

great discoveries—including so many minor discoveries of the last and of the present centuries—viz., the “conservation of matter” and the “conservation of energy.” The student commences with mechanical dynamics—the “doctrine of motion”—which, as Maclaurin says, “has been justly called the key of nature;” and, throughout his initiation in electro-chemistry, and in the laws of the inductive and conductive circuits, the dynamical principles that “work” is done, and “potential energy” stored up, in the separation of masses or molecules, and in electrical separation, and that “kinetic energy” and heat become developed when masses or molecules are allowed to fall together, and when electrical recombination occurs, are constantly insisted upon. The beneficial result of thus appealing to the intelligence of the pupil, and of directing it to grand general principles rather than to details at the earliest period, is in most cases abundantly shown in the later periods of the course.

The fundamental law of current variation, first formulated by Ohm, and verified by Pouillet, requires to be very fully elucidated, and leads directly to various processes for measuring the resistance and the electromotive force of batteries, in which the student may commence to acquire some skill in “testing.” He should be well exercised in the various formulæ relating to wires; and, as an example of the proficiency

attained in this direction, it may be mentioned that one of the practical problems he is frequently required to solve, in the school we have referred to, is the determination of the exact weight and length of a wire made up into a coil, of which the ends only are accessible. A clue to the *modus operandi* may be found in the fact that the diameter of the wire in question, and its electrical resistance, are data obtainable by measurement.

The principle and the use of Wheatstone’s balance, the electrometer, and the galvanometer, with the mode of taking their “constants,” and the measurement of very high resistances by the “fall of charge” in a condenser, next engage attention, and by degrees the student is led on to the more complicated tests for determining the nature and the distance of “faults” in cables, and to various other work pertaining to the advanced science class.

In conclusion—recognising the importance of the mental culture that science can give, and the fact that the ability to do well some useful work requiring special training and acquirements is one of the best accomplishments a man can possess—we may observe that there are many gentlemen’s sons who, even without any present necessity for or intention of joining the telegraph service, might do well to spend six months in a really good School of Telegraphy.

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## THE CHINESE AND CIVILISATION.



It is pretty generally known that the vast influx of Chinese labour into the Pacific States has year by year become a subject of increasing perplexity to American statesmen, and most people have probably some general notion of the main outlines of the difficulty; but probably very few have a clear idea of how very serious a problem it is, much less of how closely it may be possibly approaching to our own doors. The inimitable “Heathen Chinee” of Bret Harte has done much to make people think that the American jealousy of “Chinese cheap labour” is *solely* (as beyond doubt it really is very largely) a trades-union feeling founded on the usual trades-union grounds, and to hide the real significance of facts which furnish just occasion for considerable anxiety. In this anxiety England herself may feel some share; for, as already hinted, the question is threatening to become more than an American one. Not only has a Committee of Congress formally requested the President to open correspondence with our British Government upon the subject of Chinese immigration—a fact which alone has brought the subject within the range of British foreign politics—but British colonies in Australia are beginning to feel the pressure of the same difficulty. More even than this: proposals have recently been made in English newspapers to meet both the scarcity

of domestic servants and other labour difficulties in England itself by the importation of Chinese, and in some quarters the proposal has been received with marked favour. Under these circumstances it is really of importance to form some clear idea of what the “Chinese difficulty” when fully developed really is, and what are so far the ascertained effects of that contact of the Chinese *en masse* with civilisation, which some amongst ourselves are disposed to bring about.

The first side of the question which naturally strikes an Englishman is, of course, the purely economic one, and on this head we have what appears to be trustworthy evidence—much of it gathered from Chinese witnesses—in the shape of reports from a Committee appointed by the Senate of California to investigate the subject, and a previous joint Committee of Congress appointed in 1876 for the same purposes. From these documents it appears that out of a total population in California variously estimated at from seven to eight hundred thousand, at least one hundred and twenty-five thousand are Chinese, a more probable estimate being one hundred and fifty thousand, while some place it at two hundred thousand. This vast population lives at an average expense of about sixpence per day, and can hence afford to work at such extremely low wages as to drive out of the State all other labour of the same kind, even negroes being unable to compete with them. This alone would be a serious thing enough to the working classes, though

perhaps not so very disagreeable to employers ; but it becomes a serious thing to the State itself, from the fact that the labouring population so driven away are tax-payers, whilst the Chinese practically pay no taxes whatever. They live almost entirely upon Chinese rice, and wear goods also imported from China ; and dwelling as they do, fifteen or twenty together in one small room, they spend scarcely anything for lodging. They however send money home from time to time, and finally, when they have served their time, return home with the entire balance. They never marry, settle, amalgamate with the people of the country, or in any way become part of it : they simply come for a time, and when they have procured a certain amount of money, depart again, taking it with them ; the gains of the "companies"—also Chinese—that export and farm them being likewise diverted from the soil where they have been amassed.

Now a moment's consideration will show how grave a state of things this is. It is only of late years that people have understood the importance of a healthy proportion between the imports and exports of a country ; but it is tolerably understood now, and every year's totals are closely scanned by a host of able statisticians. We are all familiar with the gloomy forebodings that have been uttered of late, because England's exports have for years been much below her imports ; the reason being the apparent consequence, that the money continuously sent out of the country to pay for that excess must make the nation poorer. In this particular case, however, there are matters that tend a great deal to redress the balance, though it is not easy to tabulate them. But in the case of hundreds of thousands of men swarming into California, only to stay for so many years, and bringing nothing with them, but taking or sending much money away, it is difficult to see such compensations ; the drain of money to China is steady and certain, and it is no wonder if it be regarded with some alarm.

Serious, however, as is even this aspect of the question, its moral aspect is still more so. The Chinese labourers belong chiefly to that lowest class of the population which lives in boats on the rivers. They are nominally "engaged," but really exported, by agents of Chinese companies embarked solely in this traffic, from the English settlement of Hong Kong. Now a Chinese, even of the interior, appears to European observation to be in many matters almost devoid of moral sense. Missionaries report of him that in receiving the most rudimentary Christian instruction, he has to learn what is to him practically a new language ; and have spoken of the entirely new expression that often appears upon his countenance when he has once fairly grasped some of the most elementary religious ideas. He has little notion of either common humanity or the value of human life, and indeed possesses few positive virtues beyond patient industry, a kind of quiet orderliness, and regard for his ancestors. In Batavia, where he comes in the way of business into competition with the keenest of Jewish traders, they have a proverb that it takes two Jews to cheat a Chinese, from which it will

be gathered that the latter is, at all events, by no means a shining character. But imperfect as he may be, the river Chinese is far worse, and is generally destitute, besides, of even that modicum of peculiar "education" which on shore the paternal government compulsorily bestows on all. The women are nearly all of the most abandoned class, and the large mass live in vice and depravity which cannot be described, further than to say that what is commonly understood by "morality" does not even exist amongst them, and that the choicest gratification of their lives is abandonment to the terrible but fascinating intoxication of the opium-pipe. Such are the Chinese on the rivers of Canton, and such are they in California. Of all the vast horde in that State, there are barely 3,000 women, and these of the worst character, and kept in a horrid slavery beyond any effort of imagination to conceive. The missionary can make no impression upon them, and indeed few understand the English language. To quote a few words from one of the reports before us : "During their residence here they have never adopted either our habits, dress, or educational system ; have never learnt the sanctity of an oath ; never desired to become citizens or perform the duties of such ; never ceased the worship of their idol gods, or advanced one step beyond the traditions of their native hive." From these causes, conviction for crime is very difficult ; but it is made still more so by the existence of secret and mysterious organisations among themselves, which have tribunals of their own that pass and execute sentences even of death ! This last is such a remarkable phase of the subject that we again quote from the report concerning it. "These tribunals," it says, "exercise the power of levying taxes, commanding masses of men, intimidating interpreters and witnesses, and removing them beyond the reach of process ; enforcing perjury, controlling liberty of action, and preventing the return home of the immigrants. In fact, there exist among us tribunals and laws alien to our form of government, and which actually nullify and supersede both national and State authority, constituting an *imperium in imperio*."

It is hardly necessary to state the results of all this, but the Senatorial Committee reports that the presence of such a multitude who pay no respect to the most elementary notions of morality, isolated as they are, is already producing the most terrible moral effects upon the younger portion of the white population. The gaols also are filled with them, and the actual cost to the State of this class of criminals is said to exceed the entire revenue collected from all the Chinese in it by 12,000 dollars annually, in spite of the difficulties in prosecution and conviction just alluded to. On the other hand, it is only fair to notice one very favourable point in the quiet and peaceable character of this vast and vicious population. This is not, of course, dwelt upon by the American authorities, who are, perhaps, scarcely impartial judges ; but a report of a recent visit by some English tourists to the Chinese quarter of San Francisco speaks with marked emphasis of the order, quiet, and good humour which they marvelled to find in the midst of such abandonment to vice.

They saw desperate gambling, and abundance of the most extreme intoxication under the influence of opium, but no quarrelling and confusion such as would have characterised an English population so engaged. The same fact is indeed evident enough, even from American testimony, in the utter absence of any retaliatory violence in response to the many mob outrages to which the Chinese have lately been subjected, and in which hundreds of them have been barbarously murdered. Vicious, dishonest, immoral, immodest, untruthful as he is, the Chinese is yet quiet, orderly, and good-natured. To all the brutal violence with which he has often been treated by exasperated American mobs, he opposes merely a submissive and stolid meekness which at least deserves remark, and

'reform' party would look with less horror upon his immoralities." But he won't vote ; and as they regard a man who won't vote as unfit to live—in America, at least—we hear little of regulation or supervision, but almost solely of restriction or repression. A bill framed by a Californian Senator proposes that a tax of two hundred and fifty dollars per head shall be levied upon Chinese immigrants after New Year's Day next : while another suggestion is that Congress simply prohibit more than ten Chinese landing from any one vessel upon the soil of the United States. The probability is that our own Government will be communicated with, since nearly the whole immigration, as already noticed, takes place from the British settlements, the Chinese Government itself



CHINESE WOMEN.

is very difficult for a stronger race with one spark of manly feeling to deal with.

Such then is the problem which presses for solution in California at the present time. The circumstances thus briefly summarised have already caused many ominous outbursts of popular violence, culminating in not a few fatal outrages ; and these dangerous feelings are in fact only kept in check at the present moment by most vigorous precautions on the part of the authorities, aided by the popular belief that now the attention of Congress has been drawn to the matter, something will be done legally to remedy the evil. As to what ought to be done, however, opinions differ ; but nearly all the proposals so far made go to show that the predominating motive of them is simple working-class jealousy, and that the grave moral dangers seen by some are little thought of. The leading Republican journal of New York remarks openly enough, that "if the heathen Chinee would vote the Democratic ticket, the

professing to prohibit emigration altogether. Undoubtedly either of the proposed measures appears at first sight arbitrary, and opposed to certain principles of free action generally recognised by civilised nations. No community can, however, be expected to forego the primary right of self-preservation, blindly selfish though any given operation of that feeling may appear to be ; and however questionable may be the immediate motives of those who demand such measures, it must be remembered that the class of Chinese in question are not only fully as objectionable as the convicts who were finally refused by our own Australian colonies, but that they are themselves in no real sense free agents. They do not emigrate of their own proper will and pleasure, but are entrapped and sold into virtual though temporary slavery by five great "companies," who fatten upon the proceeds of their labour.

Upon the whole, it is perhaps probable that, despite

immediate motives and proposals, the ultimate solution of this curious Chinese question may chiefly depend upon moral considerations; and it is almost certain that it will do so as regards British dominions. There are grave and pressing social difficulties in our own midst, which an ample supply of very cheap labour would do much to solve; yet, on the other hand, it is certain that we, in our crowded community, could even less than America afford to tolerate a horde of people whose habitual vices cast ancient Corinth into the shade. It must be remembered also that, should the tide ever actually reach our shores, our lodging-house regulations would prevent most of that excessive crowding which in California causes much of the mischief. It has to be considered, again, that the main part of the emigration so far has been of the very worst class; and while we know that the small numbers of this class in London have the same characteristics as in San Francisco, we also know that China can send out if need be a class at least better, if not all that could be desired. It certainly seems at present

far from improbable that the pressure of famine may promote emigration of the real country population. It would appear that a reckless destruction of forests has caused an almost chronic drought in large provinces, and that at this moment a population double that of the United Kingdom is either actually starving or on the point of doing so. Recent accounts are simply appalling: we are told that deaths *must* this year be counted by millions in North China, whatever now befall, and that there is reason to fear dreadful scarcity may prevail for years to come. A starving people cannot be kept in bounds; and if it be so, such a state of things will have such a terrible expulsive power, that we may see a wave of Chinese emigration before which even the present statistics of Queensland and California sink into insignificance. In that case the question will face ourselves, either for our own kingdom or for our colonies, and it will be a serious one—so serious, that it is well worth while thus briefly to trace its main outlines as it now faces the citizens of the Western States.

## CREAM.

BY THE AUTHOR OF "COMMON-SENSE HOUSEKEEPING."



IT is not given to every one to know what cream really is. People who have lived in towns all their lives, and formed their ideas of country life and country joys from the experiences gained during their yearly holiday, taken it may be in the heat of summer, are as ignorant of cream, its sweetness and richness, and delicate delicious flavour, as they are of the beauty of the lanes in spring, or the loveliness of the woods in autumn. If they could just for once have a dish of real cream put before them, say with a few freshly gathered strawberries, or a tart made of early gooseberries, what would their sensations be, I wonder? It would be like a revelation to them.

I remember many years ago that I had a treat of the kind. In the early summer weather I went with a number of friends on a picnic to Bolton Woods. After spending the day in gathering wild violets and primroses, and watching the rush of waters, and peeping at the blue sky through the branches of the trees, we went into the country inn and had some dinner, and amongst other good things provided there were gooseberry tart and unlimited cream. I am afraid it will be pronounced a very gross association of ideas, but ever since that time early primroses have been connected in my mind with gooseberry tart and cream.

Of course that cream was quite a different thing to town cream. And yet town cream is not so bad in its way. Putting all ideas of comparison aside, it is good enough. It is exceedingly expensive, that is the worst of it, so that in using it one has the uncomfortable feeling that Cleopatra must have experienced when she drank the pearl dissolved in acid. Very likely the

reason that it is so inferior to true country cream is that the milk from which it is taken is inferior too. Horrible stories have been told of late years of the most objectionable adulterations to which milk is subjected; and it has been said that the brains of animals, plaster of Paris, and other substances have been mixed with the milk; but the alarm was needless. It is not often that milk is diluted with anything worse than water—which is bad enough. Those serious adulterations would be very easily detected, for they would alter the flavour and appearance of the milk entirely, as they certainly would those of the cream.

But how even town cream makes its presence felt! Blancmanges and custards are very different articles made with cream and with milk, and certain soups into the composition of which cream has entered are not to be compared for a moment with the same soups when cream is absent. If good milk can be obtained at all, it is worth while to let it stand a little and see if it will not yield some of the precious liquid, which is sure to be appreciated by some favoured member of the household, or which will prove valuable for making cakes and pastry. A little water stirred into new milk makes cream rise more quickly than it otherwise would, although it does not affect the quantity yielded. And it is an undeniable proof of the goodness of milk when cream can be obtained from it. When it is wished to keep cream for a short time, it is a good plan to boil it and sweeten it slightly with sugar. At all times the cream should be kept in a cool place, and the jug which contains it may with advantage be put into a basin of cold water.

Then cream is such a wholesome dish. Is it not Miss Nightingale who says that "in many long chronic diseases cream is quite irreplaceable by any