their legitimate wants. One class of customers will be borrowing in one season, other classes at different times, and the banker adjusts his affairs as best he can to meet all of their requirements. The degree of his success in satisfying them at the same time maintaining sound principles of banking, is the measure of his success as a banker. His business grows as their business grows and as the community thrives. The more credits they accumulate on his books the better for him; his prosperity is indissolubly linked with theirs. The idea that the bankers of any locality may enter into a conspiracy with bankers elsewhere by which their own locality will be placed at a disadvantage, or that bankers as a class may conspire against the rest of the community, is based upon a total misconception of how bankers derive profits and where their interests lie."

#### Money is Poor Value To-day.

Mr. G. S. Barnes, of the Board of Trade, has prepared the following table showing the fluctuation in value of a sovereign during the last eighteen years, measured by its capacity to purchase quantities of twenty-three selected articles of food :—

Year.	s.	d.	Year.	s.	d.
1895	...	20 0	1904	...	18 0
1896	...	20 0	1905	...	17 1 <sup>1</sup>
1897	...	19 3	1906	...	18 0
1898	...	18 6	1907	...	17 7
1899	...	19 4	1908	...	17 2
1900	...	18 5	1909	...	17 3
1901	...	18 4	1910	...	16 11
1902	...	18 3	1911	...	17 0
1903	...	17 11	1912	...	16 3.



# The Educational World.

## Technical Education.

A recent issue of the *Engineering* has an article contrasting the technical education system of Germany and Britain. In German laboratories large engines are the rule with a group of eight or ten students to each engine, which is often too large and complex for the average student to understand. Small, simple, robust machines which two students, working together, may easily test without danger of injury or expense and without the necessity of stultifying superintendence, are practically unknown. The student, continues the *Engineering*, is not left to himself to learn by his mistakes; he is certainly led and eminently satisfied by reasoning. This deductive tendency is one of the cardinal features of the German intellect, to which abstract speculation is often more agreeable than concrete fact. Popular opinion in England usually ascribes the high standard of technical education in Germany to a conscious effort towards industrial supremacy on the part of manufacturers and administrators. This is but a recent phase of the question. The converse is probably truer. Many public works which in England have been directed by companies, have in Germany been more often under State control. For this purpose technically trained officials were needed, and as we have seen in the history of the Bau-Akademi, the technical training of State officials began 22 years before the industries received like attention. Technical education in Germany is partly due to the needs of Government systems but much more largely due to national temperament. "It is a common impression not only in Germany and America but even in our own colonies, that technical education in England is represented by two old universities and a large number of evening schools. This, of course, is a false impression; but even so our evening schools are

seldom duly appreciated. At the Berlin Technical High School one of the chief aims in view is the education of draughtsmen and designers. It may well be asked if such an education can be given better under the Berlin conditions than in our evening institutions. Is not our evening class system the ideal sandwich system, so long as the student's strength is not over-taxed? Certainly, as far as results go, there are, adds the *Engineering*, hundreds of English draughtsmen trained in the evening classes, the drawing office, and the shop, who are not only better engineers, but better mathematicians than many German technical graduates. The workshop and drawing-office are excellent schools for commonsense, and those who have taught them know that the English evening class students are the most attentive to be found. As to the training of scientific engineers for pioneer work, excellent facilities already exist in England, and the future promises more, but in the apathetic attitude to science and the short-sighted impatience for profits, so conspicuous among our manufacturers, lies, perhaps, the chief adverse factor to our progress. The supply must follow the demand.

## The Need for Vocational Schools.

Mr. Edwin G. Cooley writing on "The Need for Vocational Schools" in the United States, observes:—"We are rapidly approaching the time, when we must undertake to carry school instruction forward beyond the present years of compulsory attendance, which end at fourteen." Industrial life makes ever-growing demands on the physical and intellectual powers. But home education has lost its old practical character, and, in the workshop, the system of apprenticeship, under which a boy learned a complete trade, is dying out. Moreover, the people are leaving the country and gathering into towns. All



these changes require a corresponding change in the preparation for life, called "education." "Germany has been the one nation that has fully appreciated this fact and has developed a supplementary system of schools to prevent, so far as possible, the loss involved in the evolution of modern systems of productions. She has endeavoured to conserve all her resources, both natural and human, by her systems of education. The change in her relative position in the modern industrial and commercial world is ascribed by careful students, both in Germany and in France and England, to her far-sighted educational policy." The most valuable resources of a nation, as Germany has understood, are its children. These remarks deserve to be borne in mind by every educationist in India.

#### The Industrial Work of a Mission.

A Committee of the American Marathi Mission made a statement on the 16th May last of the work of the Mission to the new Governor of Bombay. From this statement it appears that this Mission has been a pioneer in Economic and Industrial service. Many years ago some of its members began to help farmers to appreciate and carry on agriculture by improved methods. Before Government had established an Agricultural College, this Mission brought from America a trained agricultural expert. Later, he was taken up by Government and became Professor of Agriculture in the Government College at Poona.

The Mission also brought from America a highly trained and very capable mechanical expert who has developed an improved handloom which is likely to be of great economic value to the weavers, who constitute the second largest group of industrial workers. The Mission acknowledges with hearty thanks the receipt of large Government grants towards the prosecution of this undertaking.

The Mission conducts two superior Industrial schools and other Industrial training in connection with several schools. It recognises that economic, as well as spiritual, improvement is essential for the best development of India. Doubtless this is the correct view.

#### Agricultural Education.

What an intelligent cultivator needs is not so much grounding in the theory of agriculture, as in the empirical application of the theory. He does not want, for example, to bother his head very much with the epidemiology of rinderpest, but wants a cheap and easily procurable remedy for the scourge that works havoc among his cattle. There are now the agricultural departments which are in charge of the dissemination of this kind of empiric knowledge, but we fear, says the *Leader*, that the influence of lectures, demonstrations, leaflets and model farms, which are the present methods of popular agricultural education, has not been as much in the country as had been expected, though we must admit that the extent of their influence is widening rather than diminishing. The entry of a class of well-trained young men into this field, with ample capital and land, will have a greater effect on the popularisation of scientific agriculture, than the organisation of shows, demonstrations and the distribution of leaflets. The scientific pursuit of agriculture as an industry is yet uncommon in India. There is, therefore, in the opinion of the paper referred to, a great field open for enterprising young men of the wealthy landed classes who may choose practical agriculture as their vocation in life, and special efforts should be made to secure the education of such men in the agricultural colleges.

Research and practical agriculture will have to be differentiated, and special attention will have to be devoted to such valuable adjuncts of scientific agriculture as horticulture, fruit-farming and fruit-preserving, stock farming, agriculture, etc., in which there is a wide scope for enterprise. For this purpose a select body of students must be sent at the expense of the university from time to time to such countries as Denmark, Holland, America, and Australia, where the practical application of science in agriculture has made the greatest progress. The existing Government agricultural colleges in the country ought also to devote greater attention to the practical side of

agricultural education on the lines indicated above, so that students passing out of them may be able to help themselves, and raise the level of the condition of agriculture in the land.

### Co-operation and Education.

The *Indian Spectator* writes :—Mr. Henry W. Wolff seems never tired of insisting that if co-operative societies are established by artificial means where the spirit of co-operation is wanting, the societies are used for purposes which they ought not to subserve. Dividend-hunting, agrarianism, or the introduction of politics may endanger the good repute of societies which are not actuated by the true spirit of co-operation. As the co-operative societies in this country are more or less under official supervision, some of the abuses apprehended in other countries are not yet possible here. But high officials in Madras have deplored that the movement has encouraged the habit of borrowing, and they seem to think that until the spirit of co-operation shows itself in more useful ways, it is scarcely worth while multiplying the societies with official assistance. It seems that in that presidency a great many more applications are received for registration than the Registrar is able to attend to, and the staff of inspectors will have to be considerably augmented if the supervision required by so many societies is to be provided. We have seen it alleged that the Government is showing signs of lukewarmness towards the movement. Whether this suspicion is well founded or not, high officials have made no secret of their view that co-operative societies will not be a blessing if they merely encourage indebtedness to societies in the place of indebtedness to professional money-lenders. A high rate of interest may to some extent serve as a deterrent of the habit of borrowing, and a low rate of interest may encourage it. However desirable cheap credit may be, the societies must exist for a higher purpose ; they must at least teach thrift. But why does not the spirit of co-operation show itself in other ways ? May it not be because of the absence of education in the principles of co-operation ? Mr. Wolff in his recent book on co-operation

in agriculture, has a separate chapter on education. He thinks that the close connection between co-operation and education is illustrated in India, where " young as it is, co-operation has taught people to long for education, and for education they clamour with so much earnestness that, for want of other means, in the United Provinces a number of societies make their secretaries give the growing generation instruction during two hours a day." In many places a demand for instruction may exist, though it may not tend to co-operation. Unless we know the nature of the instruction that is in demand, we cannot be sure of the exact relation between the thirst for knowledge and the spirit of co-operation. But unless the people are taught in how many ways co-operation may be useful to them, it cannot be expected to spread in all directions rapidly ; and perhaps the reason why it flourishes only in one department of usefulness is that the official promoters are not able to afford the necessary guidance in other spheres of activity. Lending, borrowing, account-keeping and auditing, are all easy. Co-operation in agriculture, marketing, dairy-farming, and the various other methods of increasing production and facilitating commerce, require an amount of training which untrained officials cannot supply. If the spirit of co-operation should spread in the villages, the department of agriculture will have to provide the necessary instruction. It is not lessons in school books that will teach the people how they can in practice co-operate for various purposes. As Mr. Wolff writes : " Although schools and county council committees can do something to disseminate knowledge on the subject, the proper teachers indicated by the very subject itself are practical co-operators. They possess the advantage of being in constant touch with those whom they are appointed to enlighten, bone of their bone, flesh of their flesh. Their teaching is not schoolmastering. It is rather the teaching of a friend or a relative. These teaching co-operators must come into existence gradually. But we believe that the department of agriculture can do much to supply the

necessary practical instruction through persons who have received practical training in agriculture.

### The Indian Workman and His Education.

In the course of a very instructive paper on the subject read before the Calcutta and District Section of the Institution of mechanical engineers, Mr. John Wallace, C.E., Editor of the *Indian Textile Journal*, describes the defects of the Indian workmen in detail and suggests that Trade schools should all be furnished with good examples of wooden lathes, fret saws, drilling machines, and wooden turbines just as the weaving schools are fitted up with wooden handlooms; for the number of craftsmen who can find employment in engineering works in India is very small compared with the number who have to work away from towns and to whom labour saving devices would be valuable. The manufacture of these machines might form a part of the training of engineering students in woodwork.

With regard to hand tools, the organisers of trade schools would do well to collect some of the hand tools of the Chinese and Japanese who are far more fertile in such devices than the Indians. These tools are largely home-made and are the more valuable for this reason. One need only examine the cabinet work and toys that come from China and Japan, to be impressed with the excellent condition of the tools that need no assistance from sandpaper. The ignorance of the Indian workmen in regard to what might be called basic knowledge, and the shortness of the period that he is able to pass at school, would seem to point to a special kind of instruction in which reading and writing have no part. Four times out of five he forgets all the reading he learned in the primary school, and has little or nothing to show for his training. There are many things of much more importance to the day labourer; the things he will not forget because they are of daily use. Every boy should learn to draw, to sharpen a knife, to distinguish various woods, to knot and splice ropes, to recognise the value of pure water, fresh air, and light in dwellings. He should know that there are

only six varieties of snake whose bite is fatal, that the mosquito breeds in water and spreads malaria, that cuts and wounds should be kept clean. He should also be taught how contagious diseases are carried by flies, from the dejecta of a sick person thrown out of doors, back to the food in the house. Above all, the natural curiosity of the boy should be stimulated to seek for useful information and to think logically about it. This habit, once formed, will endure for life. There is no technical institute for the labourer's son, and the night school does not attract him, it is therefore the more important that all maistries, *i.e.*, leading hands, should be skilled workmen and also teachers, able, in a few well chosen words, to explain a difficulty or a method of work that would save both time and money. Men who cannot read may spend a lifetime within a few inches, so to speak, of knowledge that would throw a new light on their occupation, and considerably increase their wage value. It would therefore be to the advantage of many employers to pay for courses of instruction for selected young men who have shown ability in their duties, with a view of engaging them as maistries. Chief among their studies would be the art of demonstrating with a few words or a rough chalk sketch the information they would have to impart to their men. There is nothing so good as a strong pocket lens to shew the condition of a blunt edge tool. Very little talk is needed, and if a sharp edge is shewn at the same time a man will never forget the difference.

It is upon the working class that hews, forges, planes, files, twins, spins, weaves and dyes, that the quality of India's manufactures largely depends. Employers may have all the talents, skill and knowledge of a trade, but they count for little if the workers are careless or incompetent, and the supervision is slack. Regarded from this point of view, the improvement in useful knowledge of the Indian workmen is the most important of all the educational questions at present before the Government. It is not to be disposed of by means of the three R's, for, be it known to

educationists, it takes longer to learn to read and write a language correctly than to learn a trade. And the average workman's son has not time for both. As for their relative advantages, we have only to enquire into the number of clerks that are always out of work, and listen to the constant demand for good workmen whose pay is never less than twice that of the clerk. What we want of the Indian workman may be summed up very briefly:—

Keep your tools sharp.

Measure correctly.

Cut to the mark.

Keep your mind on the work.

Respect your superiors.

### Farm Schools in France, Germany and Belgium.

In view of the attention which is now being given to the subject of Farm Schools and Industries, an educational pamphlet recently issued by the Board of Education is of interest, says the *Journal of the Board of Agriculture*. The author, Mr. R. B. Greig, has had exceptional opportunities of becoming acquainted with the systems of agricultural education adopted on the Continent and in the Colonies; his observations and conclusions are, consequently, entitled to careful consideration.

A large number of schools and colleges were visited by Mr. Greig; they may be classified as follows:—

(a) Farm schools situated on farms.

(b) Winter and short course schools with no farm.

(c) Long course schools with no farm.

(d) Secondary schools with an agricultural side and a farm.

(e) Schools of practical agriculture with farms.

(f) Agricultural colleges.

(g) Itinerant instructions and women's institutes.

#### (a) FARM SCHOOLS SITUATED ON FARMS.

The first class farm schools situated on farms are found in France, Germany, and Belgium.

The author is of opinion that institutions of the type of the French *Fermes Ecoles* have no conceivable place in English education, in

view of the fact that elementary practical instruction is readily obtained on an ordinary farm; in some parts of Ireland, he thinks, schools of this type might be successful.

The German type of farm schools suffers from the grave defect that, in practice, it has not succeeded in attracting the peasant farmer class; it is resorted to by youths who wish to qualify as managers or officials.

In Belgium, however, Mr. Greig found a school of the first type (*Ecole Menagree*) for girls doing useful work. It was one of a number organised for the purpose of instructing women in household management and domestic economy, which have been in successful operation for twenty years. The specific subjects taught are laundry work, dairying and poultry keeping, and almost every duty which falls to the lot of a farmer's wife is the subject of instruction and explanation, from the point of view of interest as well as economy.

#### (b) SHORT COURSE SCHOOLS WITH NO FARM.

An admirable type of this class of school was found in Sweden, near Svalof. The programme of this school includes a winter session for men and summer session for women. The school adjoins the well-known Swedish Seed Station, and is in the midst of a district where farming is of a very high class.

#### (c) LONG COURSE SCHOOLS WITH NO FARM.

As a type of this class of school, the author describes a visit to a German *Landwirtschaftsschule* at Hildesheim. From this school over 90 per cent. of the students return to practical farming. The technicalities of farming are not taught, only underlying scientific principles are dealt with, and about one-half of the time is given to ordinary school subjects.

#### (d) SECONDARY SCHOOLS WITH AN AGRICULTURAL SIDE AND A FARM.

Under this head, Mr. Greig describes the agricultural High School at Ballarat, Australia. The syllabus here also includes ordinary school subjects and only one-third of the pupil's time is given to agriculture. Manual instruction on the farm and in the workshop is a prominent feature. The opinion in Australia

appears to be that a strictly "vocational" curriculum is a mistake.

(c) SCHOOLS OF PRACTICAL AGRICULTURE  
WITH FARMS.

This class includes the French *Ecoles Partiques d'Agriculture*, and they do not seem to have been successful in attracting the farming class of student.

The general conclusions of the author may be summarised as follows:—

1. No foreign or Colonial system is suitable or adoption *en bloc*.

Mr. Greig points out that, since the general farm practice so far as manual processes are concerned in England and Scotland is superior to that of any country, education here should be directed to instruction in the methods and systems of farming, and to such subjects as improvement of land, crops and stock. A school in which a large portion of the time is devoted to instruction in such matters as ploughing, stacking or hedging, is not needed here.

2. Secondary and other schools with an agricultural bias will succeed best where the larger proportion of the pupils intend to follow agriculture; provided that masters with proper qualifications can be obtained, and that no attempt is made to teach the *art* of agriculture.

3. As an ideal organisation Mr. Greig suggests that the best results would be obtained from an institution which combined the following features: (1) a winter school for men; (2) a summer school for women; (3) head-quarters of an itinerant staff of instructors (4) a demonstration centre; and linked thereto (5) a secondary school with an agricultural side.

The author advocates the inclusion—on the French model—of moral and civic teaching in the curriculum of agricultural education, and lays great stress on the need for teaching business methods through instruction in book-keeping.

4. Finally, attention is invited to the advantages of itinerant work, when put into the hands of a really capable instructor.

## The Work of Filing.

In further development of the investigations of Taylor in America, and Prof. Imbert at Montpellier, M. Jules Amar publishes in the *Comptes Rendus* some quantitative studies of the work of filing.

Since the expenditure of energy by the workman is measured by his consumption of oxygen, Marey's graphical methods enable us to determine the muscular effort, the useful work, and the corresponding expenditure of energy. It is then only necessary to change each element of the work; its speed, its total duration, the attitude of the workman, and the form and dimensions of the tool, in order to find the best working conditions. The number of "variables" is generally very great. Some are mechanical, others physiological. The file employed was of medium hardness, and the length of stroke varied from 10 inches to 13 inches. The material worked was brass. The workman was provided with a respiration-valve, for measuring the oxygen consumed. The chief conclusions arrived at are as follows:

1. The weight of filings taken off is generally proportional to the mechanical work, which equals the product of the length of stroke into the horizontal component of the muscular effort.

2. The rhythm of the stroke affects the quantity of work done. It varies in different individuals, but it increases the work performed up to 79 strokes per minute (about the frequency of the pulse).

3. The expenditure of work per weight of filings is less for frequent strokes than for a slow rhythm. Seventy strokes per minute is about the best.

4. The attitude of the body, whether straight or bent, its oscillations, its distance from the vice, the inclination of the arms, the inequality of their action, and the position of the feet, modify the expenditure of energy.

5. The conditions of highest efficiency are:—Body straight, but not stiff, 8 inches from the vice, which must be at the level of the navel. Angle between the feet, 68 degrees with a distance of 10 inches between the heels (in



the adult). Left arm fully extended, and pressing on the tool a little more than the right, the pressures being about 16 pounds and 17 pounds, respectively. Return stroke an easy glide, and a rhythm of 70 strokes per minute of complete rest, arms hanging straight down. In practice, fitters are employed  $8\frac{1}{2}$  hours per day, of which 7 hours are effective work. This comes to 470,000 feet-pound of work per day, and should yield 1 pound 8 ounces of brass filings.

This improved method increases the output of apprentices some 66 per cent. Fatigue is greatly reduced; respiration and pulsation undergo only half the usual increase; there is no pain in the forearm; and all irregular muscular action is done away with.

The graphic records of the work of different operatives give valuable indications concerning the differences due to the matter of age, experience, and physical condition.

It was observed both by Imbert and Taylor that apprentices show a well-marked irregularity in their muscular work.

### Education of Factory Children.

A Resolution issued by the Government of Bombay states that with a view to a further and more thorough discussion of the question of the education of children employed in factories, the Governor in Council has consulted the Bombay Millowners' Association and the Municipal Corporation of Bombay and with the co-operation of these bodies, has decided to refer the matter to a Committee consisting of their representatives and others. The committee is requested to examine generally the question of the education of factory children and more particularly to consider and report on the possibility of arranging for the education of all children employed in factories; to suggest the measures necessary to give effect to their recommendations; and to report upon whom primarily the responsibility for, and cost of, the execution of such measures should be imposed. The Governor in Council will be glad if their

report can be submitted so as to reach him in September.

### The Cost of Education.

An interesting article on "The Cost of Education. Does the Nation get value for the outlay?" appears in the July number of the *Financial Review of Reviews*.

The more recent trend of educational expenditure may be gathered from the following table showing the national and local contributions to the maintenance of all schools in England and Wales:—

Year.	Rates and (until 1903) Subscriptions.	Government Grants.	Total Attendance in all Schools.
	£	£	
1895 ...	4,824,369	6,226,805	5,305,756
1896 ...	5,423,555	6,514,140	5,433,187
1897 ...	5,703,848	6,819,393	5,517,468
1898 ...	5,549,034	7,564,993	5,586,770
1899 ...	5,951,021	8,021,186	5,664,182
1900 ...	6,434,243	8,234,202	5,695,397
1901 ...	7,073,733	8,291,653	5,777,623
1902 ...	7,590,112	8,419,052	5,903,991
1903 ...	Transition years.	8,589,789	6,002,940
1904 ...		9,799,412	6,053,685
1905 ...		10,688,400	6,070,296
1906 ...	9,814,924	10,951,104	6,022,955
1907 ...	10,237,084	11,386,045	6,001,518
1908 ...	10,485,206	11,581,485	6,016,270
1909 ...	11,162,515	11,195,375	6,060,163
1910 ...	11,635,725	11,162,405	6,071,428
1911 ...	12,216,897	11,511,180	6,067,075
1912 ...	...	11,740,535	6,075,024
1913 ...	...	11,832,235	...

It will be seen by a reference to the figures that the total outlay on education has considerably more than doubled in the nineteen years covered by the table. In the same period the attendance at the schools has only increased 769,268 on a total of 5,305,756. What is the cause of this remarkable increase if, as is evident, it is not in the number of the children educated? The word "administration" is writ largely over this increase. While "school maintenance" has only increased by about 70%, "salaries of officers" have grown

by over 200 % and the complementary item, "salaries of teachers" by about 120 per cent. Obviously what is happening is that the system is becoming enormously more bureaucratic, and at the same time a teaching staff is being provided which is extraordinarily expensive judged by the standard of twenty years since.

One evil of the present intensely bureaucratic educational system is that voluntary effort which has always been the salt of English public life has no place in it.

### Technological Institute for Calcutta.

A Committee was appointed by the Government of Bengal in January 1912 to consider various questions connected with technological education generally and to advise on the desirability of creating a technological institution in Calcutta. The Committee duly submitted its report which was subsequently examined by another Committee of experts who have worked out a detailed scheme for the establishment of the proposed institute. In accordance with the promise made by Government, the reports of the two Committees are now published for general information.

The Committee of experts in their report say :—The result of the detailed inquiries which we have made fully bears out the opinion of the Calcutta Committee that there is a great need for a well-equipped and up-to-date technological institution in Calcutta. Such an institute on the one hand will render important service to the numerous industries which centre in Calcutta and its neighbourhood, and on the other hand will fit the young men of Bengal to take a larger share in the conduct of those industries than has hitherto fallen to their lot. We recommend that at the outset, the institute should comprise the following departments :—Mechanical Engineering, Electrical and Civil Engineering, Textile Fabrics, Jute and Cotton, Chemistry for Engineering,

Textile and Special students, Printing, Commerce, and for Women, Dress-making and Millinery and Commerce.

In conclusion, the report says that the support of employers to the proposed institution is conditional on its being able to turn out apprentices who will not merely have the requisite technical knowledge and skill, but will also earn a reputation for industry, reliability, and resource. We have repeatedly been told with the utmost frankness that unless the institute can produce this type of apprentice its passed students will never succeed in obtaining or retaining good positions. The fullest attention, therefore, must be given to this warning and in the new institute the building up of a strong physique and of a good industrial character must receive the most careful attention.

### Dr. Rash Behari Ghose's Gift.

The Senate of the Calcutta University have accepted a munificent offer of ten lakhs of rupees, by Dr. Rash Behari Ghose, on the terms mentioned in his letter. Dr. Ghose, in his letter to the Vice-Chancellor, says that the offer is made for the promotion of scientific and technical education, and for the cultivation and advancement of science amongst Indians through indigenous agency. The gift is made on thirteen conditions : (1) The sum of ten lakhs to be invested in securities producing an income of four per cent.; (2) Four University Chairs to be established ; (3) The Chairs to be always filled by Indians ; (4) The salary of each Professor to be six thousand rupees annually ; (5) Every Professor, before appointment, should receive a special training in Europe, America and Japan and an allowance should be paid to them ; (6) Eight studentships to be founded, each of the annual value of Rs. 900, and 7 other conditions relating to the duties of the Professors, their selection and work.

# INSURANCE.

## Indian Life Assurance Companies Act.

The *Gazette of India* publishes the rules framed by the Governor-General in Council in exercise of the powers conferred by sections 27 and 39 of the Act. The following are taken from the rules :—

### QUALIFICATIONS OF ACTUARIES.

Any person who, as an Actuary, investigates the financial condition of a Company or signs valuation returns of a Company shall be either—

(1) a Fellow of the Institute of Actuaries, London, or a Fellow of the Faculty of Actuaries in Scotland; or

(2) where application is made by a Company and where, in the opinion of the Governor-General in Council, special circumstances exist,—

(a) an Associate of such Institute of Actuaries or of such Faculty of Actuaries; or

(b) such other person having actuarial knowledge as the Governor-General in Council may authorise to be employed to perform the duties of an Actuary.

Every application by a Company for permission to employ as an Actuary any person other than a Fellow of the Institute or Faculty of Actuaries shall state the work for the performance of which such person is required, and the Governor-General in Council, if he grants the application, shall cause a certificate to be issued to the Company permitting, subject to such conditions and restrictions as he thinks fit, the employment of the person mentioned in the application.

### PARTICULARS TO BE GIVEN IN REPORT OF ACTUARY.

An Actuary, after investigating the financial condition of a Company, shall report—

(a) whether the calculations are correct and made on the principles which are contained in the statement furnished under the Fourth Schedule to the Act;

(b) whether these principles have his approval;

(c) whether he has obtained all the information and explanations that he has required;

(d) what adjustment was used in the valuation to allow for unequal incidence of the premium income, and for premiums payable more often than once a year;

(e) the method by which both the ages at entry and the ages at valuation were arrived at;

(f) the rate at each age of the mortality as-

sumed and of the annuity values used in the valuation where the tables employed are not published;

(g) whether all negative values were eliminated from the valuation; and

(h) the reserve values held against policies effected at ages 20, 30, 40 and 50 and which have been in force for 1, 2, 3, 4, 5, 10, 15 and 20 years, respectively, in respect of—

(i) Whole Life Assurances with premiums payable throughout life;

(ii) Whole Life Assurances with premiums payable for 20 years;

(iii) Endowment Assurances payable at age 60 or previous death.

In the event of the actuary finding that the financial condition of the Company is such that in his opinion no payment should be made either of bonus to policy-holders or of dividend to members, he shall state whether or not he finds the Company to be solvent. If he finds it to be insolvent—(a) he shall state whether he considers that the Company could be made solvent as regards existing contracts by the transfer of its subscribed capital (whether paid or unpaid) to make good the deficiency in the Life Assurance Fund. If so, he shall state what in his opinion is the amount so required, and whether or not any alteration should be made in the rates of premium for future entrants; (b) if he considers that the Company cannot be made solvent as regards existing contracts by the transfer of the whole of the subscribed capital to the credit of the Life Assurance Fund, he shall state what proportion of the sum assured the Company would, in his opinion, be able to meet under such contracts if all the premiums thereunder are reduced proportionately with the sum assured and subscribed capital were fully paid up and transferred to such fund.

Companies transacting life assurance and annuity business only may include in the life assurance revenue account the paid-up capital and all the other funds of the Company, such as investment reserve fund, dividend reserve fund, sinking fund, etc., state separately both at the beginning and at the end of a year, so as to show any increase or diminution in such individual funds during the year. But although paid-up capital may be shown along with the funds in this way, it shall not be treated as part of the Company's assets for the purpose of showing a divisible surplus at the time of any actuarial investigation of the financial condition of the Company.

## MACHINERY, SCIENCE AND INVENTION.

### A Dust-collecting Device for Automobiles.

According to the American Consul at Manchester, a local Engineer has patented an apparatus which, it is claimed, will prevent the clouds of dust raised in dry weather by automobiles and other vehicles. The device, which is simple and inexpensive, collects the dust as it rises. The dust is drawn into conduits which are funnel-shaped at the mouth and which run from the rear of the front wheels to the rear of the back wheels. These conduits are connected with a box into which the dust is driven by the pressure of air, or this end can also be accomplished by the aid of a centrifugal fan geared to the driving shaft of the automobile. The contents of the dust-box can be discharged by pulling a lever at the front of the vehicle.

### Cooling Butter.

We read in the *Cold Storage* that a New Jersey inventor, who maintains that the deterioration of butter is due to the development of bacteria immediately after manufacture of the butter, has patented a device for rapidly cooling the butter immediately after manufacture to a temperature of approximately 0 deg. Fahrenheit to 6 degrees above 0 Fahrenheit, and holding the butter at this temperature until ready to ship to consumer, or to the cold storage warehouse for season storage. It is claimed that if this method is followed, butter made from cream gathered in the ordinary method, and without the special precautions now considered essential, can be produced so that it will be uniformly free from objectionable flavours, and that it will reach the consumer in as palatable a condition as it was when churned.

### Iron in Plants.

Experiments are being carried on at the agricultural bacteriological station in Vienna to increase the quantity of iron contained in certain plants, with a view to know the effect produced on the human system when those

plants are used as food. Artificially prepared foods containing iron do not always produce the desired effect, because the iron is not completely assimilated. This difficulty, it is thought, may be avoided by causing plants to take up an increased quantity of iron during their natural growth. By the addition of hydrate of iron to the soil in which the plants grew, the experiments resulted in producing spinach containing a percentage of iron seven times as great as that found in ordinary spinach. It is believed that the process will prove successful with other ferruginous plants.

### An Improved Milking Machine.

While quite an army of inventors has been at work endeavouring to improve the standard type of milking machines, it has remained for an Auckland Engineer to change radically the whole construction and application of the usual principles of machine-milking. His chief departure lies in the total elimination of most of the machinery and all of the usual pipes, cocks, and receptacles hitherto thought to be indispensable. The large vacuum pump has been dispensed with, also the independent pulsator, together with vacuum buckets and releasers. This machine, which has been named the Farmer's Milker, consists of a simple pump, with valve attachments, which acts as a vacuum pump, pulsator, and milk pump combined. The up-stroke of the piston creates the vacuum and effects the squeeze. The down-stroke collapses the inflation and forces the milk to any desired height, and thence to any distance by gravitation, in an open valley which has a removable cover. The patentee claims that this simple combination, which is operated by an eccentric fixed to a line of shafting overhead, eliminates all the objections to either bucket or releaser plants, while combining all the advantages of both, and milks clean and effectively. The machine is designed to enable the dairyman automatically to weigh the milk of each cow at every milking.—*Australian Farm Journal*.

## HINTS AND RECIPES.

### How to Bleach Ivory.

To bleach ivory ornaments or piano keys, the following method works well. The ornaments are first washed or "soaked" if possible in a bath of unslaked lime, which has in it a few ounces of bran and water. This should make a pasty solution if properly mixed, and will bleach the ivory which is discolored or stained. It should be rubbed off with a cloth and the ivory dried in magnesia powder. After a few minutes, a few strokes with a cloth gives the ivory a brilliant polish.

### A Good Cement for China.

A cement which, when dry, is perfectly white, is made of a thick solution of gum arabic, in which is stirred plaster of paris until it is of the consistency to hold the pieces of China together. Coat the edges with the mixture, press the pieces together tightly, and remove all surplus plaster from the outside, tie or fasten the pieces together and leave undisturbed for a week or more to get thoroughly dried. It is claimed that when perfectly dry, it will not come apart.

### Keep the Watch Going.

Is it better to keep a watch running continually or to let it run down and rest during periods when not in use? Watchmakers always say that a watch should not be allowed to run down and lie without running. The principal reason seems to be that the oil will gum upon the works, and when the watch is started, it will not keep good time until it is cleaned and oiled.

### To Test Woollen Goods.

To ascertain accurately the constituents of a woollen or worsted fabric, boil a sample in a strong solution of caustic soda. The caustic soda may be obtained at any drug store, but it is necessary to boil it in a porcelain vessel. The caustic soda heats out the animal fibre, leaving the vegetable fibre untouched, and thus showing the proportion of wool in the goods and likewise the amount of cotton threads.

If you wish to destroy the cotton and leave the wool, boil a sample in diluted sulphuric acid.

### To Dye Grasses.

The "Hamburger Gartenzeitung" gives the following recipe to dye mosses and grasses a fine green colour. For dark green, 1 oz. of alum in  $\frac{1}{2}$  pint of boiling water, and  $\frac{1}{2}$  oz. of carmine indigo. The grasses or mosses are dipped into the mixture and the liquid is shaken from them. They are then dried in a well ventilated, shady place, or near a fire in winter. For a lighter green more or less picric acid is added to the mixture.

### Tar Weakens Rope.

Rope is often tarred to protect it from the weather. This is a somewhat doubtful practice, as the acid in the tar weakens the rope to such an extent that engineers estimate tarred rope to be only two-thirds as strong as clean, new rope. No kind of oil or other preparation has so far been found that will not injure the rope, except tallow. Tallow and graphite are used in making transmission rope, and for lubricating it when in use.—*J. M. Drew, in Farm and Home.*

### Exterminating Rats.

A writer in a recent issue of the *Agricultural Economist* describes a method of driving away rats from their holes. He uses a mixture consisting of 3 lb. fresh tar and 5 oz. pure sulphuric acid. He has read of it years ago in an Indian newspaper, and has repeatedly used it in different places. The mixture must be prepared on the spot where the rat holes are, and poured into them as soon as it begins to seethe and bubble. It gives off a most unpleasant odour for a while, but this does not last. Occasionally he had had to repeat the treatment, but never more than twice. No rat corpses were found, but the rodents avoid the locality. The ingredients must, however, be pure and fresh so that it does not fail to bubble. He has used it in ceilings where dead rats have been found suspected of being plague-stricken. Being corrosive, it has, of course, to be carefully handled. It is worth trying if only people will see to it themselves. He is sure the failures can be traced to leaving it to others, who do not pour it in while seething, and pure sulphuric acid is not always obtainable, and people get put off with some that has lost part of its strength through exposure, or got diluted in some way.



## HEALTH AND HYGIENE.

### Hygienic Advice.

The *Yokohama Daily Herald* gives the following translation of the hygienic advice lately issued by the Japanese Health Authorities :—

Spend as much time out-of-doors as possible. Bask much in the sun and take plenty of exercise. Take care that your respiration is always deep and regular.

Let the diet be eggs, cereals, vegetables, fruits and fresh cow's milk. Take the last named as much as possible. Masticate your food carefully. Do not eat meat more than once a day.

Take a warm bath every day and a steam bath once or twice a week if the heart is strong enough to bear it.

Put on roughly-woven underwear (cotton fabrics are preferable) and clothes; a comfortable collar, light hat of any material and well fitting boots.

Early to bed and early to rise.

Sleep in a very dark and very quiet room, with windows open. Let the minimum of sleeping hours be six or six and one-half hours, and the maximum seven and one-half hours. In case of women, a rest of eight and one-half hours is advisable.

Take one day of absolute rest per week, on which you must refrain from even reading and writing.

Try to avoid any outburst of passions and strong mental stimulations. Do not overtax your brain at the occurrence of inevitable incidents or of coming events. Do not say unpleasant things, nor listen, if possible, to disagreeable things.

Be married ! Widows and widowers should be remarried with the least possible delay.

Be moderate in the consumption of even tea and coffee, not to say tobacco and alcoholic beverages.

Avoid places that are too warm, especially steam-heated and badly ventilated rooms.

It is a good and safe rule to sojourn in every place as if you meant to spend your life there,

never omitting an opportunity of doing a kindness, or speaking a true word, or making a friend.

### Daily Work.

Even the frailest human being performs prodigies of strength without knowing it. The heart does every twenty-four hours work equal to lifting a weight of forty tons a yard from the ground, while in the same time the body develops heat enough to raise twelve gallon of water from freezing point to boiling point.

### Petroleum and Health.

Although petroleum in its various forms of kerosene, lubricating and fuel oil, vaselene and mineral wax for candles is well known throughout India, its various virtues are still ignored by the great bulk of the people, says the *Indian Textile Journal*. It has already been observed among the petroleum distilleries at Baku, that the contact of petroleum with the skin of the workmen protects them against skin diseases.

Now that the mosquito is known to be the only disseminator of malaria, kerosene is used in the breeding places to form a very thin film on the water that prevents the young from breathing, and thus kills them. But kerosene has another and very important use in driving the mosquito away from dwellings. Mosquitoes avoid petroleum stores, and seem to have a strong dislike for the smell of kerosene. This suggested the rubbing of the liquid on the under side of tables, almirahs and chairs, where they conceal themselves during the daytime. The cheaper kinds of kerosene are the most effective, and although the smell is not pleasant, it soon abates, and long after a human being ceases to smell the odour, the mosquitoes avoid it. There is nothing injurious in the smell of kerosene. The better qualities of kerosene when rubbed on the skin serve as a protection for persons who prefer to sleep without a mosquito-net. It is applied to the exposed parts of the skin, on the face, neck, hands and wrists. The cheaper kinds would no doubt be just as effective but, being less perfectly purified, they are liable to produce an unpleasant burning sensation on the skin where it is tender. In the form of emulsion, petroleum is used as a medicine, and vaselene has superseded many other oils and fats for external application.