

SCIENCE.

AN ILLUSTRATED JOURNAL PUBLISHED WEEKLY.

Vérité sans peur.

NEW YORK: THE SCIENCE COMPANY.

FRIDAY, JANUARY 7, 1887.

COMMENT AND CRITICISM.

STUDENTS OF THE PROBLEMS of taxation are directing attention to a law imposing progressive taxation, lately passed in canton Vaud, Switzerland, and which will come into operation with the beginning of the new year. The practical working and effects of the law will be closely studied. The project is undoubtedly popular; for when put before the people, as is necessary for the enactment of a law in Switzerland, it was passed by very large majorities. This new Vaudois law divides real property into three classes, according as it falls below \$5,000, between \$5,000 and \$20,000, or over \$20,000 in value. The proportion of tax is to be 1 per 1,000 for the first class, $1\frac{1}{2}$ per 1,000 for the second class, and 2 per 1,000 for the third class. Personal property falls into seven classes, the lowest class being less than \$5,000 in value, and the highest over \$160,000. The rates of taxation on these classes are to be in the proportion of 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, and 4, respectively, per 1,000. Incomes from earnings are similarly put in seven classes; but, in estimating the amount to be taxed, a deduction is made amounting to \$80 for each person legally dependent on the head of the family for his support. A great many theories as to taxation will be put to test by the operation of this law, and its outcome will be watched with interest.

THE SYSTEM WHICH FECHNER deduced from the simple experiments of Weber has had the honor of exciting the criticism of nearly every eminent physiologist and physicist in Germany at one time or another during its brief career. Weber found, that, if you could just distinguish four ounces from five ounces, you could change the ounces to pounds without causing any change in the recognizability of the difference between the two weights. From this, with the aid of some hypotheses, Mr. Fechner deduced the psychophys-

ical law that the sensation is proportional to the logarithm of the excitation. The system has been attacked on every side, and Fechner's last hope is that it will stand, because the attackers cannot agree upon the mode of destroying it. But a consensus is now forming on the mode of attack. Dr. Adolf Elsas, in a recent pamphlet, boldly upholds that the system is unscientific from the root; that it does not follow from Weber's experiments except upon an unjustifiable assumption; and that no system of psychophysics, in Fechner's sense, is physically, mathematically, or philosophically possible. It is possible to state briefly where the confusion came in, viz., in mistaking the sensation of being different for a difference of sensation; but it is not possible to show in a few words how far-reaching the results of this misconception are. If a prediction is allowable, the statement may be hazarded that the outcome of the discussion will be a recognition of a valuable means of gauging the discriminative sensibility of the senses, the avoidance of many current errors in experimentation, and the conviction that it is as impossible to bridge the chasm between thought and nerve by psychophysics as by any other of the numerous methods that have been proposed.

AS WE STATED some time ago, the Kongo Free State has received a severe blow in the loss of the station at Stanley Pool. The official accounts of the affair have just reached us. It appears that the quarrel between Mr. Deane, an Englishman, who, with M. Dubois, commanded at the post, and the Arabs, was about a slave-girl who had sought refuge in the station. Notwithstanding the Arabs' threats, the young Englishman refused to give up the girl. A peace was patched up for the time being; but it was only a ruse on the part of the Arabs. Later they made an unexpected attack, and were repulsed. But soon ammunition ran short. The negro troops at the post took to their boats, and floated down stream to the next station of the association. This was commanded by Lieutenant Coquilhat. He ran up stream to the sta-

tion in his little steamer, only to find it in possession of the Arabs. Mr. Deane was found among some negroes soon after. M. Coquilhat thinks that the situation is quite serious; not, perhaps, so much for its effect upon the immediate prospects of the Kongo Free State, as because it will show the natives that the whites and the Arabs are no longer on good terms. Then, too, it brings the day nearer when the inevitable conflict between the trade association and the slavers must be fought out. It has also closed the route to the lakes *via* the Kongo and Tanganyika.

But the Kongo State has still an interest in connection with the relieving of Emin Bey, referred to in another column. Mr. Grenfell has ascended a large tributary of the Kongo, which joins the main river about twenty-five miles south of the equator, to a point in longitude east from Greenwich of $19^{\circ} 40'$, and in latitude 4.27° . Dr. Junker passed six years in the Niam-Niam territories. He telegraphs from Zanzibar that on one excursion he followed the Welle to longitude 22° east. These two points are not more than from one hundred and fifty to two hundred miles apart. It may be that the Welle, instead of being a tributary of Lake Tsad, is, after all, a branch of the Kongo. If this proves to be the case, and the river proves also to be navigable, the key to the Soudan may yet be found to be the Kongo railway and river.

THE ANNUAL REPORT of the directors of the English convict-prisons, drawn up by Sir E. F. DuCane, is interesting, principally because of the valuable statistical tables appended to it. It seems that the number of sentences of penal servitude passed by ordinary courts in England and Wales in 1885 was 1,027, a decrease of 23 per cent as compared with the number so sentenced in the previous year, which, in turn, was lower than any year on record, and only half the number sentenced to penal servitude twenty years before. At the date of the report, the convict-prison population was only 8,183, as against 11,660 in 1869. There is also a remarkable and gratifying decrease in the number of females under sentences of penal servitude. It is now but 821, only a little more than half what it was ten years ago. During the year the commencement of a new work for the war department near Chatham afforded some points of interest in connection with the employment of convict-labor. The report on this reads

as follows: "The work in question being quite in the open country, and distant about two miles from the prison at Borstal, special consideration was necessary before deciding that the work could be undertaken. Arrangements were ultimately entered into, which have enabled the convicts to be employed there with complete security. A line of narrow-gauge tramway has been laid down by the royal engineer department along the whole line occupied by the forts under construction, and this is made use of for the conveyance of the convicts to and from their work. A train of railway-carriages, specially fitted to insure the safe custody of the convicts, has been furnished. The site of the works is enclosed by a palisading ten feet high, with a ditch on the inner side, and wire entanglements on the inner side of the ditch. Warders and civil guards travel with the train, and an addition has been made to the armed guard at the works, where a selected officer is always in charge. A system of signals is established between the work and the prison, and an engine is always available in case any thing should be required, or to facilitate inspection by the superior officers of the prison all along the line."

Sir Edmund DuCane has also something to say about the operation of the separate system, which Pentonville prison was designed especially to carry out. He recalls, that, when the system of separate confinement was decided on, grave doubts were expressed as to whether it could possibly be carried out without injury to the mental and bodily health of the prisoners. At first the isolation and seclusion were very strict, and were imposed upon all prisoners for two years, after which they were removed to Australia. At first the apprehensions of the opponents of the separate system, those who had favored a system of silent or classified association, seemed justified; for it was found that a certain class of minds became enfeebled and lost their balance under the regimen adopted. As the result of this experience, the period of isolation was reduced to nine months, and its strictness was much modified. Since these changes, no evil results have followed; and Sir Edmund DuCane writes, that, "although a complete moral reformation is no longer expected to be the usual result, the separation undoubtedly prevents prisoners mutually contaminating each other, good influences have an opportunity of acting on them, and it has been found of the highest advantage as

a training and discipline preparatory to the subsequent stages of a sentence of penal servitude." At all events, the reform in the system of dealing with crime and criminals has produced such results that the directors find, that, instead of an increasing amount of crime and a swelling prison population, they are enabled, in spite of the increasing population of the country, to diminish the number of convict establishments.

AT THE LAST annual meeting of the British medical association, Dr. Shuttleworth of Lancaster read a paper on 'The relationship of marriages of consanguinity to mental unsoundness,' which has since been published in the *Journal of mental science*. Dr. Shuttleworth states, as evidence that there exists in the public mind a misgiving as to the propriety of such marriages, the fact that he is frequently asked whether any risk attends the marriage of cousins. Numerous contemporary authorities of good repute can be cited on both sides of the question. Dr. Shuttleworth shows that in early times no evil results were feared from the marriage of near kin, and quotes Jeremy Taylor to the effect that "the elder the times were, the more liberty there was of marrying kindred." In studying the history of the lower animals, it is found that "strict confinement to one breed, however valuable or perfect, produces gradual deterioration." Here, then, is the special danger of consanguineous marriages, especially as it seems to be the case that cousin-marriages are more frequent among neurotic than among perfectly healthy stock.

It seems that in 1871 Sir John Lubbock tried to insert a question as to cousin-marriages in the census schedules, but his proposal was rejected amid the scornful laughter of the house of commons as 'the idle curiosity of a speculative philosopher.' In France some attempt has been made to obtain information as to these marriages; and M. Boudin reckons that 0.9 per cent of all the marriages in France are between relations, 0.88 being between first-cousins. Other investigators present different returns, M. Dally contending that in Paris first-cousin marriages amount to 1.4 per cent of all the marriages; and M. Legoyt, chief of the statistical staff, estimates that throughout France first-cousin marriages form from 2.5 to 3 per cent of all marriages. In 1875 Mr. George H. Darwin undertook an elaborate in-

quiry into the subject in England, and, "by a series of careful mathematical processes, he satisfied himself that in England the proportion of such marriages averages from 1.25 per cent in London to 2.25 per cent in the rural districts for all classes of society, rising somewhat higher in the higher social grades." From this basis, and assuming that first-cousin marriages are not appreciably inferior in fertility to non-consanguineous marriages, Mr. Darwin concluded, that, unless we find in the idiot and lunatic asylums a larger proportion than the above figures would provide for, of children of first-cousins, then no evils, at least so far as mental unsoundness is concerned, can be attributed to first-cousin marriages. In an inquiry based on 4,308 patients, it was found that about 3.4 per cent of the inmates of asylums (5.25 per cent in Scotland) were the children of first-cousins. In Dr. Shuttleworth's own asylum at Lancaster, the record of 100 cases shows 5.1 per cent to be children of consanguineous marriages, and (included in this) 2.8 per cent of first-cousin marriages. The general conclusion seems to be that the propriety of first-cousin marriages must be decided for each case separately as it arises.

MR. STUART C. CUMBERLAND of mind-reading fame gives a very frank and rational account of his doings, in the December issue of the *Nineteenth century*. As a child, his perceptions were unusually keen. But his career as a mind-reader began only six years ago. His first attempt was entirely impromptu, but was as successful as any afterward. The gift was present; and future practice made it only quicker and more delicate, but not more certain. At first Mr. Cumberland frankly confesses he was apt to imagine himself supernaturally endowed, but soon convinced himself that the whole thing is simply an ingenious and skilled interpretation of the unconscious movements of the subject. 'Willing is either dragging or pushing,' is the mind-reader's formula. 'Distinct and intense apperception, fixed attention is incipient motion,' is the psychologist's conclusion.

The account of Mr. Cumberland's experiences with the nobility and eminence of Europe is extremely readable; but some notice of his general conclusions will be of greater interest here. The best subjects are among active brain-workers, statesmen, scientists, etc., where concentration is easy and usual. Military men make excellent subjects;

lawyers are dodgy and unsatisfactory; musicians cannot fix their attention on any thing but music; artists are better subjects; clergymen are perfect in the drawing-room, but not in public; physicians are good subjects when they have no theory about thought-reading. Von Moltke was the best and M. Dumas the worst subject. Englishmen and Germans are perhaps the best races for subjects; while uncivilized races, such as Chinamen and Indians, are bad. Mr. Cumberland's opinion on thought-reading without contact is well worth quoting in full: "Some mystically inclined people claim to be able to read thoughts without contact. For my part, I have never yet seen experiments of this kind successfully performed, unless there had been opportunities for observing some phase of physical indication expressed by the subject, or unless the operator was enabled to gather information from suggestions unconsciously let fall by somebody around. I have on several occasions managed to accomplish tests without actual contact, but I have always been sufficiently near to my 'subject' to receive from him — and to act upon accordingly — any impressions that he physically might convey."

The power is doubtless not an uncommon one, and is closely allied to the knack for reading character, which is quite common, and to the usual processes by which we detect lies and suspicious persons, or avoid being imposed upon. Mr. Cumberland believes that the process might be of actual use in detecting criminals, and once succeeded in doing this himself. The operation of muscle-reading is a very fatiguing one, and the thing is apt to be overdone by amateurs. Mr. Cumberland's experiences are important, because they will aid in divesting these psychic tricks of the mysterious character so commonly ascribed to them, and in directing popular thought into more rational and healthy channels.

THE PRISONERS OF THE SOUDAN.

WHEN General Gordon fell at Khartoom, it was reported that an Egyptian army far up the Nile, commanded by Emin Bey, continued faithful to the khedive. Since then only vague rumors have reached us; and it was generally believed that Emin Bey and his army had long since been overcome by the mahdi, his followers dispersed, and he himself killed. Within the last month, news has been received that Emin Bey is alive, and, though neglected and forgotten by the khedive

and his English rulers, is still fighting under the Egyptian flag against the followers of the mahdi.

About ten years ago, Emin Bey, then Dr. Schwitzler of Silesia in Austria, went to Egypt and entered the service of the khedive. He soon acquired the confidence of General Gordon, his commanding officer, and was rapidly promoted, and sent on several important missions into the southern part of Egypt. As a reward for his ability and success, he was made Emin Bey. When General Gordon was sent to the Soudan, Emin Bey was given command of the upper Nile, with headquarters at Lado, near Gondokoro. Here he was stationed when General Gordon was sent the second time to the Soudan. General Gordon was soon after besieged in Khartoom by the mahdi, and his communication both with upper and lower Egypt cut off. Emin Bey gradually retreated with his soldiers and their families up the Nile, fighting as he retired, and defeating the mahdi in several battles, until he made a permanent settlement at Wadelai, on the Nile (not far from Lake Albert), at the extreme southern limit of Egypt. His people are negroes from Nubia and the Soudan. For the last two or three years they have supported themselves by the cultivation of the land. "All the stations are busily employed in agricultural work, and at each one considerable cotton plantations are doing well; this is all the more important for us, as it enables us, to a certain extent, to cover our nakedness. I have also introduced the shoemaker's art, and we now make our own soap," writes Emin Bey.

Emin Bey has but two Europeans with him, — Dr. Junker and Captain Cassati. Dr. Junker is a Russian scientist, and, like his friend and former companion, Dr. Schweinfurth, is a distinguished botanist. Eight or ten years ago he went to Africa, and continued the explorations commenced by Dr. Schweinfurth in the valley of the Bahr-el-Gazel, the western branch of the Nile. He also explored the head waters of the Wellé, — one of the largest tributaries of the Kongo, — and afterwards traced the course of another large river, which Dr. Junker himself believed to be the Arouhuimi. The troops of the mahdi overran the country, and Dr. Junker was forced to retire. By great good luck he succeeded in joining Emin Bey, and has remained with him. The other European with Emin Bey is Gaetano Cassati, formerly a captain in the Italian army. He left Italy in 1879, with several other Italians, and landed upon the east coast of Africa. They spent several years in that part of Africa which the Italians have explored, until his companions were killed and he made a prisoner. He finally escaped, and made his way to Emin Bey at Gondokoro.