

Reviews.

Vaccination and the Vaccination Laws; A Physical Curse, and a Class-Tyranny. By the Rev. WILLIAM HUME-ROTHERY (a Clergyman of the Church of England, who gave evidence last year before the Select Committee of the House of Commons on Vaccination). Manchester: Printed by W. Tolley, 7, Spring Gardens.

Speech of Mr. Jacob Bright, M.P. in the debate on the Contagious Diseases Acts (House of Commons, Monday, July 22nd, 1872).—Speech of Mr. MUNDELLA in the same debate.

THESE pamphlets have reference to questions of most momentous character, whether considered in their social or scientific aspects. The latter of these being more within our province than the former is the one we shall now deal with, and in so doing limit ourselves to the practical question of efficacy or non-efficacy of the Vaccination Acts and Contagious Diseases Acts as systems for preventing the spread of fearful diseases of loathsome character. In these days of scepticism, all but universal, we ought not to be surprised to find a large number of persons who deny that any practical benefit results from the adoption of these systems, stoutly maintaining that they are not only useless for effecting their professed objects, but that they introduce a "remedy which is worse than the disease." Religious, moral, and sentimental objections are likewise urged against these systems, but these we shall not attempt to confute; for we hold that if proved to be efficacious as preservatives of the public health wise legislators must perforce uphold them as of high practical importance to the interests of the community, regardless of any transcendental notions of morality or sentimentality.

As regards Mr. Rothery's pamphlet on vaccination we must admit that he makes out a strong case *contra*; but we do not deem it conclusive, for his principal practical point, the non-success of vaccination in a number of instances, does not prove its inefficiency in the majority of cases; for such non-success is just equivalent to the fact that many well-acknowledged as ordinarily successful plans of curing other diseases are often applied with such ill-success that the patient dies in consequence of the disease instead of being cured.

But the anti-vaccine objection that the introduction of the vaccine lymph into the system is often the means of introducing foreign diseases into the system of the person vaccinated is a very important practical question; though to our mind this merely teaches that great care and pains ought to be taken to procure perfectly pure lymph.

Mr. Jacob Bright and Mr. Mundella in their opposition to the Contagious Diseases Act do not much rely on the practical inutility of the Act, for they employ nearly all their power on the sentimental objections to its operation, the string they harp on being the lowering effect on female modesty which they say results from the statutory system of compulsory medical examination and treatment; and in order to make out a good case they dilate on instances where the Act has been shamefully abused by being applied by stupid policemen to women who were not of the unfortunate class. Doubtless the weak place in the system is that it has to be carried out by common policemen, and is, perhaps, not sufficiently guarded against abuse; but as it seems to be now well-accepted that the duty of the policeman is not so much to guard us against murder, robbery, and assault, in which he continually proves his inefficiency, as to look after our sobriety, decorous demeanour, and propriety of language, the conclusion seems to be that the remedy here lies in elevating the character of the official so that he may be fully competent to perform his work without blundering or needless offence—that is, if the country will pay the wages of such high-class men as our police-constables would

then be. And if really so great an injury be worked as is alleged, it looks very much like a charge against the medical profession, because it is clear that in this matter they ought to "do their spiriting gently," since it is evident the proceedings must necessarily be offensive. The whole difficulty, however, is much magnified, for, whilst Englishwomen are content to be attended in childbirth by male accoucheurs, and are ever ready voluntarily to submit to medical examination by male doctors, it cannot be anything more than a mere feminine affectation of modesty on the part of women who do not mind violating chastity to elevate a disagreeable proceeding into a shock to their delicacy of feeling. One portion of Mr. Jacob Bright's speech is very remarkable, for he makes it appear that he regards with great tenderness those women who only "indulge in the occasional gratification of their passions," entertaining, we assume, the idea that it is only the too frequent repetition of such gratifications that is the injury, and that these occasional wrong-doers are not likely to be diseased, though there is really no sound reason for this view of the matter. If the class of diseases which this Act deals with could be confined to the persons who originate them, then Government interference would be unjustifiable; but as they are in fact frequently communicated to innocent women, and transmitted to equally innocent offspring, and are a rottenness in the bones of the nation, measures for preventing the spread of them are more than justified *malgré* all sentimentality and fancied injury to modesty.

The Expression of the Emotions in Man and Animals. By CHARLES DARWIN, M.A., F.R.S., &c., with photographic and other illustrations. London: John Murray, Albemarle Street. 1872.

ALTHOUGH this is a physiological work of the highest order, such as might be expected to proceed from the pen of this eminent *savant*, it is nevertheless a pleasant, readable book; to our mind, quite as interesting as any three volume novel, and withal far more instructive. Throughout its pages references are continually made to the habits and actions of cats, dogs, and other animals, such as all of us have many opportunities of testing by our own observation.

The philosophic *rationale* of the book will be best understood by the quotation of the opening portion of chapter I:—

The three principles which appear to me to account for most of the expressions and gestures involuntarily used by man and the lower animals under the influence of various emotions and sensations.—Mr. Herbert Spencer ("Essays," Second Series, 1863, p. 138) has drawn a clear distinction between emotions and sensations, the latter being "generated in our corporeal framework." He classes as feelings both emotions and sensations. I arrived, however, at these three principles only at the close of my observations. They will be discussed in the present and two following chapters in a general manner. Facts observed both with man and the lower animals will here be made use of; but the latter facts are preferable, as less likely to deceive us. In the fourth and fifth chapters I will describe the special expressions of some of the lower animals; and in the succeeding chapters those of man. Everyone will thus be able to judge for himself how far my three principles throw light on the theory of the subject. It appears to me that so many expressions are thus explained in a fairly satisfactory manner, that probably all will hereafter be found to come under the same or closely analogous heads. I need hardly premise that movements or changes in any part of the body—as the wagging of a dog's tail, the drawing back of a horse's ears, the shrugging of a man's shoulders, or the dilatation of the capillary vessels of the skin—may all equally well serve for expression. The three principles are as follows:—

1. The principle of serviceable associated

habits.—Certain complex actions are of direct or indirect service under certain states of the mind, in order to relieve or gratify certain sensations, desires, &c.; and whenever the same state of mind is induced, however feebly, there is a tendency through the force of habit and association for the same movements to be performed, though they may not then be of the least use. Some actions ordinarily associated through habit with certain states of the mind may be partially repressed through the will, and in such cases the muscles which are least under the separate control of the will are the most liable still to act, causing movements which we recognise as expressive. In certain other cases the checking of one habitual movement requires other slight movements; and these are likewise expressive.

2. The principle of antithesis.—Certain states of the mind lead to certain habitual actions, which are of service, as under our first principle. Now, when a directly opposite state of mind is induced, there is a strong and involuntary tendency to the performance of movements of a directly opposite nature, though these are of no use; and such movements are in some cases highly expressive.

3. The principle of actions due to the constitution of the nervous system, independently from the first of the will, and independently to a certain extent of habit.—When the sensorium is strongly excited nerve-force is generated in excess, and is transmitted in certain definite directions, depending on the connection of the nerve-cells, and partly on habit: or the supply of nerve-force may, as it appears, be interrupted. Effects are thus produced which we recognise as expressive. This third principle may, for the sake of brevity, be called that of the direct action of the nervous system.

These principles Mr. Darwin supports by numerous references to the habitual practices of the lower animals and of man.

With regard to the first of the principles above stated there is little said that is specially noteworthy, probably in consequence of its almost self-evident character; but as regards the second principle Mr. Darwin gives many instances in support of his theory; amongst others this one:—

I will here give one other instance of antithesis in expression. I formerly possessed a large dog, who, like every other dog, was much pleased to go out walking. He showed his pleasure by trotting gravely before me with high steps, head much raised, moderately erected ears, and tail carried aloft, but not stiffly. Not far from my house a path branches off to the right, leading to the hot-house, which I used often to visit for a few moments, to look at my experimental plants. This was always a great disappointment to the dog, as he did not know whether I should continue my walk; and the instantaneous and complete change of expression which came over him as soon as my body swerved in the least towards the path (and I sometimes tried this as an experiment) was laughable. His look of dejection was known to every member of the family, and was called his *hot-house face*. This consisted in the head drooping much, the whole body sinking a little and remaining motionless; the ears and tail falling suddenly down, but the tail was by no means wagged. With the falling of the ears and of his great chaps the eyes became much changed in appearance, and I fancied that they looked less bright. His aspect was that of piteous, hopeless dejection; and it was, as I have said, laughable, as the cause was so slight. Every detail in his attitude was in complete opposition to his former joyful yet dignified bearing, and can be explained, as it appears to me, in no other way except through the principle of antithesis. Had not the change been so instantaneous, I should have attributed it to his lowered spirits affecting, as in the case of man, the nervous system and circulation, and consequently the tone of his whole muscular frame; and this may have been in part the cause.

As to the origin of these antithetical signs, Mr. Darwin remarks:—

Many signs, moreover, which plainly stand in opposition to each other, appear to have had on both sides a significant origin. This seems to hold good with the signs used by the deaf and dumb for light and darkness, for strength and weakness, &c. In a future chapter I shall endeavour to show that the opposite gestures of affirmation and negation—namely, vertically nodding and laterally shaking the head—have both probably had a natural beginning. The waving of the hand from right to left, which is used as a negative by some savages, may have been invented in imitation of shaking the head; but whether the opposite movement of waving the hand in a straight line from the face, which is used in affirmation, has arisen through antithesis or in some quite distinct manner is doubtful.

As to the third principle referred to—namely, certain actions which we recognise as expressive of certain states of the mind—they are, says Mr. Darwin, the direct result of the constitution of the nervous system, and have been from the first independent of the will, and, to a large extent, of habit. When the sensorium is strongly excited nerve-force is generated in excess, and is transmitted in certain directions, dependent on the connection of the nerve-cells, and, as far as the muscular system is concerned, on the nature of the movements which have been habitually practised. Or the supply of nerve-force may, as it appears, be interrupted. Of course every movement which we make is determined by the constitution of the nervous system; but actions performed in obedience to the will, or through habit, or through the principle of antithesis, are here as far as possible excluded. Our present subject is very obscure, but, from its importance, must be discussed at some little length; and it is always advisable to perceive clearly our ignorance.

The most striking case, though a rare and abnormal one, which can be adduced of the direct influence of the nervous system when strongly affected on the body, is the loss of colour in the hair, which has occasionally been observed after extreme terror or grief. One authentic instance has been recorded in the case of a man brought out for execution in India, in which the change of colour was so rapid that it was perceptible to the eye.

Another good case is that of the trembling of the muscles, which is common to man and to many, or most, of the lower animals. Trembling is of no service, often of much disservice, and cannot have been at first acquired through the will, and then rendered habitual in association with any emotion. I am assured by an eminent authority that young children do not tremble, but go into convulsions, under the circumstances which would induce excessive trembling in adults. Trembling is excited in different individuals in very different degrees and by the most diversified causes—by cold to the surface before fever-fits, although the temperature of the body is then above the normal standard; in blood-poisoning, delirium tremens, and other diseases; by general failure of power in old age; by exhaustion after excessive fatigue; locally from severe injuries, such as burns; and, in an especial manner, by the passage of a catheter. Of all emotions, fear notoriously is the most apt to induce trembling; but so do occasionally great anger and joy. I remember once seeing a boy who had just shot his first snipe on the wing, and his hands trembled to such a degree from delight that he could not for some time reload his gun; and I have heard of an exactly similar case with an Australian savage to whom a gun had been lent. Fine music, from the vague emotions thus excited, causes a shiver to run down the backs of some persons. There seems to be very little in common in the above several physical causes and emotions to account for trembling; and Sir J. Paget, to whom I am indebted for several of the above statements, informs me that the subject is a very obscure one. As trembling is sometimes caused by rage, long before exhaustion can have set in, and as it sometimes accompanies great joy, it would

appear that any strong excitement of the nervous system interrupts the steady flow of nerve-force to the muscles.

The manner in which the secretions of the alimentary canal and of certain glands—as the liver, kidneys, or mammae—are affected by strong emotions is another excellent instance of the direct action of the sensorium on these organs, independently of the will or of any serviceable associated habit. There is the greatest difference in different persons in the parts which are thus affected, and in the degree of their affection.

The heart, which goes on uninterruptedly beating night and day in so wonderful a manner, is extremely sensitive to external stimulants. The great physiologist, Claude Bernard, has shown how the least excitement of a sensitive nerve re-acts on the heart, even when a nerve is touched so slightly that no pain can possibly be felt by the animal under experiment. Hence when the mind is strongly excited we might expect that it would instantly affect in a direct manner the heart; and this is universally acknowledged and felt to be the case. Claude Bernard also repeatedly insists, and this deserves especial notice, that when the heart is effected it re-acts on the brain; and the state of the brain again re-acts through the pneumo-gastric nerve on the heart; so that under any excitement there will be much mutual action and re-action between these the two most important organs of the body.

The vaso-motor system, which regulates the diameter of the small arteries, is directly acted on by the sensorium, as we see when a man blushes from shame; but in this latter case the checked transmission of nerve-force to the vessels of the face can, I think, be partly explained in a curious manner through habit. We shall also be able to throw some light, though very little, on the involuntary erection of the hair under the emotions of terror and rage. The secretion of tears depends, no doubt, on the connection of certain nerve-cells; but here again we can trace some few of the steps by which the flow of nerve-force through the requisite channels has become habitual under certain emotions.

A brief consideration of the outward signs of some of the stronger sensations and emotions will best serve to show us, although vaguely, in how complex a manner the principle under consideration of the direct action of the excited nervous system on the body is combined with the principle of habitually associated, serviceable movements.

When animals suffer from an agony of pain they generally writhe about with frightful contortions; and those which habitually use their voices utter piercing cries or groans. Almost every muscle of the body is brought into strong action. With man the mouth may be closely compressed, or more commonly the lips are retracted, with the teeth clenched or ground together. There is said to be "gnashing of teeth" in hell; and I have plainly heard the grinding of the molar teeth of a cow which was suffering acutely from inflammation of the bowels. The female hippopotamus in the Zoological Gardens, when she produced her young, suffered greatly; she incessantly walked about, or rolled on her sides, opening and closing her jaws, and clattering her teeth together. With man the eyes stare wildly as in horrified astonishment, or the brows are heavily contracted. Perspiration bathes the body, and drops trickle down the face. The circulation and respiration are much affected. Hence the nostrils are generally dilated and often quiver; or the breath may be held until the blood stagnates in the purple face. If the agony be severe and prolonged these signs all change; utter prostration follows, with fainting or convulsions.

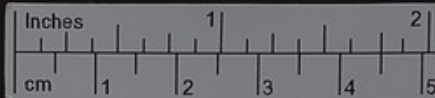
A sensitive nerve when irritated transmits some influence to the nerve-cell, whence it proceeds; and this transmits its influence, first to the corresponding nerve-cell on the opposite side of the body, and then upwards and downwards along the cerebro-spinal column to other nerve-cells, to a greater or

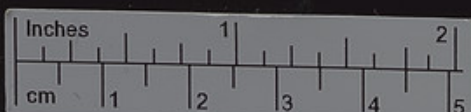
less extent, according to the strength of the excitement; so that, ultimately, the whole nervous system may be affected. This involuntary transmission of nerve-force may or may not be accompanied by consciousness. Why the irritation of a nerve-cell should generate or liberate nerve-force is not known; but that this is the case seems to be the conclusion arrived at by all the greatest physiologists, such as Müller, Virchow, Bernard, &c. As Mr. Herbert Spencer remarks, it may be received as an "unquestionable truth that at any moment the existing quantity of liberated nerve-force, which in an inscrutable way produces in us the state we call feeling, must expend itself in some direction—must generate an equivalent manifestation of force somewhere"; so that when the cerebro-spinal system is highly excited and nerve-force is liberated in excess it may be expended in intense sensations, active thought, violent movements, or increased activity of the glands. Mr. Spencer further maintains that an "overflow of nerve-force, undirected by any motive, will manifestly take the most habitual routes; and, if these do not suffice, will next overflow into the less habitual ones." Consequently the facial and respiratory muscles, which are the most used, will be apt to be first brought into action; then those of the upper extremities, next those of the lower, and finally those of the whole body.

These views Mr. Darwin proceeds to elucidate in a way that may be fairly termed captivating, making repeated references to the various photographic illustrations of the work, the portions of which following the part from which we have quoted having reference to the means of expression in animals—the special expressions of animals and of man; the book finishing with concluding remarks, and a summary, from which we extract the following:—

The movements of expression in the face and body, whatever their origin may have been, are in themselves of much importance for our welfare. They serve as the first means of communication between the mother and her infant; she smiles approval, and thus encourages her child on the right path, or frowns disapproval. We readily perceive sympathy in others by their expression; our sufferings are thus mitigated and our pleasures increased, and mutual good feeling is thus strengthened. The movements of expression give vividness and energy to our spoken words. They reveal the thoughts and intentions of others more truly than do words, which may be falsified. Whatever amount of truth the so-called science of physiognomy may contain appears to depend, as Haller long ago remarked, on different persons bringing into frequent use different facial muscles, according to their dispositions; the development of these muscles being perhaps thus increased, and the lines or furrows on the face, due to their habitual contraction, being thus rendered deeper and more conspicuous. The free expression by outward signs of an emotion intensifies it. On the other hand, the repression, as far as this is possible, of all outward signs softens our emotions. He who gives way to violent gestures will increase his rage; he who does not control the signs of fear will experience fear in a greater degree; and he who remains passive when overwhelmed with grief loses his best chance of recovering elasticity of mind. These results follow partly from the intimate relation which exists between almost all the emotions and their outward manifestations, and partly from the direct influence of exertion on the heart, and consequently on the brain. Even the simulation of an emotion tends to arouse it in our minds. Shakespeare, who from his wonderful knowledge of the human mind ought to be an excellent judge, says:—

"Is it not monstrous that this player here,
But in a fiction, in a dream of passion,
Could force his soul so to his own conceit
That, from her working, all his visage wann'd;
Tears in his eyes, distraction in 's aspect,
A broken voice, and his whole function suiting
With forms to his conceit? And all for nothing!"
Hamlet, act ii., sc. 2.





"We have seen that the study of the theory of expression confirms to a certain limited extent that man is derived from some lower animal form." To this statement of Mr. Darwin's we demur; for, as far as we can discover, all that is common to man and to the lower animals as regards expression (except in some very slight degree in apes) is that both man and the other animals make signs and gestures and utter sounds to express their emotions; but each uses signs, gestures, and sounds which are markedly different and distinctive. Mr. Darwin further remarks: This supports the belief of the specific or sub-specific unity of the several races; but, as far as my judgment serves, such confirmation was hardly needed. We have also seen that expression in itself—or the language of the emotions, as it has sometimes been called—is certainly of importance for the welfare of mankind. To understand, as far as is possible, the source or origin of the various expressions which may be hourly seen on the faces of the men around us, not to mention our domesticated animals, ought to possess much interest for us. From these several causes we may conclude that the philosophy of our subject has well deserved the attention which it has already received from several excellent observers, and that it deserves still further attention, especially from any able physiologist.

Elementary Treatise on Natural Philosophy.—By A. PRIVAT DESCHANEL. Translated and edited, with extensive additions, by J. D. EVERETT, M.A., D.C.L., F.R.S.E., Professor of Natural Philosophy in the Queen's College, Belfast. In four parts. Part IV.: Sound and Light. Illustrated by 187 engravings on wood, and one coloured plate. London: Blackie and Sons, Paternoster Buildings, E.C. 1872.

THE present is the concluding part of this very valuable work, and we find it quite equal in its high-class character, succinct, yet explicit style of description, and elucidatory engravings, to any of the former parts. It may be fairly stated that this work of Deschanel, in the shape it is presented to us by Professor Everett, is a complete compendium of science, so explanatory and well illustrated that any person of ordinary education can by studying its pages make himself acquainted with all the material points of the varied branches of natural philosophy. This is saying a great deal, but we consider we are fully justified in saying it.

Carr's Patent Disintegrating Flour Mill, also Carr's Patent Process of Flour Making on a Novel System or Mode of Manufacture. Bristol: T. Carr, Richmond Road, Montpellier; Edinburgh: J. & J. Cunningham, 102, West Bow.

CARR'S disintegrators bid fair, as it appears, to replace the old millstones used in the manufacture of flour, and revolutionise one of our most important industries, perhaps the most important of all. Hence the statements in this pamphlet are worthy of most serious attention, and therefore we have much pleasure in introducing Mr. Carr to our readers, and will let him tell his own tale.

"By this new system," he says, "material of an unfibrous and friable nature, if of adequate specific gravity, is without grinding, compression, or friction 'shattered into powder by percussion in mid air,' the said percussion being derived from the reiterated free blows of numerous, continuous acting, unarrested beaters, silently rotating in alternately reverse directions with extreme rapidity, and successively dashing to and fro each individual particle, while unsupported it is being dispersed with projectile impetus by centrifugal force, and isolated in its flight from contact with everything but that of each whirling beater encountering and shattering it by collision in mid-air. Thus, the gravity and impetus of the material operated on serves as the sole abutment to the machine, in contradistinction to the system hitherto invariably

pursued, of reducing all materials between two working surfaces, one of which surfaces supports them and acts as an abutment to the other while operating on the said intervening materials. All mills in the world of every description and for all purposes are, without a single exception, based on one or the other of the above two distinct systems. For minute operations, or for fibrous or extremely light materials, or for such as require reducing to an absolutely impalpable powder without sieving, the old system must still prevail; but for the wholesale reduction of an immense variety of other articles to a fine granular powder, the new one is now universally admitted to be incomparably the best.

"It has been found pre-eminently successful when so operating on either hard or pasty materials of considerable specific gravity, such as ores, minerals, clays, and manures, for which it was originally intended, yet though so far as the invention had been hitherto developed, its machines could be constructed to roughly pulverise very readily the millstones themselves, or any of the numerous articles, and such as are *ejusdem generis* to those enumerated in my previous patents and circulars, yet all of these machines, though made wholesale throughout Europe and America, were hitherto utterly unsuited to and totally incapable of reducing to fine flour so light a material as wheat. Happily, however, the novel combination of principles, mode of action, and system of disintegrating matter, which I had discovered and inaugurated in my invention of the original disintegrator, are of so unusually versatile and expansive a nature as to have recently enabled me to extend their original sphere of usefulness, and to adapt and apply them, without any pernicious complications, to the purposes of a flour-mill, a matter of incalculably more importance and value than those for which it had been originally designed, patented, and used. One also of a peculiarly special and exceptional character, not merely from the vast difference to those hitherto operated on, in the nature and required treatment of a compound material such as wheat is, in which one portion has to be finely powdered and the other (the bran) as little so as possible, but more especially so when the said article is considered conjointly with the peculiar mode of action of this unique mill. For, as above stated, it is entirely destitute in itself of anything to serve as an abutment, which is invariably provided in every other kind of mill, and is therefore wholly dependent, as aforesaid, for that indispensable adjunct whereby alone it can operate at all, on the gravity and impetus of the material itself that it pulverises, the said material for the time being constituting as it were a vital portion of the machine itself and an active agent in effecting its own disintegration. It appeared therefore to all familiar with the *modus operandi* of this machine directly contrary to its principles, as long since correctly defined and published far and wide by myself and subsequently by others, and equally adverse also to the experience derived from the daily working for many years of hundreds of the original disintegrators, for it to be imagined for a moment that wheat, with its low specific gravity, smallness of its particles, and the tough and fibrous nature of its outer covering, the bran, could by its mere *vis inertiae* present sufficient resistance to the beaters to enable them to reduce it into flour while it was unsupported and flying freely through the air. If, however, by any device such a thing were ever devised at all, it was considered irrational in the extreme to imagine that flour so produced could be fit for anything but the coarsest brown flour, owing to the fine pulverising of the bran, which it was erroneously supposed would in such case be inevitable. My proposed attempt therefore to construct a flour-mill on the basis of my disintegrator was satirised as a hallucination in the scientific journals of America and regarded as wholly impracticable by all who heard of my intentions here.

"In fact it was one of those prospective

projects the entire success of which in practice can by no possibility be proved or demonstrated from theory; and in the absence of all tangible evidence or precedents but such as appear adverse, the public instinctively regard all such untried propositions, involving sweeping innovations on long established usages, as chimerical illusions, while they are necessarily more or less hypothetical even to their projectors themselves, having no actual existence as real inventions until they have assumed a material form and by the test of practical operation their entire success has been thereby proved to be an accomplished fact and an established reality, superior to all preceding contrivances for kindred purposes, and of substantial benefit to the community at large. Now, happily in this case all these requisites have at length been most satisfactorily accomplished, in which practice has more than realised the dubious hopes of theory, and for ever removed obstacles hitherto thought insurmountable. The grand result of which has been no less a matter than the metamorphosing of my granulating ore, mineral, clay, and manure mill into a novel flour mill, of such marvellous efficiency as greatly to surpass in quality, and by full thirty-fold in quantity, the work a pair of millstones will do, while it simultaneously introduces an entire new process of flour-making of unparalleled efficacy."

The Civil Service Arithmetic.—By R. JOHNSTON, Author of "The Competitive Geography," &c. New edition, with examination papers given at the open competitions, &c., &c. London: Longmans, Green, and Co. 1872.

WE welcome with pleasure this new edition of a thoroughly practical work, which is worthy of our hearty commendation.

Hints and Facts on the Origin, Condition, and Destiny of Man.—By PIUS MELIA, D.D. Second Edition. Revised and improved by the Author. Burns, Oates, and Co., Portman Street and Paternoster Row.

On Mankind, their Origin and Destiny.—By an M.A. of Balliol College, Oxford. London: Longmans, Green, and Co. 1872.

WE are pleased to find that Dr. Melia's very commendable work, reviewed in our April number, has reached a second edition, and that the Doctor has been induced to revise and improve his book. Not that there was much need for any revision or improvement, for the professed object of the work being to proffer hints and facts for attentive consideration, and not to present the public with an exhaustive treatise, the work as it originally stood was, as we formerly stated, a good fulfilment of that task.

The new edition of this work is the more welcome to us just now because, from its being designed to support the orthodox view of the question, it enables us to have before us at the same time the *pro* and the *con*, since the work by the M.A. of Balliol is by no means of orthodox character; as, whilst Dr. Melia's hints and facts tend to support the two principal propositions that there is "an intelligent first Being, the principle and ruler of everything," who is distinct from the material universe, and that there is a supernatural revelation given to mankind by their Creator, the M.A. of Balliol denies or disputes the truth of these propositions in a book which we are bound to say is no mere skim-the-surface production, but a work of deep erudition and learned research, such as might be expected from an Oxonian of high standing.

The work is, however, little to our taste, for it deals not so much with scientific facts as with old world literature and old world traditions. In tone and *animus* it is antagonistic to the Bible as an authoritative revelation from God—nay more, the sentiments and views likely to be gathered up from the perusal of its pages are that the God of the Scriptures is a mythical Being, and that universal Nature is the only God, as will be seen by the perusal

Babies.

Vaccination and the Vaccination Laws; a Physical Cause, and a Chastity-Treatise. By the Rev. WILLIAM HOWE, M.A. (a Clergyman of the Church of England, who gave evidence last year before the Select Committee of the House of Commons on Vaccination). Manchester: Printed by W. Talley, 7, Spring Gardens.

Speech of Mr. Joseph Bright, M.P. in the debate on the Contagious Diseases Act (House of Commons, Monday, July 23rd, 1870).—Speech of Mr. MITCHELL in the same debate.

These pamphlets have reference to questions of most momentous character, whether considered in their social or scientific aspects. The latter of these being more widely our province than the former is the one we shall now deal with, and in so doing limit ourselves to the practical question of efficacy of vaccination. Some Acts on evidence for preventing the spread of fearful diseases of infectious character. In these days of scepticism, all but universal, we ought not to be surprised to find a large number of persons who deny that any practical benefit results from the adoption of these systems, stoutly maintaining that they are not only useless for afflicting their professed objects, but that they introduce a "curse which is worse than the disease." Religious, moral, and sentimental objections are likewise urged against these systems; for we hold that if proved to be efficacious as preservatives of the public health we legislators must perform a painful duty of high practical importance to the interests of the community, regardless of any transcendental notions of morality or non-morality.

As regards Mr. Anthony's pamphlet on vaccination we must admit that he makes out a strong case; but we do not deem it conducive, for his principal practical point, the non-efficacy of vaccination in a number of instances, does not prove its inefficiency in the majority of cases; for such non-efficacy is not equivalent to the fact that many well-acknowledged as ordinarily successful plans of curing other diseases are often applied with such ill-success that the patient dies in consequence of the disease instead of being cured.

But the anti-vaccine objection that the introduction of the vaccine lymph into the system is often the means of introducing foreign diseases into the system of the person vaccinated is a very important practical question; though to our mind this merely testifies that great care and pains ought to be taken to procure perfectly pure lymph.

Mr. Joseph Bright and Mr. Mitchell in their opposition to the Contagious Diseases Act do not much rely on the practical inefficiency of the Act, for they employ nearly all their power on the sentimental objections to its operation, the strong they base on being the lowering effect on female modesty which they say results from the statutory system of compulsory medical examination and treatment; and in order to make out a good case they dilate on instances where the Act has been shamefully abused by being applied by stupid policemen to women who were not of the unfortunate class. Doubtless the weak point in the system is that it has to be carried out by common lawmen, and is, perhaps, not sufficiently guarded against abuse; but as it seems to be now well-accepted that the duty of the policeman is not so much to guard us against murder, robbery, and assault, in which he continually proves his inefficiency, as to look after our sobriety, decorous demeanour, and propriety of language, the conclusion seems to be that the remedy here lies in elevating the character of the official so that he may be fully competent to perform his work without blundering or making offence—that is, if the country will pay the wages of such high-class men in our police-commissioners would

then be. And if really so great an injury be wrought as is alleged, it looks very much like a charge against the medical profession, because it is clear that in this matter they ought to "do their springing best," since it is evident the proceedings must necessarily be so complicated, that it is difficult, however, is much simplified, for, whilst Englishmen are content to be attended in childbirth by male助産婦, and are ever ready voluntarily to submit to medical examination by male doctors, it cannot be anything more than a mere domestic affliction of modesty on the part of women who do not mind violating chastity to elevate a disreputable proceeding into a claim to their delivery of failing. One portion of Mr. Joseph Bright's speech is very remarkable, for he makes it appear that he regards with great disfavour those women who only "passage in the occasional gratification of their passions," entreating, we assume, the idea that it is only the too frequent repetition of such gratifications that is the injury, and that these occasional wrong-doers are not likely to be damaged, though there is really no sound reason for this view of the matter. If the class of diseases which this Act deals with could be confined to the persons who originate them, then Government interference would be unjustifiable; but as they are in fact frequently communicated to innocent women, and transmitted to equally innocent offspring, and are a source in the bones of the nation, measures for preventing the spread of them are more than justified, except all non-morality and female injury to modesty.

The Expression of the Emotions in Man and Animals. By CHARLES DARWIN, M.A., F.R.S., &c., with photographs and illustrations. London: John Murray, Albemarle Street. 1872.

ALTHOUGH this is a physiological work of the highest order, such as might be expected to proceed from the pen of the great naturalist, it is nevertheless a pleasant, readable book, in every sense, quite as interesting as any three volumes of anatomy, and without far more instructive. Throughout its pages references are continually made to the habits and actions of rats, dogs, and other animals, such as all of us have many opportunities of testing by our own observation.

The philosophical rationale of the book will be best understood by the quotation of the opening portion of chapter I.—

The three principles which appear to me to account for most of the expression and gesture invariably used by man and the lower animals under the influence of various emotional sensations.—Mr. Herbert Spencer ("Essays," Second Series, 1862, p. 136) has drawn a clear distinction between emotions and sensations, the latter being "generated in our corporeal framework." He classes as feelings both emotions and sensations. I second, however, all these three principles only at the close of my observations. They will be discussed in the present and two following chapters in a general manner. Facts observed both with man and the lower animals will have to be made use of; but the latter facts are, as a rule, likely to interest us. In the fourth and fifth chapters I will describe the mental expressions of some of the lower animals; and in the succeeding chapters those of man. Everyone will then be able to judge for himself how far my three principles throw light on the theory of the subject. It appears to me that so many expressions are thus explained in a fairly satisfactory manner, that probably all will hereafter be found to come under the same or closely analogous heads. I need hardly promise that movements and changes in any part of the body—as the wagging of a dog's tail, the drawing back of a horse's ears, the shrugging of a man's shoulders, or the dilatation of the capillary vessels of the skin—may all equally be traced to expression. The three principles are as follows:—

1. The principle of servilelike associated

habits.—Certain complex actions are of direct or indirect service under certain states of the mind, in order to relieve or gratify certain emotions, desires, &c.; and whenever the same state of mind is induced, however feebly, there is a tendency through the force of habit and association for the same movements to be performed, though they may not then be of the least use. Some actions ordinarily associated through habit with certain states of the mind may be partially repressed through the will, and in such cases the muscles which are least under the separate control of the will are the most liable still to act, causing movements which we recognise as expressions. It is certain other states the showing of one habitual movement requires other slight movements; and these are likewise expressive.

2. The principle of antithesis.—Certain states of the mind lead to certain habitual actions, which are of service, as under our first principle. Now, when a directly opposite state of mind is induced, there is a strong and involuntary tendency to the performance of movements of a directly opposite nature, though these are of no use; and such movements are in some cases highly expressive.

3. The principle of action due to the constitution of the nervous system independently from the state of the will, and independently to a certain extent of habit.—When the sensation is strongly excited, nerve-force is generated in excess, and is transmitted in certain definite directions, depending on the connection of the nerve-force, and partly on habit; or the supply of nerve-force may, as it appears, be interrupted. Effects are then produced which we recognise as expressive. This third principle may, for the sake of brevity, be called that of the direct action of the nervous system.

These principles Mr. Darwin supports by numerous references to the habitual practices of the lower animals and of man.

With regard to the first of the principles above stated there is little said that is especially noteworthy, probably in consequence of its almost self-evident character; but as regards the second principle Mr. Darwin gives many instances in support of his theory, amongst others like this:—

I will here give one other instance of antithesis in expression. I formerly possessed a large dog, who, like every other dog, was much pleased to get out walking. He showed his pleasure by trotting joyfully before me with high steps, head much raised, and with a merry, snoring sound, but not a silly grin. One day, however, a path branched off to the right, leading to the bathroom, which I used often to visit for a few moments, to look at my experimental plants. This was always a great disappointment to the dog, as he did not know whether I should continue my walk; and the instantaneous and complete change of expression which came over him as soon as my body swerved in the least towards the path (and I sometimes tried this as an experiment) was laughable. His look of dejection was known to every member of the family, and was called his *do-down face*. This manifested in the head drooping low, the whole body sagging in a sinking and sinking motion—the ears and tail falling suddenly down, but the tail was by no means wagged. With the falling of the ears and of the great shape the eyes became much changed in appearance, and I fancied that they looked less bright. His aspect was that of pitiful, hopeless dejection; and it was, as I have said, laughable, as the cause was so slight. Every detail in his attitude was in complete opposition to his former joyful yet dignified bearing, and was to be explained, as it appears to me, in no other way except through the principle of antithesis. Had not the change been so instantaneous, I should have attributed it to his lowered spirits affecting, as in the case of man, the nervous system, and circulation, and consequently the tone of his whole muscular frame; and this may have been in part the case.

As to the origin of these antithetical signs, Mr. Darwin remarks:—

Many signs, moreover, which plainly stand in opposition to each other, appear to have had on both sides a significant origin. This seems to hold good with the signs used by the deaf and dumb for light and darkness, for strength and weakness, &c. In a future chapter I shall endeavor to show that the opposite gestures of affirmation and negation—namely, vertically nodding and laterally shaking the head—have both probably had a natural basis. The waving of the hand from right to left, which is used as a negative by some savages, may have been invented in imitation of shaking the head; but whether the opposite movement of waving the hand in a straight line from the face, which is used in affirmation, has arisen through antithesis or is some quite distinct manner is doubtful.

As to the third principle referred to—namely, certain actions which we recognize as expressive of certain states of the mind—they are, says Mr. Darwin, the direct result of the consideration of the nervous system and have been in the first independent of the will, and, in a large extent, of habit. When the nervous system is strongly excited, nerve-force is generated in excess, and is transmitted in certain directions, dependent on the connection of the nerve cells, and, as far as the muscular system is concerned, on the nature of the movements which have been habitually practiced. Or the supply of nerve-force may, as it appears, be interrupted. Of course every movement which we make is determined by the constitution of the nervous system; but actions performed in obedience to the will, or through habit, or through the principle of antithesis, are less so far as possible considered. One ground subject is very obscure, but, of its importance, must be discussed at some little length; and it is always advisable to perceive clearly our ignorance.

The most striking case, though a rare and abnormal one, which can be adduced of the direct influence of the nervous system when strongly affected on the body, is the loss of colour in the hair, which has occasionally been observed after extreme terror or grief. The anæsthetic influence has been recorded in the case of a man brought out for execution in India, in which the change of colour was so rapid that it was perceptible to the eye.

Another good case is that of the trembling of the muscles, which is common to men as to many, or most, of the lower animals. Trembling is of no service, often of much disservice, and cannot have been at first acquired through the will, and thus rendered habitual in association with any emotion. I am assured by an eminent authority that young children do not tremble, but go into convulsions, under the circumstances which would induce excessive trembling in adults. Trembling is excited in different individuals in very different degrees and by the most diversified causes—by cold to the surface before fire, or, although the temperature of the body is then above the normal standard, in blood-poisoning, glandular disease, and other diseases; by general failure of nerve-force; by exhaustion after excessive fatigue; locally from nerve injuries, such as burns; and, in an especial manner, by the passage of a substance. Of all emotions, fear notoriously is the most apt to induce trembling; but so do occasionally great anger and joy. I remember once seeing a boy who had just shot his first snipe on the wing, and his hands trembled to such a degree from delight that he could not for some time reload his gun; and I have heard of an exactly similar case with an Australian savage to whom a gun had been sent. Fine music, from the rapture occasioned, causes a shiver to run down the backs of some persons. There seems to be very little in common in the above several physical causes and emotions to account for trembling; and Mr. J. Paget, to whom I am indebted for several of the above statements, informs me that the subject is a very obscure one. As trembling is sometimes caused by rage, long before exhaustion can have set in, and as it sometimes accompanies great joy, it would

appear that any strong excitement of the nervous system interrupts the steady flow of nerve-force to the muscles.

The manner in which the secretions of the alimentary canal and of certain glands—in the liver, kidneys, or mammae—are affected by strong emotions is another excellent instance of the direct action of the nervous system on these organs, independently of the will or of any servilely associated habit. There is the greatest difference in different persons in the extent to which they are thus affected, and in the degree of their effect.

The heart, which goes on unintermittently beating night and day in a wonderful manner, is extremely sensitive to external stimuli. The great physiologist, Claude Bernard, has shown how the beat of the heart of a sensitive nerve reverts on the heart, even when a nerve is touched so slightly that no pain can possibly be felt by the animal under experiment. Hence when the mind is intensely excited, we might expect that it would indirectly affect in a direct manner the heart; and that it is universally acknowledged and felt to be the case. Claude Bernard also repeatedly insists, and this deserves especial notice, that when the heart is affected it reacts on the brain; and the state of the brain again reacts through the pneumo-gastric nerve on the heart; so that under any excitement there will be much mutual action and reaction between these two most important organs of the body.

The vaso-motor system, which regulates the diameter of the small arteries, is directly acted on by the emotions, as we see when a man blanches from shame; but in this latter case the shocked transmission of nerve-force to the vessels of the face may, I think, be partly explained in a certain manner through habit. We shall also be able to throw some light, though very little, on the involuntary motion of the hair under the emotions of terror and rage. The secretion of tears depends, no doubt, on the connection of certain nerve-cells; but here again we can trace some few of the steps by which the flow of nerve-force through the regulate channels has become habitual under certain emotions.

A brief consideration of the outward signs of some of the stronger emotions and emotions will best serve to show us, although vaguely, in how complex a manner the principle under consideration of the direct action of the excited nervous system on the body is combined with the principle of habitually associated, servilely associated movements.

When animals suffer from an agony of pain they generally writhe about with frightful contortions; and those which habitually use their voices after playing or in games. Almost every muscle of the body is brought into strong action. With man the mouth may be closely compressed, or more commonly the lips are retracted, with the teeth clenched or ground together. There is said to be "grinding of teeth" in a bull, and I have frequently seen the grinding of the molar teeth of a cow which was suffering severely from inflammation of the bowels. The Danish physiologists in the Zoological Institute, when she produced her young, suffered greatly; she incessantly walked about, or rubbed on her sides, opening and closing her jaws, and clattering her teeth together. With man the eyes stare wildly as in terrified astonishment, or the brows are heavily contracted. Perspiration bathes the body, and drops trickle down the face. The circulation and respiration are much affected. Hence the muscles are generally dilated and often quiver; or the mouth may be held open the blood stagnates in the upper face. If the agony be severe and prolonged these signs of change; when prostration follows, with fainting or convulsions.

A sensitive nerve when irritated transmits some influence to the nerve-cell, whence it proceeds; and this transmits its influence, first to the corresponding nerve-cell on the opposite side of the body, and then proceeds and downwards along the cerebro-spinal column to other nerve-cells, to a greater or

less extent, according to the strength of the excitement; so that, ultimately, the whole nervous system may be affected. This involuntary transmission of nerve-force may or may not be accompanied by consciousness. Why the initiation of a nerve-cell should generate or liberate nerve-force is not known; but that this is the case seems to be the conclusion arrived at by all the greatest physiologists, such as Müller, Fodor, Bernard, &c. As Mr. Herbert Spencer remarks, it may be received as an "exceptionally truth that at any moment the existing quantity of liberated nerve-force, which is an inextinguishable way produces in us the state we call feeling, may expand itself in some direction—most generally an equivalent manifestation of force somewhere"; so that when the cerebro-spinal system is highly excited and nerve-force is liberated in excess it may be expended in intense sensations, active thought, violent movements, or increased activity of the glands. Mr. Spencer further maintains that as an "overflow of nerve-force, undirected by any motive, will necessarily take the most habitual route; and, if these do not suffice, will next overflow into the less habitual ones." Consequently the facial and respiratory muscles, which are the most used, will be apt to be first brought into action. The flow of the upper extremities, next those of the lower, and finally those of the whole body.

These views Mr. Darwin proceeds to elucidate in a way that may be fairly termed captivating, making repeated reference to the various photographic illustrations of the work, the portions of which following the part from which we have quoted having reference to the means of expression in animals—the special expressions of animals and of man; the look denoting with convulsing convulsions, and a summary, from which we extract the following:

"The movements of expression in the face and body, whatever their origin may have been, are in themselves of much importance for our welfare. They serve as the first means of communication between the mother and her infant; the smile approval, and thus encourage her child on the right path, or browns disapproval. We readily perceive sympathy in others by their expression; our sufferings are thus mitigated and our pleasures increased, and mutual good feeling is thus strengthened. The movements of expression give vividness and energy to our spoken words. They reveal the thoughts and feelings of others, and truly that do words, which may be feigned. Whatever amount of truth the so-called science of physiognomy may contain appears to depend, on either long ages accumulated, on different persons bringing into frequent use different facial muscles, according to their dispositions; the development of these muscles being perhaps thus increased, and the lines or furrows on the face, due to their habitual contraction, being thus rendered deeper and more conspicuous. The free expression by outward signs of an emotion intensifies it. On the other hand, the repression, as far as is possible, of all outward signs of intense emotion. No outward signs of violent passion will increase its rage; he who does not control the signs of his fear will experience fear in a greater degree; and he who remains passive when over-relied with grief loses his best chance of recovering clarity of mind. These results follow partly from the intimate relation which exists between almost all the emotions and their outward manifestations, and partly from the direct influence of exertion on the heart, and consequently on the brain. Even the dissimulation of an emotion tends to increase it in our minds. Shakespeare, who has in his wonderful knowledge of the human mind ought to be an excellent judge, says—

"It is not monstrous that this player here, But in a fiction, in a dream of passion, Could force his soul so to his own conceits That, from her working, all his visage would, Transform to his eyes, devotion to a sinner, A broken heart, and every other such thing 'Wh' forms to his conceit? And all he uttering."

"We have seen that the study of the theory of expression confirms to a certain limited extent that man is derived from some lower animal form." To this statement of Mr. Darwin's we dissent; for, as far as we can discover, all that is common to man and to the lower animals as regards expression (except in some very slight degree in apes) is that both man and the other animals make signs and gestures and utter sounds to express their emotions; but each uses signs, gestures, and sounds which are markedly different and distinctive. Mr. Darwin further remarks: "This supports the belief of the specific or sub-specific unity of the several races; but, as far as my judgment serves, such confirmation was hardly needed. We have also seen that expression is itself—or the language of the emotions, as it has sometimes been called—is certainly of importance to the welfare of mankind. To understand, as far as is possible, the source or origin of the various expressions which may be hourly seen on the faces of the men around us, but to question our domesticated animals, and to possess much interest in us. From these several causes we may conclude that the philosophy of our subject has well deserved the attention which it has already received from several excellent observers, and that it deserves still further attention, especially from any able physiologist."

Elementary Treatise on Natural Philosophy.—By A. PUYAT DUMASIER, Translated and edited, with extensive additions, by J. D. EVERETT, M.A., D.C.L., F.R.S.E., Professor of Natural Philosophy in the Queen's College, Belfast, in four parts. Part IV.: Sound and Light. Illustrated by 145 engravings on wood, and one coloured plate. London: Macmillan and Sons, Paternoster Buildings, E.C. 1871.

THE present is the concluding part of this very valuable work, and we find it quite equal in its high-class character, consistent yet simple style of description, and satisfactory engravings, to any of the former parts. It may be fairly stated that this work of Dumasier, in the shape it is presented to us by publisher Everett, is a complete compensation of errors, so explanatory and well illustrated that any person of ordinary education can by studying the pages make himself acquainted with all the material points of the varied branches of natural philosophy. This is saying a great deal, but we consider we are fully justified in saying it.

Carr's Patent Disintegrating Flour Mill.—See Carr's Patent Process of Flour Making on a Novel System, or Mode of Manufacture. Bristol: J. Carr, Richmond Road, Moor-spring, Edgborough. J. & J. Cunningham, 165, West Bow.

CARR'S DISINTEGRATORS did but, as it appears, to replace the old millstones used in the manufacture of flour, and revolutionize one of our most important industries, perhaps the most important of all. Hence the statements in this pamphlet are worthy of most serious attention, and therefore we take much pleasure in introducing Mr. Carr to our readers, and will let him tell his own tale.

"By this new system," he says, "material of an uniform and brittle nature, of adequate specific gravity, is without grinding, compression, or friction, shattered into powder by percussion in still air; the said percussion being derived from the retarded flow of steam, continuously acting, unassisted by rollers, simply rotating in alternately reverse directions with extreme rapidity, and successively discharging to and fro each individual particle, while the material is being disintegrated with progressive increase in centrifugal force, and broken in its flight down contact with everything but that of each whirling bucket encountering and shattering it by collision in mid-air. Thus, the gravity and impetus of the material operated on serves as the sole stimulus to the machine, in contradistinction to the system hitherto invariably

permeated, of reducing all materials between two working surfaces, one of which surfaces supports them and acts as an abutment to the other while operating on the said intervening materials. All mills in the world of every description and for all purposes are, without a single exception, based on one or the other of the above two distinct systems. The minute operation, or the shattering of extremely light materials, as for such as rocks, is effected by an absolutely insuperable power being exerted; the old system must still prevail; but for the wholesale reduction of an immense variety of other articles to a fine granular powder, the new one is now universally admitted to be incomparably the best."

"It has been found pre-eminently successful when so operating on either hard or partly material of considerable specific gravity, such as iron, minerals, clays, and manures, for which it was originally intended, yet through so far as the invention had been hitherto developed, its machine could be constructed to roughly pulverize very readily the millstones themselves, or any of the numerous articles, and such as are chosen operate to those enumerated in my previous patents and circulars, yet all of these machines, though made without exception in Europe and America, were hitherto utterly unable to deal with a material as wheat. Happily, however, the novel combination of principles, mode of action, and system of disintegrating matter, which I had discovered and incorporated in my invention of the original disintegrator, are of so unusually valuable and extensive a nature as to have recently enabled me to extend their original sphere of usefulness, and to adapt and apply them, without any painful complications, to the purpose of a flour-mill, a matter of incalculably more importance and value than those for which it had been originally designed, patented, and used. One aim of a peculiarly special and exceptional character, not merely from the vast difference to those hitherto operated on, as in the nature and required treatment of the material such as wheat is, in which one machine has to be finely produced and the other (the bran) as little as possible, but more especially so when the said article is considered conjointly with the peculiar mode of action of this unique mill. For, as above stated, it is entirely distinctive in itself of anything to serve as an abutment, which is invariably provided in every other kind of mill, and is therefore wholly dependent, as above said, for that indispensable adjunct whereby alone it can operate at all, on the gravity and impetus of the material itself that it pulverizes, the said material for the time being constituting as it were a vital portion of the machine itself and an outgrowth in effecting its own disintegration. It appeared therefore to me familiar with the most successful mode of this machine directly contrary to its previous, on an long since universally defined and published law and acted by myself and subsequently by others, as my earlier advice also to the experience derived from the daily working for many years of hundreds of the original disintegrators, for it to be imagined for a moment that wheat, with its low specific gravity, softness of its particles, and the tough and fibrous nature of the outer covering, the bran, could by its mere use derive prompt sufficient resistance to the beaters to enable them to reduce it into flour while it was unsupported and flying freely through the air. It, however, by my device such a thing were ever devised at all, it was considered irrational in the extreme to imagine that such a proceeding would be fit for anything but the coarsest brown flour, serving to the fine pulverizing of the bran, which it was avowedly supposed would in such case be inevitable. My proposed attempt, therefore, to construct a flour-mill on the basis of my disintegrator was admitted as a hallucination, by the ablest journals of America and regarded as wholly impracticable by all who heard of my intention here."

"It is that it was one of those prospective

projects the entire success of which in practice can by no possibility be proved or demonstrated from theory; and in the absence of all tangible evidence or precedents but such as appear abroad, the public instinctively regard all such untold propositions, involving sweeping innovations on long established usage, as chimerical fancies, while they are necessarily more or less hypothetical even to their promoters themselves, having no actual existence as real inventions until they have assumed a material form, and by the test of practical operation their entire success has been thereby proved to be an accomplished fact and an established reality, superior to all preceding contrivances for kindred purposes, and of substantial benefit to the community at large. Now, happily in this case all these requisites have at length been most satisfactorily accomplished, in which process has been that which the dubious laws of theory, and the ever removed obstacles which thought is insurmountable. The great result of which has been to leave matter than the metamorphosis of my granulating iron, mineral, clay, and manure into a novel four mill, of such marvellous efficiency as to greatly to surpass in quality, and by far thirty-fold in quantity, the work a pair of millstones with all while it simultaneously introduces an entire new system of flour-making of unparalleled efficacy."

The Civil Service Arithmetic.—By E. JOURNAN, Author of "The Competitive Geography." &c. New edition, with examination paper given at the open competitions, &c., &c. London: Longmans, Green, and Co. 1871.

We welcome with pleasure this new edition of a thoroughly practical work, which is worthy of our hearty commendation.

Hints and Facts on the Origin, Condition, and Destiny of Man.—By FRED. MAITLAND, D.D. Second Edition. Revised and improved by the Author. Boston, Gates, and Co., Portman Street and Paternoster Row.

On Marking, their Origin and Destiny.—By an M.A. of Balliol College, Oxford. London: Longmans, Green, and Co. 1871.

We are pleased to find that Dr. Maitland's very commendable work, written in our April number, has reached a second edition, and that the Doctor has been induced to revise and improve his book. But that there was much need for any revision or improvement, for the profound object of the work being to prefer clear and facts for attentive consideration, and not to present the public with an exhaustive treatise, the work as it originally stood was, as we humbly stated, a good fulfilment of that task.

The new edition of this work is the more welcome to us just now because, from its being designed to support the orthodox view of the question, it enables us to have before us at the same time the pro and the con, since the work by the M.A. of Balliol is by no means of orthodox character; as, whilst Dr. Maitland's aims and tone tend to support the two principal propositions that there is "an intelligent God, being, the creator and ruler of everything," who is distinct from the material universe, and that there is a supernatural revelation given to mankind by their Creator, the M.A. of Balliol desires to disprove the truth of these propositions in a book, which we are bound to say is no mere skin-deep production, but a work of deep erudition and learned research, such as might be expected from an Oxonian of high standing.

The work is, however, little to our taste, as it deals not so much with scientific facts as with old world literature and old world traditions. In tone and avowed it is antagonistic to the Bible as an authoritative revelation from God—may more, the sentiments and views likely to be gathered up from the perusal of the pages are that the God of the Scriptures is a spiritual Being, and that universal Nature is the only God, as will be seen by the perusal